Response for Document 80001

80001-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80002

WindEISArchives

From: windeiswebmaster
Sent: Monday, September 13, 2004 7:15 AM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80002

AECI_Facing_up_to_the_True_Cos...

Thank you for your comment, Glenn Schleede.

The comment tracking number that has been assigned to your comment is 80002. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 13, 2004 07:14:56AM CDT

Wind Energy EIS Draft Comment: 80002

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Privacy Preference: Don't withhold name or address from public record
Attachment: C:\Documents and Settings\Owner\My Documents\AECI Facing up to the True Costs & Benefits of Wind Energy 062404 Final.pdf

Comment Submitted:
It seems quite clear that DOI, BLM and the drafters of the EIS have been unduly influenced and misled about the true costs and benefits of wind energy by the wind industry, US Department of Energy & the National Renewable Energy "Laboratory."

Questions about submitting comments over the Web? Contact us at: windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

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

Glenn R. Schleede

June 24, 2004

Facing up to the True Costs and Benefits of Wind Energy

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for US energy supply and demand

– Contents –

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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 1/3rd 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.

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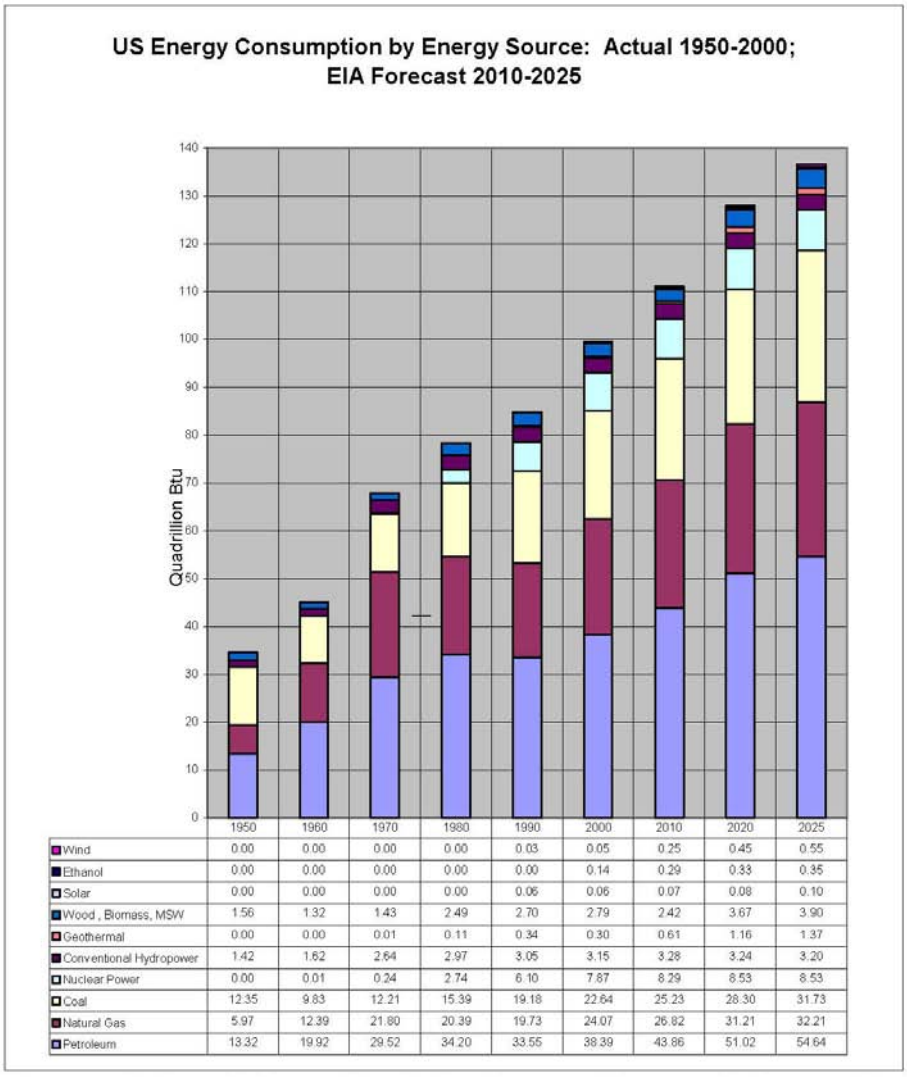


	1950	1960	1970	1980	1990	2000	2010	2020	2025
Wind	0.00	0.00	0.00	0.00	0.03	0.05	0.25	0.45	0.55
Ethanol	0.00	0.00	0.00	0.00	0.00	0.14	0.29	0.33	0.35
Solar	0.00	0.00	0.00	0.00	0.06	0.06	0.07	0.08	0.10
Wood , Biomass, MSW	1.56	1.32	1.43	2.49	2.70	2.79	2.42	3.67	3.90
Geothermal	0.00	0.00	0.01	0.11	0.34	0.30	0.61	1.16	1.37
Conventional Hydropower	1.42	1.62	2.64	2.97	3.05	3.15	3.28	3.24	3.20
Nuclear Power	0.00	0.01	0.24	2.74	6.10	7.87	8.29	8.53	8.53
Coal	12.35	9.83	12.21	15.39	19.18	22.64	25.23	28.30	31.73
Natural Gas	5.97	12.39	21.80	20.39	19.73	24.07	26.82	31.21	32.21
Petroleum	13.32	19.92	29.52	34.20	33.55	38.39	43.86	51.02	54.64

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.

US Energy Consumption by Energy Sources		
	"Traditional" Energy Sources: Petroleum, Coal, Natural Gas, Hydro & Nuclear	"Renewable" Energy Sources: Wind, Solar, Geothermal, Ethanol, Wood, Biomass & MSW
Actual		
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%
EIA Forecast		
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

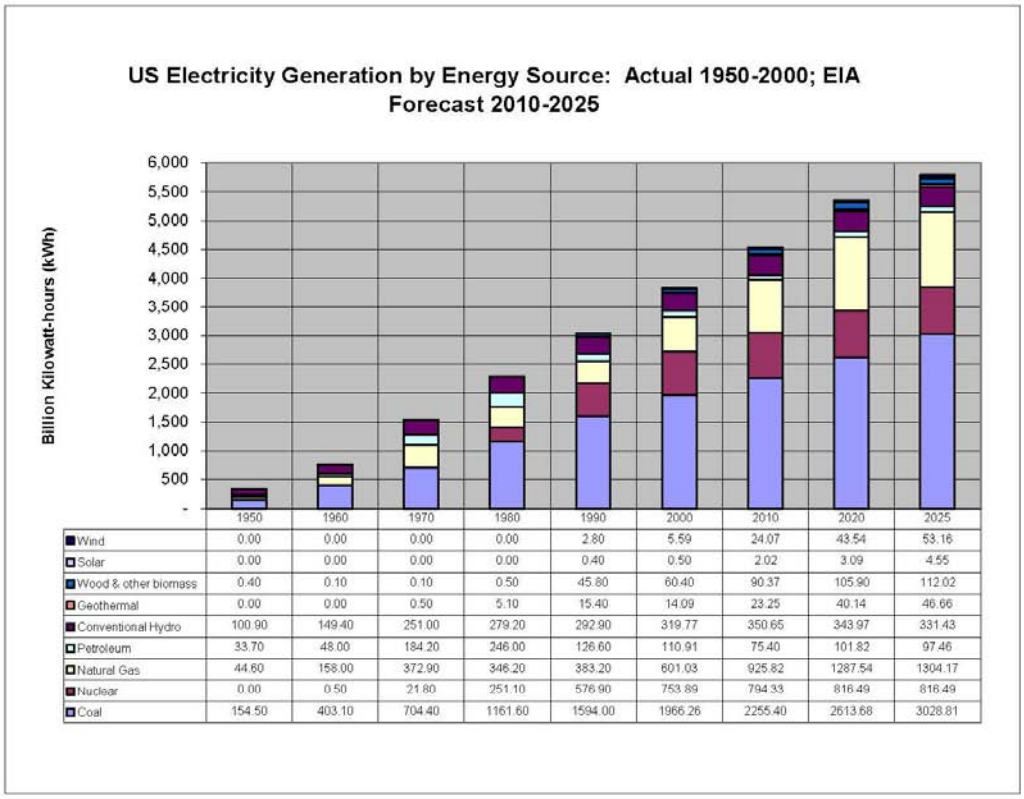
It's also important to look at data on past and projected electric generation by energy source because electric generation is the way that the alleged benefits of wind energy would be captured.

