

# **Facing up to the True Costs and Benefits of Wind Energy**

A necessary step in any attempt to understand the outlook for US  
energy supply and demand

Comments for

The owners and members of

Associated Electric Cooperative, Incorporated

At their 2004 Annual Meeting in

St. Louis, Missouri

By

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June 24, 2004

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## **Facing up to the True Costs and Benefits of Wind Energy**

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Good Morning;

It is a distinct honor and pleasure to have this opportunity to speak to the members and owners of Associated Electric Cooperative, Incorporated.

It is a special honor and privilege for me for two reasons. First, after having spent my military service and college years in Minnesota, I came to regard the Midwest as the “real” America – in contrast to the East and West Coasts. Second, it is a privilege to speak to the members and owners of an organization that places its highest priority on the interest of consumers.

These considerations are important because I have spent most of the past 40 years on the East Coast, with over 30 of those years in the shadow of the Nation’s capital – where reality and facts play such a small role in the decisions and actions of our political leaders and other government officials, and where the interests of consumers and taxpayers are not well represented.

I have had the opportunity to watch some 30 years of government “energy policy” initiatives. Except in the case of electricity, policies relying primarily on market forces have been successful. On the other hand, federal and state attempts to dictate the way that the people of America satisfy their energy requirements – through regulations, tax credits and other subsidies --- have generally been both ineffective and detrimental to the interests of consumers and taxpayers.

That is not a partisan statement. During those 30 years, 7 Presidents from both major parties have occupied the White House, and the US House and Senate have been under the control at one time or another of both major parties. Bad policies and unrealistic objectives – such as “energy independence” -- have been pursued by both parties. For example, federal and state policies are now the driving forces behind current attempts to force greater use of wind to produce electricity – the principal subject that I will talk about today.

“Energy” legislation that would repeat and expand upon bad policies of the past is again pending in the US Congress. Politicians and a horde of lobbyists are using the current high oil and natural gas prices as an excuse to pass that legislation. Hopefully, they will fail.

Most of my working career in the federal government and private sector organizations has been focused on energy matters. Since retiring, I use some of my time to analyze and write about government and private sector energy policies, programs, regulations, and projects that I believe are detrimental to the interests of consumers and taxpayers. This activity, including work on wind energy, is entirely self-financed and is not on behalf of any client or other interest.

It is from the perspective of consumers and taxpayers that I will deal with my assigned topic.

Before dealing with the primary topic, that is the role of wind energy, I will spend a few minutes focusing on data about broader energy and electricity markets. After commenting on the costs and benefits of wind energy, I will deal briefly with the subject of mandated “Renewable Portfolio Standards” or RPS – a topic that apparently is of interest to your political leaders in Missouri. By way of preview, I will tell you now that I believe that “Renewable Portfolio Standards” are the most insidious device yet concocted by regulators and other officials to shift costs from “renewable” energy producers to electric customers and hide those costs in monthly electric bills.

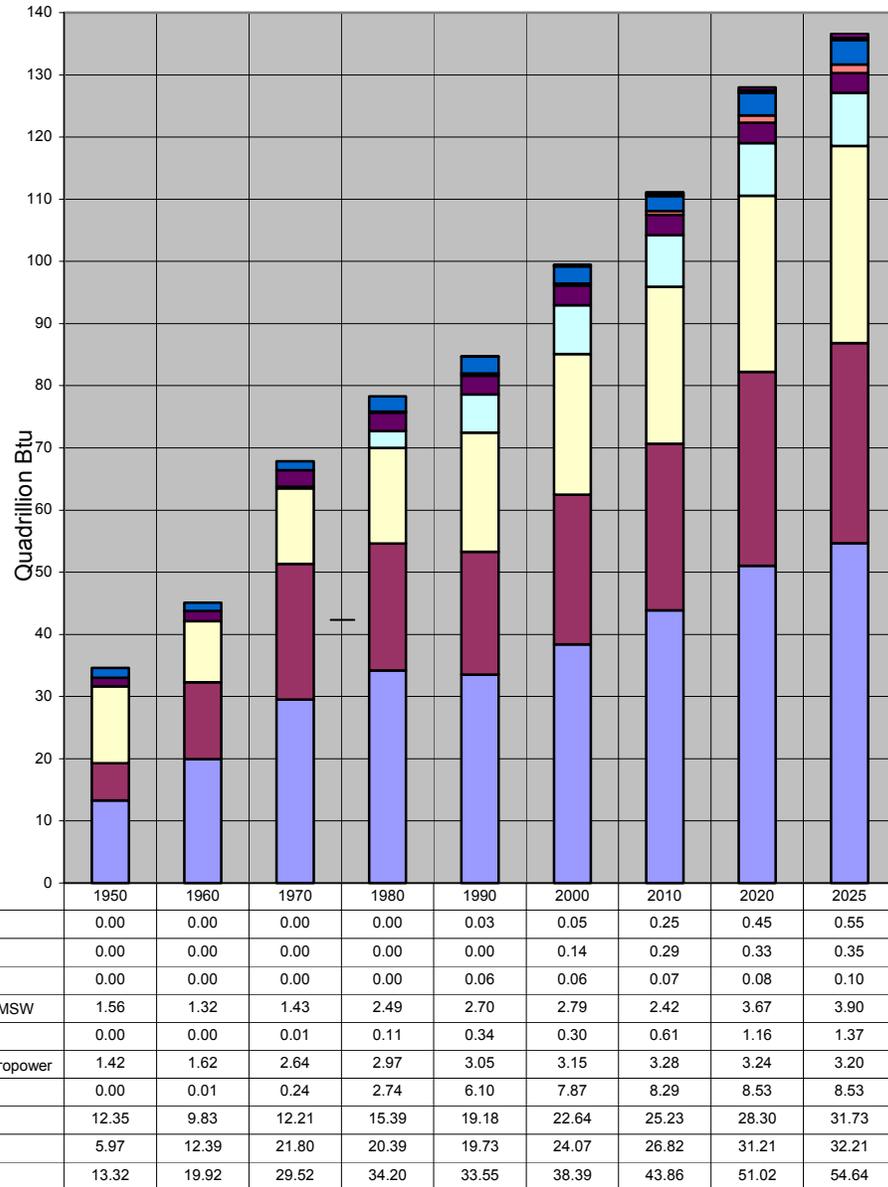
## **1. US Energy Consumption by Energy Source – Recent History and Outlook**

It’s important to look at data on past and projected energy consumption by energy source because those data help put the existing and potential contribution of wind energy into perspective. Nearly all of the data I will use today comes from the US Energy Information Administration (EIA) which is the one part of the US Department of Energy that strives for objectivity in its analyses and reports.