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."



	1950	1960	1970	1980	1990	2000	2010	2020	2025
Wind	0.00	0.00	0.00	0.00	2.80	5.59	24.07	43.54	53.16
Solar	0.00	0.00	0.00	0.00	0.40	0.50	2.02	3.09	4.55
Wood & other biomass	0.40	0.10	0.10	0.50	45.80	60.40	90.37	105.90	112.02
Geothermal	0.00	0.00	0.50	5.10	15.40	14.09	23.25	40.14	46.66
Conventional Hydro	100.90	149.40	251.00	279.20	292.90	319.77	350.65	343.97	331.43
Petroleum	33.70	48.00	184.20	246.00	126.60	110.91	75.40	101.82	97.46
Natural Gas	44.60	158.00	372.90	346.20	383.20	601.03	925.82	1287.54	1304.17
Nuclear	0.00	0.50	21.80	251.10	576.90	753.89	794.33	816.49	816.49
Coal	154.50	403.10	704.40	1161.60	1594.00	1966.26	2255.40	2613.68	3028.81

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.

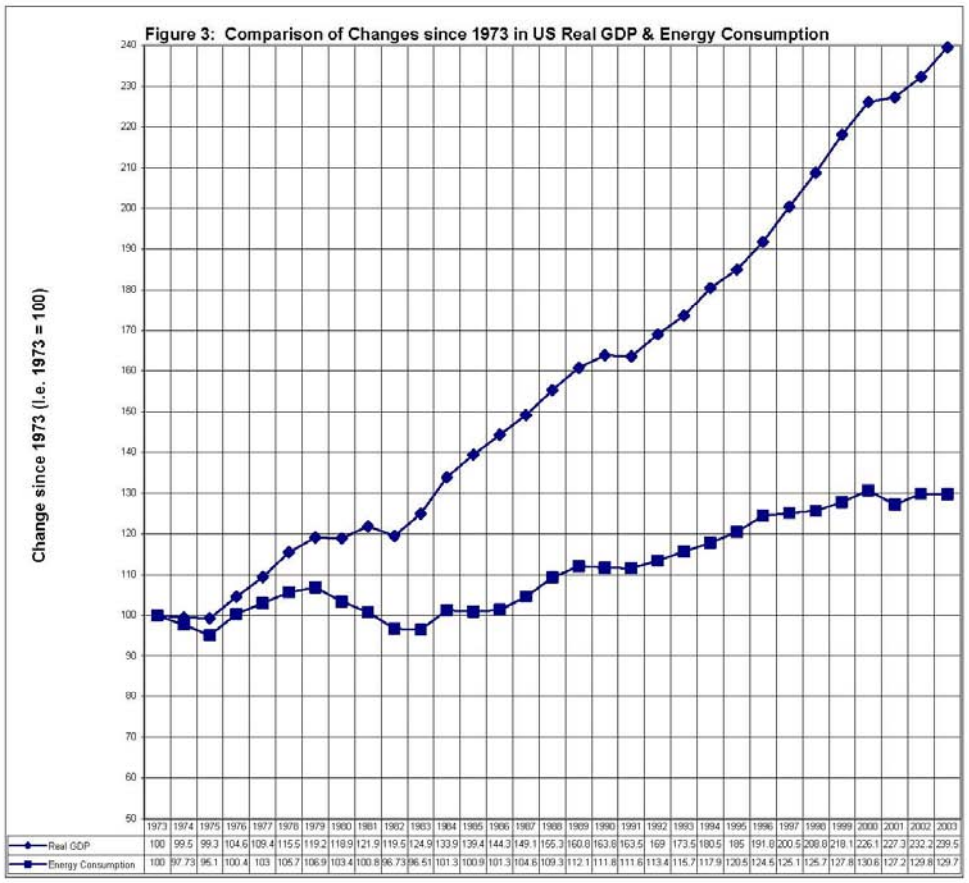
2) **Improved *energy efficiency has occurred as an unplanned byproduct* of adoption of new technologies.** Examples include computerization, telecommunications and new lighter weight materials. New technologies have *permitted increased productivity and required less energy* than the equipment and activities 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)."[1]

7



	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Real GDP	100	99.5	99.3	104.6	109.4	115.5	119.2	118.9	121.9	119.5	124.9	133.9	139.4	144.3	149.1	155.3	160.8	163.8	163.5	169	173.5	180.5	185	191.8	200.5	208.8	218.1	226.1	227.3	232.2	239.5
Energy Consumption	100	97.73	96.1	100.4	103	105.7	106.9	103.4	100.8	96.73	96.51	101.3	100.9	101.3	104.6	109.3	112.1	111.8	111.6	113.4	115.7	117.9	120.5	124.5	125.1	125.7	127.8	130.6	127.2	129.8	129.7

That figure sounds impressive. However, based on EIA's latest forecast of US energy consumption[2] 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.

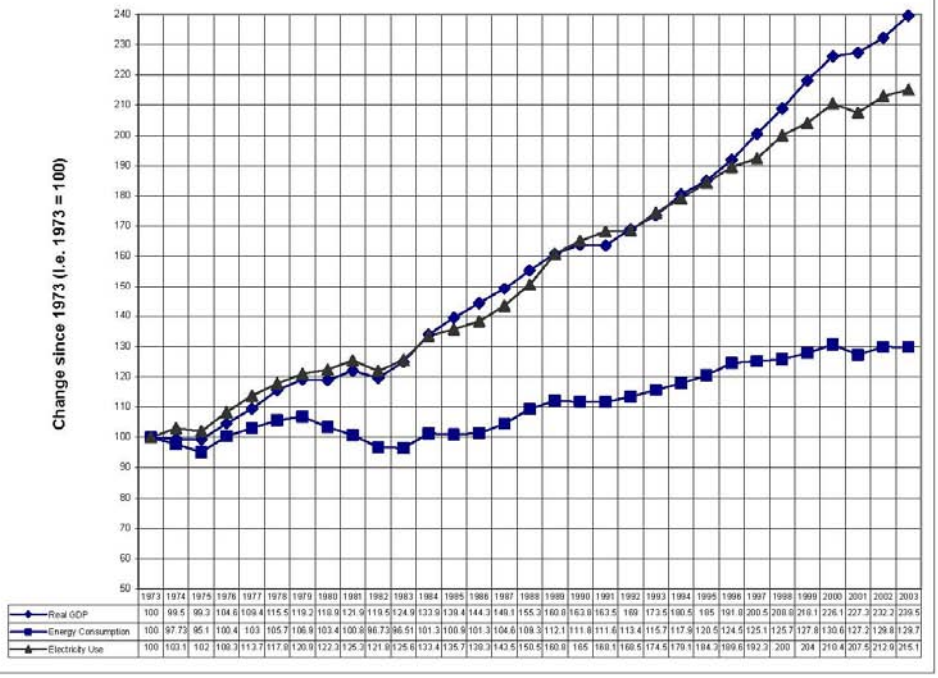
c. The third and final point about energy efficiency is that the United States is not the "energy wastrel" that many would like to have us believe. This is illustrated by the fact that

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.[3]

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.

Figure 4: Comparison of Changes since 1973 in US Real GDP, Energy Consumption & Electricity Use



	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Real GDP	100	99.5	99.3	104.6	109.4	115.5	119.2	119.9	121.9	119.5	124.9	133.9	139.4	144.3	149.1	155.2	160.0	163.0	163.5	169	173.5	180.5	185	191.0	200.5	208.6	216.1	226.1	227.3	232.2	239.5
Energy Consumption	100	97.73	95.1	100.4	103	105.7	106.9	103.4	100.8	96.73	96.51	101.3	100.9	101.3	104.6	109.3	112.1	111.8	111.6	113.4	115.7	117.9	120.5	124.5	125.1	125.7	127.8	130.6	127.2	129.8	129.7
Electricity Use	100	103.1	102	109.3	113.7	117.8	120.9	122.3	125.2	121.9	125.6	133.4	135.7	139.3	143.5	150.5	160.8	165	168.1	168.5	174.5	179.1	184.2	189.6	192.3	200	204	210.4	207.5	212.9	215.1

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.[4] 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.