Figure 1, a graph and table shown on the next page, shows actual US energy consumption by energy source for 1950, 1960, 1970, 1980, 1990 and 2000 and EIA’s forecasts for 2010, 2020 and 2025. Several points would be evident if you study the detailed data:

- First, total US energy consumption nearly tripled from 1950 to 2000 – from 34.61 quadrillion Btu to 99.46 Btu. If EIA’s forecasts prove to be correct, energy consumption will grow by another 1/3<sup>rd</sup> from 2000 to 2025.
- Second, “traditional” energy sources – that is, petroleum, coal, natural gas, hydropower and, beginning in 1970, nuclear energy have been and will continue to be the sources of energy that supply US energy requirements.
- Third, so-called “renewable” energy sources – wind, solar, geothermal, biomass and ethanol -- have supplied and will continue to supply only a tiny part of US energy requirements. This is true despite federal and state actions costing hundreds of millions of our tax dollars for R&D, tax breaks and other subsidies and despite numerous requirements to encourage or force consumers to use “renewable” energy.
- Fourth, the overwhelming shares of the so-called “renewable” energy sources have been and will continue to be supplied by wood, biomass and trash (“municipal solid waste” or MSW). The “renewables” being pushed hardest by the federal and state governments – wind, solar, geothermal, and ethanol – supplied less than 1% of our energy in 2000 and, even with EIA’s somewhat ambitious estimates, would be supplying less than 2% of our energy by 2025.

**US Energy Consumption by Energy Source: Actual 1950-2000;  
EIA Forecast 2010-2025**



These exceedingly small shares reflect the fact that renewables are costly in economic and environmental terms – as I will discuss in more detail in the case of wind. They are niche technologies and are highly unlikely to ever supply a significant share of US energy needs. Unfortunately, politicians and certain advocacy groups would like us to believe otherwise. Undoubtedly, they will continue feeding false and misleading information to the public and media claiming that “renewables” offer great promise.

The table below shows the percentages of total US energy consumption from “traditional” and “renewable” sources.

<b>US Energy Consumption by Energy Sources</b>		
	<b>“Traditional” Energy Sources: Petroleum, Coal, Natural Gas, Hydro &amp; Nuclear</b>	<b>“Renewable” Energy Sources: Wind, Solar, Geothermal, Ethanol, Wood, Biomass &amp; MSW</b>
<b>Actual</b>		
1950	95.5%	4.5%
1960	97.1%	2.9%
1970	97.9%	2.1%
1980	96.7%	3.3%
1990	96.3%	3.7%
2000	96.6%	3.4%
<b>EIA Forecast</b>		
2010	96.1%	3.9%
2020	95.6%	4.4%
2025	95.4%	4.6%
Data Source: US Energy Information Administration		

When viewing the above numbers for renewables, please keep in mind that about half of those energy supplies consist of wood and wood waste. The existing and potential contributions of wind, solar, and geothermal energy are very small.

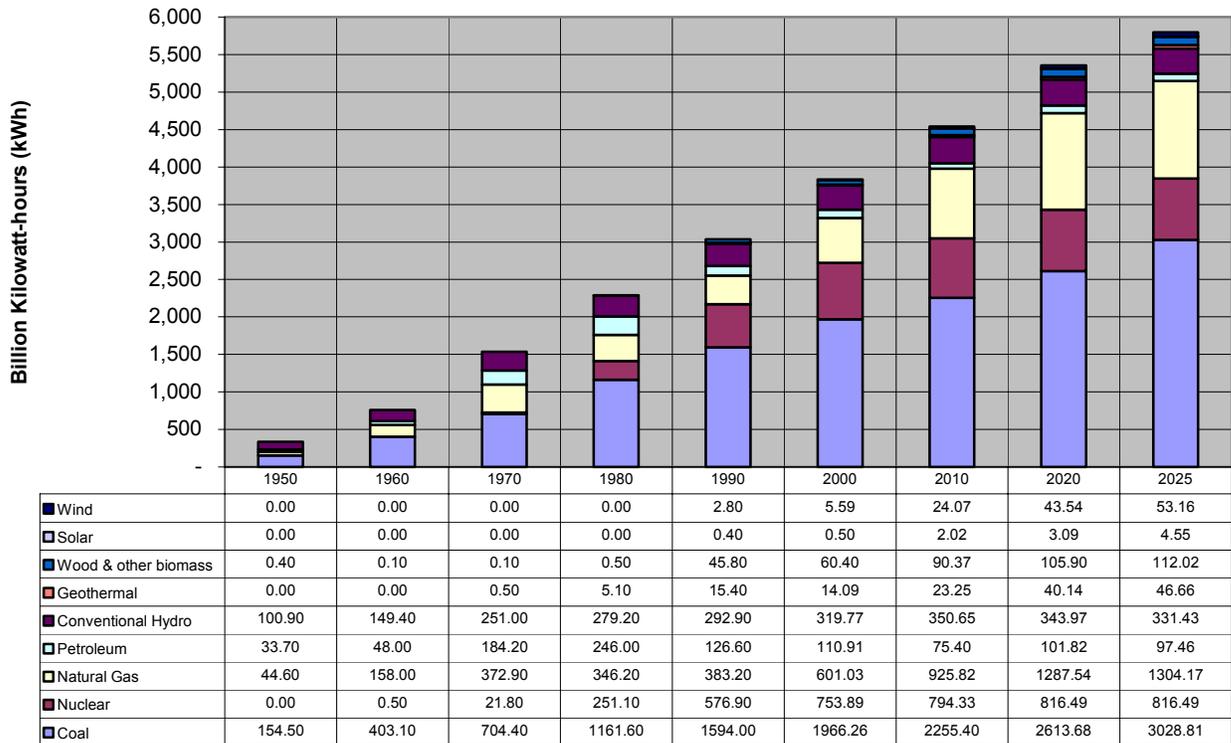
## **2. US Electric Generation by Energy Source – Recent History and Outlook**

It’s also important to look at data on past and projected electric generation by energy source because electric generation is the way that the alleged benefits of wind energy would be captured.

Figure 2, a graph and table shown on the next page, show actual US electricity production by energy source for 1950, 1960, 1970, 1980, 1990 and 2000 and EIA’s forecasts for 2010, 2020 and 2025. The numbers are in billions of kilowatt-hours (kWh). Several points would be evident if you could study the detailed data:

- First, there has been tremendous growth in US electricity production and demand, reflecting both economic growth and increased electrification. Electricity production increased 11-fold from 1950 to 2000; i.e., from 334 billion kWh in 1950 to 3,832 billion kWh in 2000. Electricity production more than doubled from 1970 to 2000.
- Second, as in the case of overall US energy consumption, the overwhelming share has been produced by using the traditional energy sources and that will continue to be the case.
- Third, wood, wood waste and other biomass, and trash (“MSW”) will be providing more than half of the small shares projected to come from “renewables.”