Accelerated Depreciation Benefits for a $323 million capital investment in a "wind farm"

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
1st	20%	$64,600,000	$22,610,000	$7,752,000
2nd	32%	$103,360,000	$36,176,000	$12,403,200
3rd	19.2%	$62,016,000	$21,705,000	$7,441,920
4th	11.52%	$37,209,000	$13,023,360	$4,465,152
5th	11.52%	$37,209,000	$13,023,360	$4,465,152
6th	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.[5] 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.[6] 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.[7] 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.[8]

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[9] 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.

US Energy Consumption by Energy Source: 2000 Actual and EIA Forecast for 2025				
	Actual 2000		EIA Forecast for 2025	
Energy Source	Quadrillion Btu	% of Total	Quadrillion Btu	% of Total
Traditional Sources				
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%
Non-Hydro Renewables				
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%
Total	99.46	100%	136.58	100%

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.[10] 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 form "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

[1] *Federal Register*, Volume 66, pages 3316ff, January 12, 2001. DOE Technical Support Document.
[2] US Energy Information Administration, *Annual Energy Outlook 2004*, Table A2 and Supplemental Table 2.
[3] US Energy Information Administration, *International Energy Outlook 2004*, Table A3, p. 166.
[4] US Energy Information Administration, *Annual Energy Outlook 2004*, Table A8.
[5] Mr. Buffett's February 27, 2004, Chairman's Annual Letter to Shareholders, Berkshire Hathaway, p. 14.
[6] That is, total capacity of 6,370,000 kW of rated capacity x 8760 hours per year x .25 capacity factor.
[7] 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.
[8] 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

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.

[9] That is, 100,000 kW capacity x 8760 hours per year x .30 capacity factor x $0.015 per kWh = $3,942,000.

[10] 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.

Response for Document 80002

80002-001: The commentor suggests that the analysis undertaken to estimate the economic impacts of wind energy development is deficient because (1) the impacts of these developments on individual utility generation and transmission systems are not explicitly considered in the analysis, and (2) the models used in the analysis are flawed.

As is stated in the Executive Summary (page ES-1) and in Chapter 1 of the PEIS, the purpose of the PEIS is "to assess the environmental, social, and economic impacts of wind energy development on BLM-administered land." A cost-benefit analysis would likely have considered a range of factors relevant to the development of wind energy compared with other forms of electricity generation. These factors would include impacts on individual utility generation and transmission systems, specifically the impacts on generation capacity and reliability considerations, air quality, and ratepayer and taxpayer impacts. Although the analysis undertaken for the PEIS used a wind development scenario that takes into account some of these factors, in particular capital costs, fossil fuel prices, and transmission systems issues, the analysis is limited specifically to those environmental and economic impacts that result from wind energy developments on BLM-administered land. The analysis of impacts on utility systems, and environmental and economic impacts that occur beyond BLM-administered land is, therefore, beyond the scope of the analysis undertaken for the PEIS.

The amount of predicted wind capacity in each state was calculated by the National Renewable Energy Laboratory (NREL) by using the Wind Industry (WinDs) Model, which uses the best available data and modeling methodology for this purpose. The calculations are based on a maximum market capacity for wind development subject to environmental and other planning constraints on BLM-administered lands. Data generated by NREL in the WinDs Model were used as a basis for estimating the impacts of wind development over the time period 2005 to 2025. The WinDs data show the timing of maximum potential wind development for each of the 11 states with BLM-administered land, given a series of assumptions relating to location, capital costs, fossil fuel prices, and transmission systems issues. A large proportion of the data used in the model comes from federal government sources, in particular the U.S. Department of Energy's Annual Energy Outlook, which forecasts fossil energy prices over the time period used in the PEIS. A full description of the WinDs model appears in Appendix B of the PEIS.

The purpose of the modeling efforts in this PEIS is to provide a general framework of possible development over the next 20 years, in order to assess the impacts of implementing a Wind Energy Development Program for BLM-administered lands. The BLM recognizes that many factors can affect the accuracy of the projections, and, as discussed in Appendix B, a variety of

factors will determine actual development levels. However, the maximum potential development scenario (MPDS) and WinDS models employed in the PEIS are adequate for forecasting potential development levels over such a large geographic area and long, projected time frame. Greater accuracy in these forecasts would not likely result in changes to the requirements of the Wind Energy Development Program; that is, the proposed policies and BMPs would not be changed at this time. The program requires that BLM employ adaptive management strategies to the oversight of wind energy development on BLM-administered lands. The BLM will monitor the level of wind energy development into the future as well as the effectiveness of its policies and BMPs. If necessary, adjustments to the programmatic requirements will be made.

Although the Jobs and Economic Development Impact (JEDI) Model developed by NREL (2004) can be used for local and state level analyses of wind projects, it was not used to estimate these impacts in the PEIS. As discussed in Section 13.1, representative data were taken from the JEDI model and other sources to support the PEIS economic impact calculations. Specifically, data describing the breakdown of specific cost elements for a generic wind project were taken from the JEDI model. Beyond the use of these cost data, the estimation of impacts of wind development for each of the years and states was undertaken independently of the JEDI model.

Document 80003

WindEISArchives

From: windeiswebmaster
Sent: Monday, September 13, 2004 2:52 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80003

BLM_Comment_80(
03.doc (25 KB)

Thank you for your comment, Rick Benas.

The comment tracking number that has been assigned to your comment is 80003. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 13, 2004 02:52:00PM CDT

Wind Energy EIS Draft Comment: 80003

First Name: Rick
Middle Initial: C
Last Name: Benas
Organization: The Saratoga Associates
Address: 443 Broadway
City: Saratoga Springs
State: NY
Zip: 12866
Country: USA
Privacy Preference: Don't withhold name or address from public record
Attachment: S:\50019\Benas.rcb\BLM Comment.doc

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Comment:

The Saratoga Associates (TSA) thanks the BLM for the opportunity to comment on the Draft Programmatic EIS facilitating wind energy development. TSA would like to share a visual migration strategy developed in New York State that we believe will facilitate wind energy development in sensitive areas such as public lands administered by BLM.

The strategy is called "Enforceable Sustainability" (See article in North American Windpower Sept. and Oct. issues of this year) and is derived from the New York State Department of Environmental Conservation's (NYSDEC) Program Policy "Assessing and Mitigating Visual Impacts". (The NYSDEC Visual Policy is available on NYSDEC's website).

In order to assert that visual impacts have been sufficiently minimized to the extent practicable it is essential that each and every visual mitigation strategy should be employed and those that are not applicable should be addressed by stating why the strategy does not apply. The NYSDEC Policy has a universal list of known mitigation strategies. One strategy that BLM does not address is aesthetic offsets.

Aesthetic offsets were first conceptualized and introduced in New York State. This occurred in 1982 in the Marcy-South Electric Transmission Line Administrative Law Proceeding (PSC Case 70126). They were created in direct response to address visual and aesthetic impacts from an overhead 345kV electric transmission line incapable of being fully mitigated. Such transmission facilities have visual and aesthetic characteristics similar to wind turbine arrays.

An aesthetic offset is defined as a correction of an existing aesthetic problem [eyesore] within the project viewshed *not required under any existing legal authority*. Another example of a legitimate offset is to clean up a messy and unkempt area, also within the project-affected viewshed that would otherwise not occur because of funding limitations. These types of aesthetic problems (there are others) are offset candidates. A decline in the landscape quality associated with a proposed project can, at least partially, be "offset" by the correction. The Policy further states that offsets should be employed in sensitive locations, where significant impacts from the proposal are unavoidable or mitigation of other types would be uneconomic, and the mitigation used is only partially effective. This is the case with wind turbine arrays. 80003-1

Offsets are direct aesthetic corrections within the project-affected viewshed that would not otherwise occur. Offsets are not the same as other compensatory mechanisms. Compensatory mechanisms, such as parkland and wetland creation and acquisition and other niceties, are not true offsets, although they may also be very valuable. True aesthetic offsets must be viewed in exactly the same way as air quality offsets (see 6 NYCRR Part 231 or Federal equivalent) for a further understanding of offsets.