**US Electricity Generation by Energy Source: Actual 1950-2000; EIA  
Forecast 2010-2025**



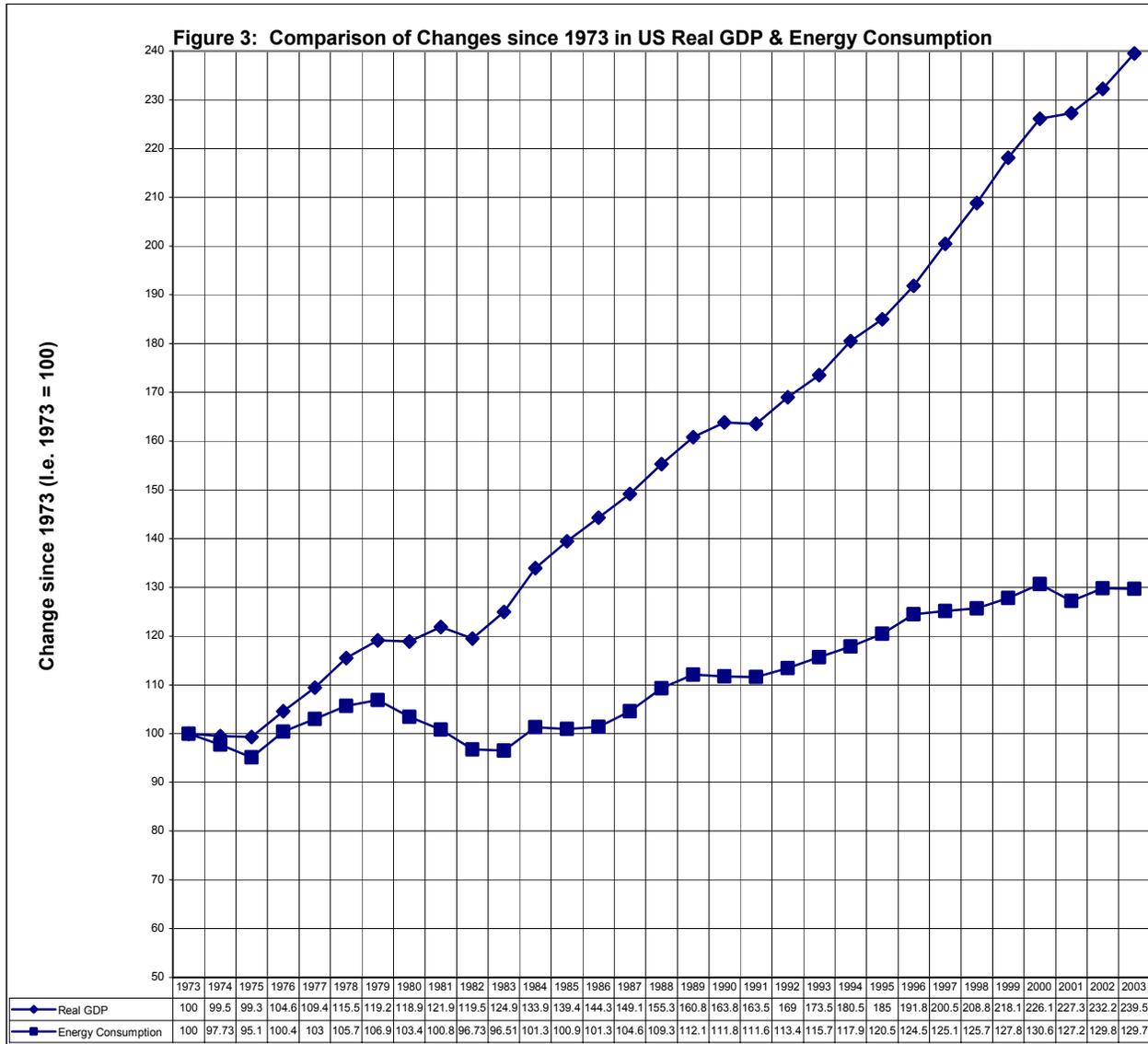
### **3. US Achievements in Energy Efficiency and Conservation**

It is also important to look at the facts about energy efficiency and conservation since developments in those areas have been critically important in our recent energy history and will be in the future. Three points are particularly important.

- a. **First, the US has become much more energy efficient during the past 30 years.** This can be seen quite clearly in Figure 3 on the next page. That graph compares real (i.e., inflation adjusted) US Gross Domestic Product (GDP) and energy consumption, with both indexed to 1973. As you can see, GDP has increased significantly during the 30-year period from 1973 to 2003 – actually by 139.5%. Energy consumption, however, increased by only 29.7%. Thus, our economy is *much less energy intensive* than in the past.
- b. **Second, despite claims by our political leaders, government mandates do not deserve the credit for the significant increases in US energy efficiency.** Instead, four developments during the past 30 years account for most improvements. Specifically:

- 1) **Relatively high prices**, particularly during the 1970s and early 1980s led many individuals and organizations to focus on their energy costs and find ways to reduce those costs *in ways that made sense for them*. For example, they found ways to reduce energy losses, change equipment and processes to reduce energy requirements, and reduce energy-intensive activities. Higher energy costs led to demands for more energy efficient products, which have been finding their way into popular use. Undoubtedly, the relatively high current prices for petroleum products and natural gas will bring about additional efficiency measures.
- 2) **Improved energy efficiency has occurred as an unplanned byproduct of adoption of new technologies.** Examples include computerization, telecommunications and new lighter weight materials. New technologies have *permitted increased productivity and required less energy* than the equipment and activities that were replaced. For example, computers using small amounts of electricity have replaced multiples of electric typewriters, adding machines, calculators, and cash registers. Also, information and data moving electronically has replaced documents that would have required energy to produce paper, electricity to run presses, and motor fuel to move the documents. Lighter materials have meant that the total weight of goods and things (e.g., automobiles) moving from one place to another requires less energy than in the past.
- 3) **The make up of the US economy has changed significantly, resulting in a higher proportion of less energy-intensive manufacturing and services.** Some of the more energy intensive activities have moved to other countries. In addition, the new activities that have been added to US economic activity tend to be less energy intensive than in the past. For example, an increasing share of the nation's economic activity is accounted for by "intellectual property-based" activities (e.g., software) that are less energy intensive.
- 4) **Technological advancements in spin-offs from defense-related R&D have contributed to US energy efficiency.** Perhaps the most obvious example is the fact that Department of Defense (DOD) sponsored work on aircraft engines and advanced materials has contributed directly to the increased efficiency in gas-turbine based electric generating units.