By bundling decommissioning and offsets, and making them enforceable the public is assured that its treasured places and public lands will ultimately be restored and left in an *improved* condition.

The public, particularly the splintered segment of the environmental community, understands the long-standing American tradition of respecting the greatest good for the greatest number *in the long run*. In addition, to be sustainable, decommissioning should include the provision for maximum recycling and reuse of the project remnants. The public may then more fully embrace

wind energy, a proven leader in sustainable energy and accept the demanding presence of the wind farm on public lands at least in the short run.

80003-1 (cont.)

Response for Document 80003

80003-001: Thank you for your comment. We appreciate your input and participation in the public review process. Aesthetic offsets have been incorporated as a possible mitigation strategy for the BLM to consider during site-specific evaluations.

Document 80004

WindEISArchives

From: windeiswebmaster
Sent: Monday, September 13, 2004 5:08 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80004

Thank you for your comment, barb sachau.

The comment tracking number that has been assigned to your comment is 80004. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 13, 2004 05:08:15PM CDT

Wind Energy EIS Draft Comment: 80004

First Name: barb
Last Name: sachau
Address: 15 elm st
City: florham park
State: NJ
Zip: 07932
Country: USA
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
turbines kill birds. i oppose and object to any more installations of wind turbines to kill birds - i am absolutely, vehemently opposed. minimizing kills is clearly not good enough. We need a less harmful way of energy production. I also oppose blm giving the american public "choices" of their choice this smacks of saddam hussein. americans can well make their own choices of their own free will - they do not need to be forcefed by blm, the agency that kills wild horses.

dead birds stay dead. i do not want wind turbines.
During 2003 bats migrated in northern appalachia. 400 died at FPL Energy Mountaineer wind energy center on backbone mountain in west virginia. the site was only inspected weekly so the kill was probably much larger than that.

In Altamont Pass in San Francisco 7000 towers killed 22000 birds including 400 to 800 golden eagles. environmental groups that once favored wind power now oppose it.

80004-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80004

80004-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80005

WindEISArchives

From: windeiswebmaster
Sent: Monday, September 13, 2004 11:59 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80005

Thank you for your comment, David Freeman.

The comment tracking number that has been assigned to your comment is 80005. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 13, 2004 11:58:51PM CDT

Wind Energy EIS Draft Comment: 80005

First Name: David
Middle Initial: w
Last Name: Freeman
Address: 706 Muir avenue
Address 2: Rock Springs Wyoming
City: Rock Springs Wyoming
State: WY
Zip: 82901
Country: USA
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
I am in favor of developing wind energy resources in wyoming. I see no reason not to develope it, and solar power as well. Thanks. Dave Freeman

80005-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80005

80005-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80006

WindEISArchives

From: windeiswebmaster
Sent: Tuesday, September 14, 2004 11:23 AM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80006

Thank you for your comment, Edith and Thomas Welty.

The comment tracking number that has been assigned to your comment is 80006. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 14, 2004 11:22:51AM CDT

Wind Energy EIS Draft Comment: 80006

First Name: Edith and Thomas
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Address: 5990 East Jeremy Lane
City: Flagstaff
State: AZ
Zip: 86004
Country: USA
Email: twelty@earthlink.net
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
Yes! It is a good idea to use BLM land for wind energy. I support all your efforts. 80006-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80006

80006-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80007

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Wednesday, September 15, 2004 2:40 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80007

Thank you for your comment, Timothy Goodrich.

The comment tracking number that has been assigned to your comment is 80007. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 15, 2004 02:40:05PM CDT

Wind Energy EIS Draft Comment: 80007

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Country: USA
Email: tggoodrich@cox.net
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
In reference to the Draft EIS proposal: I am in favor of any measure that would help the propogation of clean, renewable wind energy in the United States as long as it proves to be safe in the regards of animals in thier migratory patterns and other movements. 80007-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80007

80007-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80008

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Thursday, September 16, 2004 3:18 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80008

Radnor_revisited_8 0008.doc (37...

Thank you for your comment, Sue Sliwinski.

The comment tracking number that has been assigned to your comment is 80008. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 16, 2004 03:18:24PM CDT

Wind Energy EIS Draft Comment: 80008

First Name: Sue
Middle Initial: m
Last Name: Sliwinski
Organization: Sardinia preservation Group
Address: 10820 allen rd.
City: east concord
State: NY
Zip: 14055
Country: USA
Privacy Preference: Don't withhold name or address from public record
Attachment: C:\Documents and Settings\Computer\My Documents\sues\Radnor revisited.doc

Comment Submitted:
Today's commercial wind energy is not beneficial enough to justify it's intrusion into our most natural places. It does not allow fossil fuel plants to stop or even reduce their function significantly, so they continue to spew in spite of the monster turbines. Wind developers are very aggressive and I'm not surprised that you have many applications already. EXPECT MANY MORE! Where will you draw the line? As for noise, your website simply quotes industry rhetoric. The newer turbines have NOT been improved, and noise continues to be a huge impact, particularly since developers insist on building too close to people's homes. You should do your own research instead of relying on industry propaganda.
If the wind industry really made a true difference, it's intrusion would be tolerated. But it doesn't. In Europe where development has existed for a number of years, there is swelling opposition to commercial wind, to the point that new political parties are forming to fight it's advancement. Wind power is the only renewable energy that promotes itself as "being ready and available NOW", as compared with solar and other sources, so goverments are relying heavily on it to meet their green targets...much too heavily. In the US, I'm sure that many projects will have to be built before the majority starts to realize what folly it is, and it would be a shame if our most pristine locations are already ruined by that time. It would be wise for you to take a 'wait and see' approach. Give it 5 years, and then take this poll again. You will notice a big difference between then and now.
Please see attachment that shows the little benefit wind has compared with it's huge negative impact. The document compares the simple use of energy efficient lightbulbs with the output of giant wind turbines. Which do you think is 'greener'?

80008-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

EMPAInc.*

Investment in Wind yields negligible Environmental Benefits

A February 26, 2003, news story distributed by PRNewswire states, "Radnor Township announced today that it will purchase a large portion of its electricity from wind energy, making it the nation's leading wind energy purchaser among municipalities."

The story also indicates that the purchase involves 1,400,000 kilowatt hours (kWh) per year for 3 years, with the electricity coming from a wind plant near Mount Storm in West Virginia.

Action has negative environmental consequences

The Township officials' action was no doubt well intentioned but analysis of the transaction described in the story shows that they:

- Incorrectly assume the action has a favorable environmental impact.
- Do not understand the actual costs and benefits of electricity from commercial wind plants.
- Do not recognize that the tiny, if any, environmental benefit of their action is overwhelmed by the adverse environmental, ecological, scenic and property value impact in West Virginia where wind plants are being constructed to produce the electricity.
- Could have taken other action resulting in greater benefit, without the environmental costs.

Radnor's Planned Purchase not 'Significant'

80008-2

Though the purchase is referred to as 'significant', it is not. The amount of electricity involved – 1,400,000 kWh per year -- may sound like a lot but it is equal to just 1/1000 of 1% of the 136,778,000,000 kWh of electricity sold by electric utilities in Pennsylvania during 2001.

Adverse Environmental Impact of Wind Plants in West Virginia

The FPL Energy-owned wind plant that would, in theory, produce the electricity that Radnor plans to purchase is but one of several planned for scenic West Virginia. Another proposal in the area would result in 200 (350-400 ft.) wind turbines along 14 miles of picturesque high mountains near Canaan Valley National Wildlife Refuge, Canaan Valley State Park, Blackwater Falls State Park, and the Monongahela National Forest, which includes Dolly Sods and Dolly Sods Wilderness Area. (Famous places in Monongahela National Forest nearby are Bear Rocks, Stack Rocks, Blackbird Knob, Red Creek Campground, and the Allegheny Front Bird Observatory.)