US Department of Energy (DOE) officials, various advocacy groups and federal and state political leaders and regulators would like to have us believe that government-mandated energy efficiency standards – e.g., for appliances – have been the driving force in improved US energy efficiency. However, the facts demonstrate that government-mandated efficiency standards for home appliances save *very little energy*. For example, DOE has claimed that its new efficiency standards for clothes washers issued in January 2001 would save "5.52 Quads of energy over 27 years (2004-2030)."<sup>1</sup>



That figure sounds impressive. However, based on EIA's latest forecast of US energy consumption<sup>2</sup> the nation will be using about 3,330 Quads of energy during that period. Thus, DOE's 5.52 Quad estimate equals less than 17/100 of 1% of US energy consumption during *the entire 27-year period*, a truly trivial reduction – particularly when taking into account the fact that DOE typically overstates the potential energy saving benefits of its appliance efficiency standards.

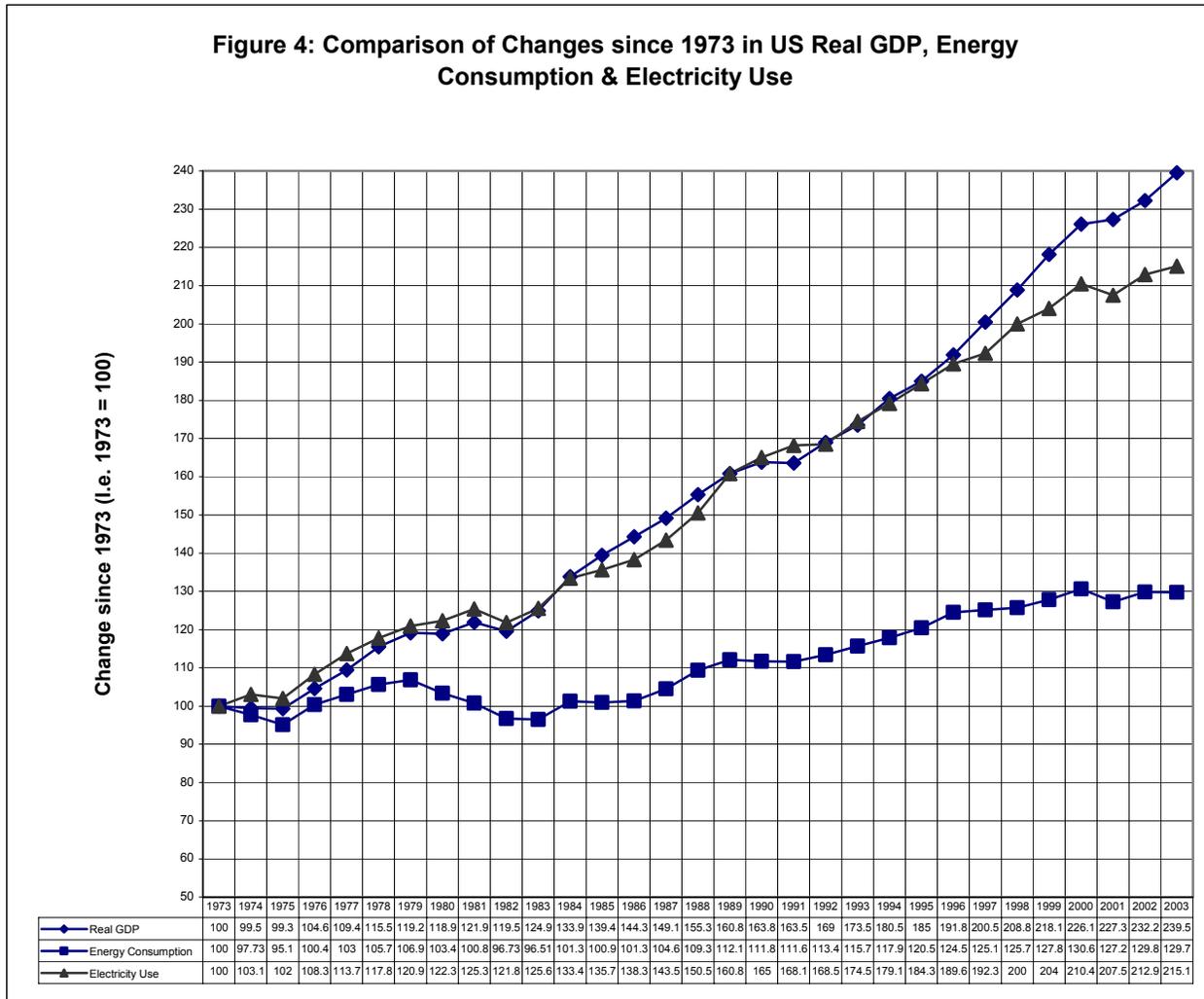
Such small savings are quite typical, despite the fact that DOE efficiency standards impose hundreds of millions of dollars in additional costs on America's consumers – costs that many consumers will never recover through energy savings.

- c. **The third and final point about energy efficiency is that the United States is not the "energy wastrel" that many would like to have us believe.** This is illustrated by the fact that

the US accounts for 29% of the world's Gross Domestic Product (GDP) but it accounts for only 24% of the world's energy consumption.<sup>3</sup>

#### **4. New Energy Supplies will be Required to Support Continuing Economic Growth**

Despite improvements in energy efficiency, additional energy supplies will be required, particularly electricity, if our economy is to continue growing. Figure 4, below, is the same graph shown earlier on the relationship between US GDP and energy consumption, except that a line depicting electricity use has been added.



As you can see, growth in electricity demand paralleled growth in GDP for many years but, due to improved energy efficiency, electricity demand has been growing more slowly than GDP since 1996. Still, electricity demand is continuing to grow significantly. EIA projects growth nationally of only 1.8% per year.<sup>4</sup> That seems to be low – at least when compared to Associated's member sales which appear to be growing about 2.9% per year on average.

## **5. The True Cost of Electricity from Wind is Much Greater than the Benefits**

Now let's turn to the subject of wind energy. The productive use of energy from wind certainly is not new. For decades, windmills have been used effectively to grind grain, pump water, and charge batteries to store electricity in areas not served by electric distribution lines.

*The new factors are the attempts by governments to force the use of this niche technology to produce significant amounts of electricity commercially.*

**a. Wind Advocates' False and Misleading Claims.** I won't spend a lot on the claimed virtues of wind energy because you undoubtedly have seen and heard those claims in the media and from other sources. The wind industry, with substantial help from the US Department of Energy, DOE's National Renewable Energy "Laboratory" (NREL), and other wind energy advocates – using false and misleading information -- has been highly successful in publicizing its claims. In summary, they would have us believe that:

- Wind energy can make a significant contribution toward supplying US energy requirements.
- Wind energy is environmentally benign.
- Electricity produced from wind would permit offsetting large amounts of emissions that would otherwise be produced by generating plants fueled with coal, natural gas, or oil.
- Electricity produced from wind costs only slightly more than electricity produced by traditional energy sources.
- "Wind farms" can make a significant contribution to rural economic development.
- Greater US reliance on electricity from wind would help reduce dependence on imported oil.
- Wind energy is not getting its "fair" share of taxpayer and consumer-financed subsidies.