True costs and benefits of electricity from commercial wind plants

The story reveals that Radnor officials were misled and don't understand that commercial wind energy is not an environmentally benign source of electricity. The officials are probably not aware of certain facts such as the following:

Energy Market & Policy Analysis, Inc., PO Box 3875, Reston, VA 20195-1875, Phone: 703 709-2213
Email: EMPAInc@aol.com

1. **Electricity produced from wind detracts from electric system stability.** Wind turbines produce electricity only when the wind is blowing within certain speed ranges. Their output is intermittent, highly variable, and largely unpredictable and uncontrollable. They detract from – rather than add to – electric system stability. Because electric systems must be constantly kept in balance (supply-demand, frequency, voltage, transmission line load), reliable or "dispatchable" generating units, powered generally by traditional energy sources, must be immediately available to "back up" the unreliable output from wind plants.

2. **Promoters of wind energy routinely overstate environmental benefits.** Wind promoters incorrectly advocate that each kilowatt-hour (kWh) of electricity produced by a wind turbine displaces the same amount of fuel-use and emissions associated with a kWh of electricity produced by a fossil-fuel generating unit. However, the reliable generating units that serve in the "backup" role for the unreliable output of wind turbines must be running at near full capacity, or in "spinning reserve" mode, even when the turbines are generating electricity. While operating in these modes, the fossil-fueled units are producing close to the same amount of emissions as they would in generating modes. Therefore, the contribution of wind turbines to emission reduction will be tiny, at best, and perhaps non-existent. In addition to the incorrect assumption by kWh-per-kWh offsets, wind energy advocates often use outdated information about emissions when making their claims, not taking into account the difference that newer, cleaner burning fossil fueled plants make.

3. **Promoters routinely ignore wind development environmental damage.** Electricity from wind is not environmentally benign. Damage caused by wind plants are becoming increasingly clear, which explains the growing opposition to them in the US and Europe. Wind plants adversely affect a wide variety of environmental, ecological, and scenic values. Concerns include bird kills, interference with migration patterns, and noise and "flicker" at nearby residences, often affecting the occupant's health. Local governments that are responsible for safety must be aware of common problems such as fires, falling ice, and blade disintegration caused by mechanical failures and lightning.

   The scenic impact of wind plants is significant, and as valued natural landscapes disappear, more concern is apparent. Governments are recognizing that protective measures are needed. An Oregon official who, after recently passing a wind facility along the Washington-Oregon border, was quoted in a Washington paper as saying: "How is this different than allowing illuminated advertising billboards in our most beautiful places? "

4. **The huge machines produce very little electricity.** If FPL Energy's 66-megawatt wind plant on West Virginia's Backbone Mountain, with its 44 wind turbines spread across over 4,000 acres of land, achieves an annual 30% capacity factor, it will produce 173,448,000 kWh of electricity each year (i.e., 66,000 kW x 8760 hours x .30). That sounds like a lot of electricity but, in fact, it is equal to:

   a. 13/100 of 1% of the 136,778,000,000 kWh of electricity sold by electric utilities in Pennsylvania during 2001.

   b. 19/100 of 1% of the 92,783,000,000 kWh of electricity produced in West Virginia during 2000.

5. **The primary driving force for the construction of wind plants is the windfall profits accruing to their owners as a result of federal and state tax shelters and other credits– not because of benefits to the environment.** Wind plants provide few, if any, environmental benefits and few net economic benefits to the areas where they are located.

80008-2
(cont.)

A company proposing a new 300 megawatt wind plant in West Virginia costing $300,000,000 would be able to:

a. Shelter $132,000,000 from federal income tax liability in the tax year when the project went into service, an additional $67,200,000 in the second year, $40,320,000 in the third year, and the remaining $60,480,000 in the next 3 years because of generous accelerated depreciation allowed for wind plants. Assuming a marginal tax rate of 35%, this could reduce the company's federal tax liability by $46,200,000 in the first year, $23,530,000 in the second year, $14,112,000 in the third year and $21,168,000 in the next 3 years.

b. Deduct an additional $14,191,200 per year for 10 years from its federal tax liability because of federal Production Tax Credits of $0.018 per kWh for all electricity produced.

c. Escape significant West Virginia corporate income tax liability because the federal accelerated depreciation reduces taxable income. The tax that could be avoided could amount to 9% (the WV corporate tax rate) of the amount of the federal depreciation deduction; i.e., $11,880,000 in the first year, $6,048,000 in the second year, $3,628,800 in the third year, and $5,443,200 in the next three years.

d. Avoid approximately 90% of the normal liability for the West Virginia's Business & Occupation Tax and for the West Virginia Property Tax that provides funds for County and School functions -- because of special tax breaks passed by the West Virginia Legislature. (This benefit would be worth $2.5 to $3 million per year in avoided taxes.)

80008-2 (cont.)

The above federal and state tax breaks add up to $77,423,460 in the first year, $48, 911,460 in the second year and a total of $325,434,600 for the first 10 years. The tax breaks for wind plant owners shift tax burdens to remaining taxpayers, further degrading supposed local economic benefits.

The value of the tax breaks to the wind plant owner could easily exceed the owner's income from the sale of electricity, particularly in the early years of the project. That income would be approximately $23,652,000 per year if the wind plant achieved a 30% capacity factor and the electricity were sold for $0.03 per kWh (i.e., 300,000 kW x 8760 hrs. x .30 capacity factor x $0.03 per kWh sale price would = $23,652,000).

Radnor could more effectively reduce environmental impact of it's electric generation

Radnor is a wealthy Township. According to the Town's web site, the average home sale price in 2000 was $382,269. Quite likely, many residents there can afford environmental improvement measures without exporting adverse environmental impacts onto others. However, no one needs to be wealthy to be more environmentally sensitive.

Census data shows that Radnor has about 10,000 households. If each household substituted two 27-watt energy efficient light bulbs for two 100-watt incandescent bulbs that are used an average of 4 hours per day, the people of Radnor Township would avoid the use of 2,131,600 kWh of electricity each year*, approximately **50% more** than the 1,400,000 kWh wind power purchase!

* 2 bulbs x 73 watts x 4 hours would save 584 watt-hours per day. 584 watt-hours x 365 days = 213,160 watt-hours per year per household. 10,000 households x 213,160 watt-hours = 2,131,600,000 watt-hours or 2,131,600 kWh.

Reduced Electric bills for Radnor residents

At $5 per bulb, 20,000 bulbs would cost $100,000. But, assuming an average rate of $0.13 per kWh, Radnor residents would reduce their electric bills by $277,108 annually. So in addition to reducing the environmental impact associated with generating the unneeded 2,131,600 kWh, the cost to electric consumers would also be reduced. (That might explain the purchase participation of Exelon, the parent company of the local utility that serves Radnor Township.)

Environmental Symbolism over Substance

Radnor Township's decision to purchase 1,400,000 kWh of electricity from wind energy is a clear case of symbolism over substance. Contrary to the claim in the press release, the Commissioners should not receive acclaim for [their] "visionary wind purchase", because the attempt to polish their environmental image ignores the adverse environmental, ecological, scenic and property value impacts on the West Virginia residents where the giant wind turbines are located. Others involved in the scheme include:

- FPL Energy, the current owner of the wind plant on Backbone Mountain in West Virginia, now called the "Mountaineer Wind Energy Center."
- The Exelon Power Team that has contracted for the purchase of electricity from the FPL Energy wind plant.
- Washington Gas Energy Services, Community Energy, Inc. and the Energy Cooperative, the companies marketing the electricity.
- Radnor Township Environmental Advisory Committee, and the Clean Air Council of Pennsylvania who are participating in or encouraging environmental symbolism.
- The collection of organizations in the Washington, DC, area that have announced similar purchases during the past few weeks of what is purported to be electricity produced from the FPL Energy owned wind plant in West Virginia. These include:

1. Montgomery County, Maryland
2. Catholic University, American University, and the World Bank- District of Columbia

80008-2
(cont.)