Such claims have led federal and state political leaders and regulators to provide massive subsidies for wind energy and requirements that force increased use of electricity generated by wind and other "renewable" energy sources.

In fact, officials of DOE, NREL, the wind industry, and various wind advocacy groups have misled the public, media, Congress, and state government officials in their efforts to force expensive, poor quality electricity from "wind energy" on to the people of America. They have:

- Greatly *overstated* the environmental, energy and economic *benefits* of "wind energy," and
- Greatly *underestimated* the true cost of wind energy, as well as the adverse environmental, ecological, scenic, and property value impacts.

**b. Ten Truths about Wind Energy.** However, in recent months the truths about "wind energy" are emerging and citizen opposition to "wind farms" is growing in various parts of the US and in other countries, including the UK, Germany, Spain, Denmark, Italy, and Australia. I will summarize for you this morning the information that is emerging that runs counter to the DOE and wind industry claims.

There are at least 10 major reasons why construction of so-called “wind farms” are detrimental to the interests of citizens, consumers and taxpayers and why current efforts to extend or expand federal and state subsidies for wind energy or to mandate use of wind energy should be opposed.

- 1) **Tax avoidance – not environmental and energy benefits – has become the prime motivation for building “wind farms.”** Perhaps federal and state government officials have not yet recognized how overly generous they have been to “wind farm” owners, or that their largess merely shifts huge amounts of cost from “wind farm” owners to ordinary taxpayers and electric customers.

The enormity of the tax avoidance benefits of “wind farms” can be illustrated by a project planned in Iowa by MidAmerican Energy, an electric utility owned by Warren Buffet’s famous company, Berkshire Hathaway. The proposed “wind farm” would consist of 180 to 200 wind turbines, each with a capacity of 1.5 to 1.65 megawatts (MW) and total capacity of 310 MW. (The rated capacity of the project is about the same as Associated’s 303 MW Thomas Hill unit #2 but it would be spread over hundreds of acres, it would produce less than a third of the electricity, and it would produce the electricity only when the wind is blowing within the right speed range.)

MidAmerican Energy estimates that the project would cost \$323 million, not counting necessary additions to transmission capacity.

“Wind farm” owners enjoy two very generous federal tax breaks:

- Five-year double declining balance accelerated depreciation (5-Yr., 200%DB), and
- Production Tax Credit of \$0.018 for each kWh of electricity produced during the first 10 years of project operation.

Since Iowa conforms its state corporate income tax to the federal system, the 5-yr, 200% DB depreciation could also be deducted from otherwise taxable income in Iowa, thus reducing corporate tax liability in that state.

- a) **Accelerated Depreciation.** The following below shows the tax avoidance benefits at the federal and state (Iowa) level due to a “normal” application of 5-Yr. 200% accelerated depreciation for the owner of a \$323 million “wind farm.”

If this project were placed in service before January 1, 2005, it would qualify for a “bonus” depreciation deduction of 50% of its cost in the first tax year for federal corporate income tax purposes. This means that the full first year depreciation for property qualifying for 5-Yr. 200% DB treatment would be able to deduct from otherwise taxable income a total of 60% of the cost in the first tax year, 16% in the second tax year, 9.6% in the third year and the remaining 14.4% in the ensuing three tax years.

<b>Accelerated Depreciation Benefits for a \$323 million capital investment in a “wind farm”</b>
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Tax year	Depreciation %	Deduction from Federal & State taxable income	Reduction in Corporate Income Tax Liability	
			Federal - assuming 35% marginal tax rate	State (Iowa) – assuming 12% marginal tax rate
1 <sup>st</sup>	20%	\$64,600,000	\$22,610,000	\$7,752,000
2 <sup>nd</sup>	32%	\$103,360,000	\$36,176,000	\$12,403,200
3 <sup>rd</sup>	19.2%	\$62,016,000	\$21,705,000	\$7,441,920
4 <sup>th</sup>	11.52%	\$37,209,000	\$13,023,360	\$4,465,152
5 <sup>th</sup>	11.52%	\$37,209,000	\$13,023,360	\$4,465,152
6 <sup>th</sup>	5.76%	\$18,604,800	\$6,511,680	\$2,232,576
Total	100%	\$323,000,000	\$113,050,000	\$38,760,000

- b) **Wind Production Tax Credit.** The second very generous federal tax break for wind energy is the wind “Production Tax Credit” which allows a “wind farm” owner to deduct from federal income tax liability \$0.018 per kWh of electricity produced commercially during the first 10-years of the project life. This tax credit expired at the end of 2003 but efforts are underway in the US Congress to restore the credit, perhaps retroactively. Unfortunately for ordinary taxpayers, the efforts to restore the credit probably will be successful.

If MidAmerican Energy’s proposed 310 MW “wind farm” achieved a 30% capacity factor, it would produce 814,660,000 kWh of electricity each year (i.e., 310,000 kW x 8760 hours per year x .30 capacity factor). Production of that amount of electricity would provide a deduction from federal tax liability of \$14,664,240 per year for 10 years, or a total of \$140,664,240.

- c) **State tax breaks.** The State of Iowa also permits local governments to exempt “wind farms” from 70% to 100% of the property taxes that would normally be paid.

Tax breaks used by “wind farm” owners mean that the tax burden they escape is shifted to ordinary taxpayers. When considering the magnitude of these tax breaks, it’s useful to keep in mind that, according to Mr. Buffett, MidAmerican Energy’s total tax payments (federal, state and local) totaled \$100 million in 2002 and \$251 million in 2003.<sup>5</sup> The proposed “wind farm” would significantly reduce MidAmerican’s tax liability.

*Revenue from electricity sales.* In addition to these enormous tax benefits, the owner of a “wind farm” would receive revenue from the sale of the electricity that is produced. If the “wind farm” produced at a 30% capacity factor and the owner were able to sell the electricity for \$0.03 per kWh, the annual revenue would be \$24,449,400 (i.e., 814,680,000 kWh x \$0.03).

In Iowa, there is a virtually guaranteed market for electricity produced from “renewable” sources due to the State’s “Renewable Set Asides” requirement applicable to investor-owned utilities and “Mandatory Green Power Option” applicable to all utilities. Under the latter requirement, utilities must provide their customers the “opportunity” to purchase the electricity produced from renewables at a premium price.