The U.S. Department of Energy sponsored a conference at which Radnor's symbolic purchase was announced. The overall cost of that conference to taxpayers and participants exceeded $100,000, which could have paid for the 20,000 energy efficient light bulbs that would have allowed Radnor Township to realize a greater savings in electricity use than the amount of the token wind energy purchase. Not only would that have meant less consumption, equating to less generation, resulting in less emissions and less cost, it would also have NOT supported an inappropriate and unnecessary power plant in another state, that is robbing local residents of their natural environment and their quality of life.

* * *

Responses for Document 80008

80008-001: Thank you for your comment. We appreciate your input and participation in the public review process.

80008-002: As is stated in the Executive Summary (page ES-1) and in Chapter 1 of the PEIS, the purpose of the PEIS is "to assess the environmental, social, and economic impacts of wind energy development on BLM-administered land." The analysis undertaken for the PEIS included a wide range of economic and environmental factors relevant to the assessment of impacts of wind projects on BLM-administered land. The PEIS also used a wind development scenario that takes into account capital costs, fossil fuel prices, and transmission systems issues, as the basis for the calculation of environmental and economic impacts. Other factors that may be included in a broader analysis of wind energy compared with other forms of electricity generation, including impacts on individual utility generation and transmission systems, the impact of conservation measures, and the impact on ratepayers and taxpayers, were not included in the PEIS analysis. The majority of these impacts would likely be taken into account as part of the initial decision to proceed with specific wind development projects and are, therefore, beyond the scope of the analysis undertaken for the PEIS.

Document 80009

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Thursday, September 16, 2004 7:40 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80009

Thank you for your comment, Luis Pacheco.

The comment tracking number that has been assigned to your comment is 80009. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 16, 2004 07:39:36PM CDT

Wind Energy EIS Draft Comment: 80009

First Name: Luis
Middle Initial: R
Last Name: Pacheco
Address: #####
City: #####
State: ##
Zip: #####
Country: USA
Email: #####
Privacy Preference: Withhold address only from public record

Comment Submitted:
How canI be part of the wind energy program..Im the owner of 80 acres in #####, ##### County, i will like to make the 80 acres a wind field of energy..with the help of our federal gov. I don't have the money to do it my self. Thanks Luis. 80009-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80009

80009-001: Your comment addresses issues that are beyond the scope of the PEIS, the mission and responsibilities of the BLM, and/or the defined programmatic scope of the proposed Wind Energy Development Program. We appreciate your input and participation in the public review process.

Document 80010

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Monday, September 20, 2004 11:58 AM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80010

Thank you for your comment, Marty Malone.

The comment tracking number that has been assigned to your comment is 80010. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: September 20, 2004 11:57:33AM CDT

Wind Energy EIS Draft Comment: 80010

First Name: Marty
Last Name: Malone
State: ##
Zip: #####
Country: USA
Privacy Preference: Withhold address only from public record

Comment Submitted:
I am in favor of developing wind energy resources on public land. 80010-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80010

80010-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80012

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Friday, October 01, 2004 6:53 AM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80012

WavegenTech_800 12.pdf (193 KB)...

Thank you for your comment, Paul Caetano.

The comment tracking number that has been assigned to your comment is 80012. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 1, 2004 06:52:34AM CDT

Wind Energy EIS Draft Comment: 80012

First Name: Paul
Middle Initial: J
Last Name: Caetano
Address: 4667 N. Safford Ave
City: Fresno
State: CA
Zip: 93704-2920
Country: USA
Email: pcaetano@pacbell.net
Privacy Preference: Don't withhold name or address from public record
Attachment: C:\Documents and Settings\AntiMusick\My Documents\WavegenTech.pdf

Comment Submitted:

Wind energy is ok, but do we really want to see a bunch of prop turbines dotting the landscape like trees? The reports say they kill many birds. Well how about focusing on Wave Power, Wave Energy is untapped here in the United States, this is what we should be doing don't let Europe pass us in this technology. Back In 2000 when California had the energy crisis I wondered if anyone knew about Wave Power, it is simple, have you ever seen a "marine geyser" or Hawaii's ! "blowholes". Wave generators works on the principle of a piston, the waves go up and down in a man made chamber near the ocean, a hole on top lets the air in and out with the rhythm of the waves all you need to a turbine generator to harness the energy. Take a look at the wavegen.com pages and see what they have been doing in Scotland for some years now. 80012-1 80012-2

http://www.wavegen.com
http://www.wavegen.co.uk

Questions about submitting comments over the Web? Contact us at: windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Realities of Wave Technology

Tom Heath BSc,PhD,M.I.Mech.E C.Eng – Wavegen

Synopsis

The opportunities offered by wave energy are discussed together with the available resource. The technical challenges are highlighted with particular reference to Wavegen's LIMPET plant on the island of Islay. Areas of application of wave energy technology are discussed.

From where do waves come?

Figure 1

Viewed from Space the earth is a beautiful place with white clouds covering the blue of the sea and the greens and yellow of the land. The whole planet is warmed to a greater or lesser degree by the sun whose nuclear furnace has supplied will continue to supply all the energy ever used by humanity. Through the effects of cloud cover and through the differential heat absorbtion by land and water with differing surface conditions, through the influence of the rotating earth and the effects of day and night different parts of the atmosphere warm to differing degrees creating pressure variations across the globe and the general rotation of the atmosphere. These temperature differences cause density variations which influenced by gravity and the spinning globe cause winds. As the wind drags across the surface of the ocean they drag the water surface with it creating ripples on still water. As the wind continues to blow the ripples become wavelets, the wavelets become waves and if the fetch is long enough, the waves develop into the great ocean swells beloved of surfers. Once formed ocean waves can travel great distances with minimal loss of energy until they break on some distant shore. We thus see that wave energy is simply a derived form of solar power which is constantly renewed by the sun and the engine of the atmosphere.

Wave Energy resource

Just as electrical power is not stored in transmission lines but flows from the generator to the user, so wave energy is not static but flows in the direction of wave propagation. If the energy flowing past a particular point in the ocean or arriving at a shoreline is not captured there then it is lost. Fortunately for the wave energy industry if one wave is lost there will be another one along soon bearing more energy. Because the energy is flowing we can consider the amount of

Figure 2

power in kW contained in each linear metre of wave front. Figure 2 shows values of annual average power flux in kW/m at different points across the globe. The quoted values are for deep water sites and hide one of the inescapable realities of wave energy; that a single point value of annual wave power hides the wide variation between the differing power available in different seasons of the year. Off the West coast of Scotland the winter availability may be four times the summer average. In our part of the world this can be considered an advantage because our energy demand in the cold season is so much higher than that in the summer months. This is not necessarily true worldwide. The Atlantic seaboard of the British Isles has one of the best wave energy climates on the planet with 60-70kW/m in deep water off the Western Isles falling to 15-20kW at the shoreline as the effects of bottom friction and wave breaking take their toll. With the land mass of Scotland offering shelter to the south west the available power falls as we move east along the northern coast of Scotland but is still a remarkably attractive 25-50kW/m (dependent on water depth) by the time we reach the waters of Orcadia. The reality is that the power is there, the challenge is to harness it.

The Challenge for Wave Power

For more than two centuries inventors have been filing patents for systems to capture power from the waves and yet we still do not have a wide application of wave energy devices as power generators. So what is the problem? Actually there is no conceptual problem. We can extract power using articulated rafts, nodding ducks, compressible floating bags, tethered buoys, bottom standing oscillating water columns, over-spilling systems, submerged pressure chambers etc etc. Similarly there are no insurmountable technical problems. Whilst there is much engineering difficulty the wave energy community has solutions to just about every aspect of the technology. The reality is that the only long term problem is making the technology work at a cost of power which a consumer is willing to pay. In the long term fossil fuel generation will become more expensive and wave generated power will fall in cost, but until that time the development of wave power is hampered by the need to introduce a fledgling technology into a commercial

market dominated by subsidised low cost fossil fuel and nuclear generation. Twenty years ago the wind industry suffered similar problems but largely through the far sighted long term support to manufacturers offered by the Danish government that nation was able to develop an industry which with the premiums offered for green power can now compete on a commercial footing. The wave energy industry is now in a similar stage of development to the wind industry in the 1980's with privately funded prototype devices under development with public support and some public money. There will be failures on the way, that is the nature of technical development, but with sustained public support to create conditions where new energy sources can be introduced to the market there is every expectation that wave power will mature to make a major contribution to our energy needs.