- 2) **Huge windmills – often taller than the US Capitol -- produce very little electricity.** Due to exceedingly generous tax breaks and other federal and state subsidies, there are

more than 20,000 windmills scattered across thousands of acres of land in 30 states. Over 15,000 windmills were built in California during the 1980s due to a generous federal investment tax credit. Many of those windmills have been abandoned.

About 88% of the 6,370 megawatts (MW) the currently operable wind turbine capacity is located in six states: California, Texas, Minnesota, Iowa, Washington and Oregon.

If those thousands of windmills average a generous 25% capacity factor, the total amount of electricity produced annually would be 13,950,300,000 kilowatt-hours.<sup>6</sup> That sounds like a lot of electricity. However, that amount of electricity would be:

- Equal to 36/100 of 1% of the 3,831,000,000,000 kWh of electricity produced in the US during 2002.
- Much less (13.5%) than the electricity produced during 2003 by Associated's 1,200 MW New Madrid and 1,153 MW Thomas Hill coal-fired generating stations (which stations produced 16,121,059,000 kWh).
- Less than would be produced annually by four 500 MW base load natural gas fired combined-cycle generating units operating at an 80% capacity factor (14,016,000,000 kWh). Such units would be comparable to Associated's Chouteau and St Francis units. Those units occupy only a few acres and can be located near load centers, reducing line losses and holding down transmission costs.

Note also that, even with the generous tax breaks and subsidies, the US Energy Information Administration (EIA) doesn't expect wind to supply even 1% of US electricity by 2025! EIA's ambitious estimate of less than 1% contrasts with DOE's totally unrealistic "goal" of obtaining 5% of US electricity from wind by 2020.

- 3) **Electricity from wind turbines has less real value than electricity from reliable generating units, and they detract from electric system reliability.** Wind turbines produce electricity only when the wind is blowing within the right speed range. Today's models may begin producing some electricity at wind speeds of about 8 miles per hour (MPH), reach rated capacity around 33 MPH, and cut out around 56 MPH. Because their output is intermittent, volatile and largely unpredictable, the electricity they produce has less value than electricity from reliable ("dispatchable") generating units.

Electricity grids must be kept in balance (supply & demand, voltage, frequency), so one or more reliable, dispatchable generating units must be immediately available at all times to "back up" the unreliable wind generation. The reliable, backup units must ramp up and down to balance the output from the wind turbines. Wind turbines detract from grid reliability and would be of no value in restoring an electric grid when there is a blackout. Wind turbines have virtually no "capacity" value.

- 4) **The true cost of electricity from wind energy is much higher than wind advocates admit.** Wind energy advocates like to ignore key elements of the true cost of electricity from wind, including:
- The cost of tax breaks and subsidies which, as indicated above, shift tax burden and costs from “wind farm” owners to ordinary taxpayers and electric customers.
  - The cost of providing backup power to balance the intermittent and volatile output from wind turbines.
  - The full, true cost of transmitting electricity from “wind farms” to electric customers. “Wind farms” are highly inefficient users of transmission capacity. Capacity must be available to accommodate the total rated output but, because the output is intermittent and volatile, that transmission capacity is used only part time. The wind industry seeks to avoid these costs by shifting them to electric customers.
  - The extra burden on grid management.
- 5) **Claims of environmental benefits of wind energy are exaggerated.** The wind industry likes to claim that electricity from wind offsets emissions that would be produced by fossil-fueled generating units. However, they typically overstate the potential emission offset, ignore the fact that backup generating units must be immediately available and running at less than their peak efficiency or in spinning reserve mode. The backup units continue to emit while in these modes. Also, the generation that may be offset may not be powered by fossil fuels.
- 6) **“Wind farms” have significant adverse impacts on environmental, ecological, scenic and property values and create potential hazards to health and safety.** Citizens in various states (and other countries) where “wind farms” have been constructed have become painfully aware that – in addition to the high true cost of the electricity -- “wind farms” impair environmental, ecological, scenic and property values. Among the adverse impacts are noise, bird kills, interference with bird migration paths and animal habitat, destruction of scenic vistas and ecological rarities (such as the Flint Hills and Tallgrass Prairie in Kansas), aircraft warning lights, blade “flicker,” spoiling the lives of neighbors and lowering the value of properties located near the huge structures.
- 7) **“Wind farms” produce few local economic benefits and these are overwhelmed by the higher costs imposed on electric customers through their monthly bills.** DOE, the National Renewable Energy Laboratory (NREL) and the wind industry have falsely claimed that “wind farms” provide significant economic benefits in the areas and states where they are constructed.<sup>7</sup> They often claim benefits from the capital investment, jobs, tax revenues, lease payments to landowners, and “other” economic activities. Sometimes they claim increased tourist traffic.

In fact, there are few economic benefits and these are overwhelmed by the higher true cost to electric customers and taxpayers of the electricity produced by the “wind farms”:

- The lion’s share of the capital investment goes for turbines, blades, towers, electronics and related equipment which are produced in other states and, often, other countries. Little of the money for equipment and supplies would be spent locally.

- Most of the jobs during construction (which lasts only a few months) are filled by imported workers. For example, only 20 of 200 construction period jobs were filled by local workers in the case of the Top of Iowa “Wind Farm” built in 2001. Only 7 permanent jobs resulted.
- Tax revenues are often small due to generous federal and state tax breaks. Imported workers probably pay income tax in other states.
- Income from “wind farm” lease payments to landowners would have local economic benefit only if that income is spent or invested locally – which is not likely if the landowners are absentee or the income is invested or spent elsewhere.
- Increased tourist traffic, if any, from those wanting to see the huge machines is likely to be temporary because they would have only “curiosity value.” The money that would be spent or invested locally by those who stay away because of the scenic impairment and other adverse impacts on environmental, ecological and property values could easily exceed the income from temporary visitor interest.
- There probably will be an increase in demand locally for sand and gravel for the huge concrete bases for the towers and, perhaps, a few other materials and supplies. Some local businesses may see temporary increases in business during construction (e.g., restaurants).

These minimal economic benefits will be much more than offset by:

- First and foremost, the increase in electric customers’ monthly bills – because electricity produced from wind is more expensive -- will be many times the economic benefit. If the electricity from MidAmerican Energy’s proposed “wind farm” (identified earlier) were to cost only \$0.015 per kWh more than electricity from other sources, the extra cost borne by electric customers would be \$12,220,200 per year. (Keep in mind that higher costs for electricity mean that less money is available to consumers to spend for food, clothing, shelter, education, medical expenses and other needs, thus lowering economic activity.)
- The cost of repairing roads damaged by the construction traffic (unless paid by the “wind farm” owner) and the additional cost of government services (e.g., police, fire protection) due to the existence of the “wind farm.”
- Other potential losses of economic activity; e.g., less tourism, less interest in moving to the area if it is one dependent on attracting people for primary or second homes, and the related negative economic impacts.