The Technical Challenge

The technical challenge in Wave energy is driven by the commercial challenge. Notwithstanding political considerations the success of wave energy in relation to other energy supply technologies will ultimately be determined by the price at which it can deliver power to the market. The cost of producing wave generated electricity is comprised primarily of the capital expenditure in building and installing the device and connecting to the electricity grid. Capital expenditure typically accounts for more than 90% of the cost of producing wave power. This is in marked contrast to fossil fuel plant where the input fuel is a high proportion of cost. A successful wave energy device will therefore have a minimum capital expenditure and a maximum electrical output. This rather obvious fact creates a dilemma for the designer of wave energy plant. The device structure has to survive the worst that the sea can throw at it; but only just. Looking at it simplistically if we over-design a wave energy machine by a factor of two it will cost twice as much and the price of power will double. We will then have a very reliable wave power device that no-one will want to buy. We thus have to go through a development stage where we build prototype units which, as far as we can tell with the available information, will survive fabled storms and which may not be economic generators but will give us the information on loads and performance to enable the next design to be closer to the limit. At Wavegen we have just gone through this exercise in the construction of our LIMPET device on Islay.

Figure 3

The concrete collector Figure 3, we are assured by the construction engineers, contains a higher density of steel reinforcement that a nuclear bunker. It has also survived the worst storms on Islay in living memory (according to the locals). All the signs are that the extreme service loads estimated prior to the construction may be a factor of 20 higher than those actually occurring so that we now have the opportunity to apply this knowledge to make major reductions in the cost of our next shoreline device.

The long term future of bulk wave energy generation lies in exploiting the offshore resource and as engineers we have to produce optimised designs for:

- The wave energy collector
- Installation
- The power conversion system
- The moorings
- The power transmission system
- Generation controls
- Access and maintenance
- Recovery and decommissioning

As a general rule proponents of wave energy are trying to do everything that engineers have for years been trying to avoid. We are looking to place our structures permanently in areas of high wave activity so that whilst a super tanker might seek shelter we will seek the storm. Whilst a Cruise liner might fit stabilisers for passenger comport we are more often than not relying on a high response amplitude to some form of motion in order to extract power. Whilst ship and offshore jackets are designed to shed wave forces we are, at least in small to moderate waves, trying to interact with them. It is not surprising therefore that in pushing the design envelope of marine structures we are having to develop and extend our analytic tools. These tools then need testing and calibrating against field data; which takes us back to prototype devices and testing.

There is a debate within the wave energy industry as to how to best to develop a wave energy device. There are many schools of thought. Some advocate that everything can be learnt in wave tanks and that there is no need to go to sea until all problems are solved to a high degree of confidence. Others prefer a progressive increase in scale from small tank models, to larger models which can be tested in sheltered waters and thence to the full size. Others believe that the time cost of the progressive approach is unacceptable and that if a device is worthwhile the best way to develop is to build the first unit at the full scale so that real data become immediately available and the route to bulk generation is thereby shortened. There is no doubt that this is could be true but it is equally true that the risk of failure increases with the latter approach. There is also a debate within the industry as to whether research into shoreline generation has any merit or whether all our efforts should be focussed offshore.

Figure 4

With our LIMPET device Figure 4 Wavegen have a vested interest in this debate. We are certainly in agreement that the long term future for wave power lies offshore and are developing a device for offshore application. We also believe that, with our colleagues from the Queens University of Belfast, we have learnt a great deal in the construction and operation of the shoreline plant which will help in the design, construction and operation of the offshore unit. Such areas include:

- OWC performance
- Turbine Technology
- Turbo-generation Control
- Plant safety systems
- Grid Integration
- Data logging and performance monitoring.

We are looking at a class of floating device based on oscillating water column (OWC) technology using a turbine power take off. In this respect we benefit directly from the experience we have gained in operating the Islay plant. In running the unit in all weathers and sea states we have been able to amass operational data which would not have been possible on an dynamic floating structure. The calibration of the turbine for example required a duct flows to be measured at many positions in the duct over a long time period. This was possible on the fixed platform of LIMPET but could not have been done offshore. As such we have knowledge of turbine performance outwith ideal laboratory conditions and are able to more accurately predict and improve performance. Similarly in operating proprietary equipment in the marine environment but on land we have learnt what is likely to work and what is not so that for us LIMPET has proved to be an invaluable stepping stone from the coast line to offshore generation.

Applications of Wave Power

The long term goal for the wave energy industry is to be bulk suppliers of power feeding national grids from offshore wave farms. This will happen in the fullness of time. Bulk electricity generation is not however the only application of wave power. In concert with solar power, wave powered buoys are already used for powering marine buoys. They have also been proposed as pumps for low pressure transmission of water, for producers of high pressure water for desalination and as sea calming devices for coastal protection. Whilst focussing on the offshore potential of wave energy we should not lose sight of the potential of LIMPET type devices. Wavegen are performing feasibility studies for a number of commercial applications of LIMPET derivatives. These range from grid connected generators to OWC systems built as part of coastal protection schemes.

The Realities

The realities of wave energy are thus:

- There is an extremely large supply of power available.
- The technology already exists for the extraction of this power
- The technical challenges are solvable.
- The problems lie in solving the problems at a cost that is acceptable to the market.

Responses for Document 80012

80012-001: Thank you for your comment. We appreciate your input and participation in the public review process.

80012-002: Your comment addresses issues that are beyond the scope of the PEIS, the mission and responsibilities of the BLM, and/or the defined programmatic scope of the proposed Wind Energy Development Program. We appreciate your input and participation in the public review process.

Document 80014

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Saturday, October 02, 2004 3:33 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80014

Thank you for your comment, Vicki Patton.

The comment tracking number that has been assigned to your comment is 80014. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 2, 2004 03:32:43PM CDT

Wind Energy EIS Draft Comment: 80014

First Name: Vicki
Middle Initial: L
Last Name: Patton
Privacy Preference: Withhold address only from public record

Comment Submitted:
I believe that we should learn from history. Germany has covered their most scenic areas with thousands of industrial wind turbines and has discovered that the energy is unreliable and that the turbines do not significantly produce the energy that was anticipated. Please do not cover our great nation with wind turbines. Wind energy sounds good. Until the energy produced by wind generators can be stored, then there will be no significant tribution to our energy needs. Do not start cluttering up America! 80014-1

Questions about submitting comments over the Web? Contact us at: windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80014

80014-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80015

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Monday, October 04, 2004 8:13 AM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80015

Wind_Turbines_&_birds_80015.pd...

Thank you for your comment, #####.

The comment tracking number that has been assigned to your comment is 80015. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 4, 2004 08:12:47AM CDT

Wind Energy EIS Draft Comment: 80015

First Name: #####
Middle Initial: #
Last Name: #####
Address: #####
Address 2: #####
City: #####
State: ##
Zip: #####
Country: USA
Privacy Preference: Withhold name and address from public record
Attachment: /Macintosh HD/Desktop Folder/Wind Turbines & birds.pdf

Comment Submitted:
A resounding NO, NO, NO to Wind Turbines. These are inefficient, hideous looking, destructive steel and concrete bird and bat killing hulks. They need a tremendous footprint to create an insignificant amount of unreliable energy.

Generations to come will be left with nothing in terms of beautiful open spaces.

There are much better sources of renewable energy. Use the funding to clean up outdated energy plants. Start a conservation campaign.

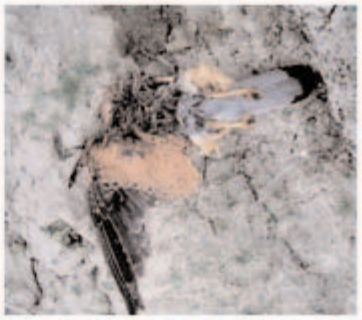
80015-1

I absolutely resent our public lands being used for these hideous wind turbines. I do not my tax dollars used in this way.

They are a band-aid to our energy problems. Don't do to our country what has happened in Denmark and what is beginnning to happen all over the world. Please see attached for a look at what these so-called environmentally friendly turbines do.

Thank you for the opportunity to express my views.

Questions about submitting comments over the Web? Contact us at: windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.



Response for Document 80015

80015-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80016

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Wednesday, October 13, 2004 2:21 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80016

Thank you for your comment, #####.

The comment tracking number that has been assigned to your comment is 80016. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 13, 2004 02:21:11PM CDT

Wind Energy EIS Draft Comment: 80016

First Name: #####
Middle Initial: #
Last Name: #####
Organization: #####
Address: #####
City: #####
Email: #####
Privacy Preference: Withhold name and address from public record

Comment Submitted:
I am the vice president of a small nature conservation organization in the south of France and we are definitely agaisnt wind power for two main reasons : there is an average of 15 birds killed per turbine per year and a larger number of bats wherever it is a bat area. It is an average counting the areas where there are bird migration and area without. The second reason is that there is an absolute need of other reliable energy source to back up the wind turbines during the 50 % days of year when they do not supply energy because of low wind or too high wind. 80016-1

Questions about submitting comments over the Web? Contact us at: windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80016

80016-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80017

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Monday, October 18, 2004 8:08 AM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80017

Thank you for your comment, Chuck Lassen.

The comment tracking number that has been assigned to your comment is 80017. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 18, 2004 08:07:37AM CDT

Wind Energy EIS Draft Comment: 80017

First Name: Chuck
Middle Initial: W
Last Name: Lassen
Email: #####
Privacy Preference: Withhold address only from public record

Comment Submitted:
During the late 70's I observed the fiasco that took place in Western Colorado, when the big push to produce energy from the Oil Shale reserves was taking place.
Our Government allowed the Oil and Gas conglomerates along with their cronies, large construction contractors to work on a cost plus basis to justify the production of oil from oil shale. The outcome was exactly what the original premise consisted of: To expensive to produce this type of energy.
What we saw was, dirt being moved from one large pile to another 2 miles away for 2 months, then move it back to the original pile, over and over for at least a 1 1/2 years of the project. With a cost plus contract! Thereby, justifying the original premise that oil shale production was too expensive.
What ever you do, keep those who have ulterior motives out of the process. Keep the smaller organizations that have been working in the industry involved and once the price per KW is established, help these smaller organizations acquire the financing to develop the industry.
Keep a watchful eye on the Power producers who have put a substantial amount of finances into Natural Gas turbines recently, so that they do NOT force the Wind Turbine industry out by giving them pittance for their production.
Like, oil shale, Wind Energy is not rocket science and has been used much longer than petroleum. It should not take a long period of time to decide how or why to let this happen, as the only question will come from those who have positions for their type of industry, which will most likely come from the petroleum producers. We already know what they can do to the cost of production.

80017-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80017

80017-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80018

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Friday, October 29, 2004 10:10 AM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80018

Thank you for your comment, Marilynn Thurtle.

The comment tracking number that has been assigned to your comment is 80018. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 29, 2004 10:09:22AM CDT

Wind Energy EIS Draft Comment: 80018

First Name: Marilynn
Middle Initial: A
Last Name: Thurtle
Address: 1132 Sport of Kings Ave
City: Henderson
State: NV
Zip: 89015
Country: USA
Email: my4turtles@aol.com
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
I believe that we need to do everything possible to seek alternative energy supplies. We should be aware of the environmental impacts, but the big picture is the need for energy.

I hope that the Proposed Action will be accepted and implemented. We should look to subsidizing private companies that actively use and perfect these systems. The government should not foot the bill completely. EACH state should be required to do a certain amount as well.

Here in Nevada, we can seek to use solar energy as well. In other states with less usable sunshine, they may have to rely on wind more.

Please do what is neccessary to make changes that will help OUR nations children have a better future--more affordable future, as well as a cleaner environment!

80018-1

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80018

80018-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80019

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Friday, October 29, 2004 11:00 AM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80019

BagOWind_80019.doc (20 KB)

Thank you for your comment, Ken Taylor.

The comment tracking number that has been assigned to your comment is 80019. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 29, 2004 11:00:20AM CDT

Wind Energy EIS Draft Comment: 80019

First Name: Ken
Last Name: Taylor
Address: PO Box 4722
City: Carson City
State: NV
Zip: 89702
Country: USA
Privacy Preference: Don't withhold name or address from public record
Attachment: C:\Documents and Settings\Ken Taylor\Desktop\BagOWind.doc

Questions about submitting comments over the Web? Contact us at: windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

October 29, 2004

To Whom It May Concern:

I want you to stop wasting my tax dollars. Wind energy is not viable. It is a pipe dream that the so-called environmentalists have suckered you into.

Give the money back and put it into a realistic alternative, such as nuclear, hydro, or hydrogen-cell power generation. This fuzzy-wuzzy-feel-good "science" is absurd. Wind power (and solar power) may be appropriate for rural, "off-the-grid" power generation, but it will NEVER account for a significant part of our energy production.

800019-1

How much have you spent so far? How much do you plan to spend? How many scientists do you employ? Why can't you see what is obvious to most experts who have objectively analyzed this energy source?

Why is it that government can get away with a "project" like this – if a private-sector company were proposing such a ridiculous program, they would be out of business in a "New York minute".

Please **STOP NOW!**

Sincerely,

Ken Taylor
PO Box 4722
Carson City, NV 89702

Response for Document 80019

80019-001: Thank you for your comment. We appreciate your input and your participation in the public review process. Wind power producers are currently operating and are not going out of business. Wind power is a viable part of the national energy mix, and development of wind power is required by the National Energy Policy.

Document 80020

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Friday, October 29, 2004 12:27 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80020

Thank you for your comment, Merritt Yochum.

The comment tracking number that has been assigned to your comment is 80020. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 29, 2004 12:26:36PM CDT

Wind Energy EIS Draft Comment: 80020

First Name: Merritt
Middle Initial: K
Last Name: Yochum
Address: 4837 East Nye Lane
City: Carson City
State: NV
Zip: 89706
Country: USA
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
Wind power and Solar power will never be competitive with nuclear power. The plan to subsidise so called renewable energy is more political than pratical. Subsidies do not lower costs, they are always merely tax loopholes and a means of welth redistribution. When added up the costs to the public at large is always increased.Nuclear power has proven to be by far the most eficient and safest non poluting power source ever developed. Go nuclear, stop the pie in the sky nonsense and give us a break.

80020-1

Questions about submitting comments over the Web? Contact us at: windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.

Response for Document 80020

80020-001: Thank you for your comment. We appreciate your input and participation in the public review process.

Document 80021

WindEISArchives

From: windeiswebmaster@anl.gov
Sent: Friday, October 29, 2004 9:36 PM
To: WindEISArchives
Subject: Wind Energy EIS Comment 80021

Thank you for your comment, #####.

The comment tracking number that has been assigned to your comment is 80021. Once the comment response document has been published, please refer to the comment tracking number to locate the response.

Comment Date: October 29, 2004 09:36:16PM CDT

Wind Energy EIS Draft Comment: 80021

First Name: #####
Middle Initial: #
Last Name: #####
Address: #####
City: #####
State: ##
Zip: #####
Country: USA
Email: #####
Privacy Preference: Withhold name and address from public record

Comment Submitted:
The Carson Valley is noted to be a very windy place. I believe there are other area also around Reno and Washoe Valley that are also windy areas. I would have thought the wind energy would have been set up already. Its about time we think of other means of energy. Also I would think we could be using more solar energy. The sun shine so much here in Nevada that I would think people would use solar panels,etc. more than they do. Maybe the price should be lower so more people would use them. 80021-1

#####

Questions about submitting comments over the Web? Contact us at:
windeiswebmaster@anl.gov or call the Wind Energy EIS Webmaster at (630)252-6182.