In fact:

- It many cases, it would be cheaper for electric customers to take up a collection and pay landowners not to allow wind turbines on their property!
- In states such as Iowa where most large “wind farms” are owned by out-of-state companies, there would be a net outflow of wealth (dollars) from the state because of the “wind farm.” Because of the high true costs of electricity from wind, the outflow may even be greater per kWh than for electricity produced from imported energy sources.<sup>8</sup>

**8) Various other subsidies shift large amounts of cost from “wind farm” owners to ordinary taxpayers and electric customers.** The wind industry benefits from many other subsidies not mentioned above. These include:

- DOE funding (now totaling several hundred millions of dollars) for wind energy R&D.
- Guaranteed markets for electricity (even though the prices are above market) as a result of the insidious “renewable portfolio standards” that are imposed in several states.
- Additional markets due to mandated purchases of “green electricity” by federal and state government agencies at above market prices – with the costs offset from the agencies’ other programs. For example, forced purchases by the military services mean less money available for training, weapons and other equipment.
- State programs requiring or encouraging electric utilities to offer “green” electricity at premium prices, seldom attract enough “volunteers” to pay the utilities’ costs of buying the “green” electricity and administering the program. (The cost not recovered from customers paying premium prices is spread to all other customers.)

**9) The big “winners” are “wind farm” owners and a few landowners who lease their land.** Electric customers and taxpayers are the big “losers.” First, as demonstrated above, “wind farm” owners benefit enormously from the generous tax breaks and other subsidies that shift tax burden ordinary taxpayers. “Wind farm” owners also benefit from the revenue from the sale of electricity while shifting costs (e.g., backup generation and transmission costs) to electric customers.

Secondly, a few landowners who lease their land may be “winners” but their neighbors are the “losers.” For example, landowners who lease land at the rate of \$5,000 per MW of wind turbine capacity would derive income of \$500,000 per year. However, if that “wind farm” achieved a 30% capacity factor and the electricity cost consumers only an extra \$0.015 per kWh, the extra cost to electric customers would \$3,942,000 per year<sup>9</sup> or nearly 8 times the income received by the few landowners. That is why it would be cheaper for the electric customers to pay the landowners to NOT allow wind turbines to be built on their land!

To repeat, the big “losers” when “wind farms” are built are the electric customers who pay the higher true cost of electricity produced by the “wind farms” and ordinary taxpayers who absorb the tax burden escaped by the owners.

- 10) Some in the wind industry and their advocates in DOE may claim that “wind energy” deserves the huge tax breaks and other subsidies because other energy sources have received even larger government-imposed benefits.** Ideally, subsidies for all energy sources would be reduced significantly, but the wind argument is fundamentally flawed because it does not take into account either the existing or potential contribution of wind energy in supplying US energy requirements.

My preliminary estimates indicated that tax breaks and subsidies for wind energy from the first few items in the above list will easily exceed \$300 million in 2002 and may be higher in the years ahead.

The wind industry’s claims that it does not get its fair share of government subsidies should be considered in light of the small contribution that wind is expected to contribute in supplying US energy requirements. This small contribution (despite the enormous growth in subsidies) can be seen in the following table that is based on the Energy Information Administration’s (EIA) Annual Energy Outlook 2004.

<b>US Energy Consumption by Energy Source: 2000 Actual and EIA Forecast for 2025</b>				
Energy Source	Actual 2000		EIA Forecast for 2025	
	Quadrillion Btu	% of Total	Quadrillion Btu	% of Total
<b>Traditional Sources</b>				
Petroleum products	38.39	38.60%	54.64	40.01%
Natural Gas	24.07	24.20%	32.21	23.58%
Coal	22.64	22.76%	31.73	21.14%
Nuclear Power	7.87	7.91%	8.53	6.25%
Conventional Hydropower	2.84	2.86%	3.17	2.32%
Other	0.31	0.31%	0.03	0.02%
Sub-Total – Traditional	96.12	96.64%	130.31	95.41%
<b>Non-Hydro Renewables</b>				
Geothermal	0.30	0.30%	1.37	1.00%
Wood	0.41	0.41%	0.41	0.30%
Other Biomass	2.07	2.08%	3.09	2.26%
Municipal Solid Waste	0.31	0.31%	0.40	0.29%
Solar Thermal, electric & hot water	0.06	0.06%	0.09	0.07%
Solar Photovoltaic	0.00	0.00%	0.01	0.01%
Ethanol	0.14	0.14%	0.35	0.26%
Wind	0.05	0.05%	0.55	0.40%
Sub Total – Non-Hydro renew.	3.34	3.36%	6.27	4.59%
<b>Total</b>	<b>99.46</b>	<b>100%</b>	<b>136.58</b>	<b>100%</b>

As the table shows, fossil energy sources (petroleum, natural gas and coal, combined) are expected to supply 84.73% of US energy requirements in 2025 – or 212 times the 40/100 of 1% expected from wind. If wind subsidies totaled \$300,000,000 in 2002, the

industry's "fair share" argument would suggest that subsidies for fossil energy sources should be at least \$63,600,000,000! Clearly, the wind industry's claim is without merit.

Some wind energy advocates have claimed that wind energy could help reduce US dependence on imported oil. That claim is false because very little electricity is produced by oil-fired generating units (less than 3%) and that share is decreasing steadily. Older oil-fired units are being replaced with units using other energy sources (usually natural gas). Oil-fired turbines are used only when required to satisfy peak demand and intermittent wind turbines cannot be counted on to supply electricity during peak periods.

- c. **Despite facts, it's hard to reverse bad government policies and programs.** Clearly, wind energy advocates in the US Department of Energy (DOE), DOE's National Renewable Energy "Laboratory" (NREL) and the wind industry have been successful in spreading their claims. Many in governments, the media and the public have believed those claims and now speak favorably about "wind energy" but without ever having tested their accuracy.

As "wind farms" have spread, citizens' groups in the US and other countries have begun evaluating, challenging and exposing false and misleading claims made by the advocates. However, citizens' groups that challenge government wind energy policies face an uphill battle. Strong constituencies always coalesce around and fight to continue and expand government policies, programs and regulations that provide hundreds of millions of dollars in generous tax breaks and other subsidies. The wind industry and its supporters – with so much taxpayer and electric customer money available to them – can easily afford political contributions and other lobbying efforts to achieve their objectives.

Also, the wind industry has ready access to and support from DOE officials who control the flow of tax dollars for renewable energy programs, as well as NREL and other DOE contractor employees who – using taxpayer dollars -- aid the wind industry's lobbying and public relations efforts. These officials and employees actively participate in the development and distribution of biased "studies," "analyses," and "reports" that overstate the benefits and understate the true costs of wind energy.<sup>10</sup> Their actions suggest that their loyalty is to the interests of the wind industry, not those of taxpayers and consumers.

Ideally, citizens would have an avenue for redress via the US Congress, but that avenue is effectively closed off by (a) the dominance of the DOE-NREL-wind industry lobbying and PR efforts, and (b) the fact that members of Congress and their staffs are much more responsive to special interests than to the interests of ordinary taxpayers and consumers.

## **6. Renewable Portfolio Standards – An Insidious Device to Shift Costs to Consumers**

Fortunately, the leading "energy" legislation pending in the US Congress does not provide for nationwide "Renewable Portfolio Standards" (RPS). As you probably know, a "Renewable Portfolio Standard" or RPS would set some minimum amount or percentage of electricity that a distribution company would have to produce or purchase and make available to its customers. The "standard" would have to be met even though electricity produced from "renewable" sources was substantially more costly than electricity from "traditional" sources.

Renewable Portfolio Standards have been adopted in several states, including Iowa, and are being considered actively by other states, including Missouri.

Such standards benefit wind and other “renewable” electricity producers at the expense of electric customers. I mentioned earlier that (a) Renewable Portfolio Standards are one of the many subsidies being provided for wind energy and (b) that I believe Renewable Portfolio Standards are one of the most insidious ways yet developed to shift costs from renewable developers to ordinary electric customers – and to hide those costs in monthly electric bills.

It’s important to note that most advocates of RPS do NOT consider hydropower as an acceptable “renewable” energy source. Instead, the standard would have to be met with electricity produced from geothermal, solar, wind or certain biomass sources.

Many utilities, usually in order to comply with statutes or regulations, offer their customers the option of paying a premium price for electricity that is (allegedly) produced from one of the accepted “renewable” energy sources.

However, relatively few customers sign up for these programs. On average, less than 1% of the electric customers have signed up to pay the premium prices. The revenue that is received from the few customers who sign up generally is not sufficient to cover the higher cost of the electricity and the cost of administering the program. Since the utility subject to an RPS must recover its costs, the portion of those costs *not* paid by volunteers is likely to be spread over all other electric customers and collected through monthly electric bills – often without the customers’ specific knowledge.

The practical result for producers of electricity from “renewables” is that they have a government-created “market” for their expensive products. RPS are, in effect, a device to “tax” electric customers for the benefit of producers of high cost electricity from “renewables.” That’s why I consider RPS as an insidious device.

If you agree, I hope you will work to convince your federal and state legislators to avoid establishing either a national or state RPS.

## **7. Conclusions**

In summary, I believe the facts support the following conclusions concerning our national energy outlook and the role of wind energy:

- The US has been, is now, and will almost certainly continue for decades to be heavily dependent on coal, petroleum, natural gas, hydropower and nuclear energy to meet our energy requirements.
- Despite the hundreds of millions of tax dollars spent on R&D and the other generous subsidies, there is no serious possibility that non-hydro “renewable” energy sources will make a significant contribution toward supplying US energy requirements.

- Improvements in energy efficiency and reductions in energy intensity have enabled the US to continue economic growth while holding down energy demand and energy costs. However, those improvements should not be attributed to government-mandated standards, which have imposed hundreds of millions of dollars in additional costs on the nation's consumers.
- The wind industry, DOE and its national laboratories, and other wind energy advocates have misled the public, media, Congress and state legislators and regulators with their claims about the benefits of wind energy. In fact, they have greatly overstated the benefits and understated the true costs.
- Federal and state government actions designed to force greater reliance on wind and other non-hydro renewable energy sources are:
  - Distorting capital investment by steering capital to projects that have little merit.
  - Producing significant transfers of wealth from taxpayers and electric customers to owners of "wind farms" and other renewable energy production facilities.

These effects are particularly true in the case of the generous federal and state tax breaks and "Renewable Portfolio Standards."

- The people of America are not being well served by federal and state government officials who:
  - Fail to understand the facts about the nation's energy situation and outlook,
  - Continue pursuing energy policies that are costly and ineffective, and
  - Cater to special interest groups at the expense of consumers and taxpayers.

Thank you for your attention. I would be pleased to answer any questions you have about my comments.

## Endnotes

<sup>1</sup> *Federal Register*, Volume 66, pages 3316ff, January 12, 2001. DOE Technical Support Document.

<sup>2</sup> US Energy Information Administration, *Annual Energy Outlook 2004*, Table A2 and Supplemental Table 2.

<sup>3</sup> US Energy Information Administration, *International Energy Outlook 2004*, Table A3, p. 166.

<sup>4</sup> US Energy Information Administration, *Annual Energy Outlook 2004*, Table A8.

<sup>5</sup> Mr. Buffett's February 27, 2004, Chairman's Annual Letter to Shareholders, Berkshire Hathaway, p. 14.

<sup>6</sup> That is, total capacity of 6,370,000 kW of rated capacity x 8760 hours per year x .25 capacity factor.

<sup>7</sup> The National Renewable Energy Laboratory (NREL) recently released an economic model, called JEDI, that allegedly would permit calculating local economic impacts of a "wind farm." Analysis of the model revealed that it is deficient in many ways and grossly overstates local economic benefits and understates economic costs.

<sup>8</sup> There is a further risk that state and local government officials need to consider. It is quite common for owners of "wind farms" to place the title in single asset limited liability companies (LLCs). Because of the huge front end

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loading of tax benefits, there could be a big incentive for “wind farm” owners to sell or abandon wind facilities if performance deteriorates or maintenance, repair and replacement costs escalate. As occurred in California (where hundreds of windmills were built in response to big tax incentives in the 1980s), localities could be faced with the problem of deteriorating and abandoned windmills after the tax benefits for “wind farms” have been captured by the original owners.

<sup>9</sup> That is, 100,000 kW capacity x 8760 hours per year x .30 capacity factor x \$0.015 per kWh = \$3,942,000.

<sup>10</sup> For example, NREL recently released an economic “model” (labeled JEDI -- Jobs and Economic Development Impact or WIM -- Wind Impact Model) that allegedly permits calculating local and/or state economic benefits that flow from construction and operation of a “wind farm.” Analysis demonstrates that the model relies on assumptions that produce overestimates of economic benefits and fails to consider many costs resulting from “wind farms.” This is but one example of NREL and DOE’s Office of Energy Efficiency and Renewable Energy (DOE-EERE) documents that overstate benefits and underestimate costs of wind energy.