

PRESIDENT'S MESSAGE



A group of archeologists at an excavation site found two time capsules, one clearly labeled “open first.” Once inside, the team discovered a CD – long an obsolete technology, but one that had dominated information exchange at a critical time in the evolution of knowledge systems. After searching for a device that could utilize the CD, the archeologists extracted several documents, including excerpts from what

they knew to be “newspapers,” once a form of social communication, and an electronic mail note, the initial stage in virtual interactions among humans. “We tried and failed,” lamented the author of the letter. “Our industrial economy collapsed from lack of political will to do the right thing. Our energy grids simply broke down. We didn’t learn our lessons from the other guys. Oh, my kingdom for a policy, a policy!”

The time capsule also contained a small, colorful artifact with four wheels. “It looks to be a toy or some sort of object for play,” said one researcher. “Dunno,” said another. “Appears to be more of an iconic, religious symbol. Look at this – it’s a face, see, clearly displaying human characteristics and an expression of happiness. And I think this object is intended to mimic an ancient form of transportation rite.” The team searched through their universal databases and came up with various references to a substance called “gasoline” for vehicles called “automobiles” that individual humans did indeed use for transportation. The object appeared to be some sort of “reward” for the use of that substance. “An effigy, for ceremonial purposes, perhaps?” one of the scientists speculated.

Ever more curious, the archeologists opened the second time capsule. Inside was a square, thin 5.25-inch object made of material that the team knew to be “basic plastic,” a cultural archetype expressed in a form of mass entertainment called “movies” in ca. 1967, during a time known as the American Period. After much research on the object, one team member encountered a reference to “floppy diskettes” but no device existed that could utilize it. Fortunately, the first time capsule included other materials and memorabilia, many focused on what looked to have been a disastrous series of events in ca. 1970s.

Piecing together the bits of evidence in the time capsules, the research team concluded that they had discovered the Missing Link: the factor that explained the sudden disappearance (in relative historical terms) – an extinction, of sorts – of a powerful ancient civilization known as “America” or

more commonly the “United States.” This civilization, which operated as a complicated federation of separate provincial societies had, at one time, held supreme hegemonic power in the world. It had been a unique human experiment, these disparate, sometimes competing societies, often termed a “melting pot,” bound together by a common creed or “constitution.” America had mysteriously disappeared – vanished – and no compelling theories existed for how this had happened. The team concluded that, in fact, the Americans had exhausted their energy system. But, it was not a problem of running out of critical fuels, something that could have been resolved by a society that was clearly advanced enough to discover alternatives. Rather, it appeared to have taken the form of a complex, political/social disintegration caused by an extended period of competition among the provincial societies and lack of agreement about how to deal with their shared energy systems. In addition, there were hints of a mysterious practice that seemed to be pervasive in American socioeconomic life, the tendency by American leaders, commonly called “elected officials,” to shelter individual members of society from the actual costs of the forms of energy that were typically used. This led to large-scale disruptions and upheaval from which American civilization apparently never could recover. Even more astonishing to the researchers was convincing evidence that individual Americans themselves went along with, even encouraged, this mysterious practice. “Funny,” said the team leader as the full weight of their important discovery, and the huge publicity around it, sunk in. “And we always

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Editor’s Corner

This issue of *Dialogue* includes excellent papers by Kemm Farney and Glenn Schleede.

Kemm Farney’s article addresses the option value of power generation assets and the attractiveness of investments in such facilities in view of extreme price volatility in power markets.

Glenn Schleede addresses the existing and proposed wind-generation in Wisconsin, the relative benefits of wind-generation, and the policies that support such facilities.

Please send new articles (or suggestions for articles) and notices for publication in *Dialogue*. Include news of chapter events and appropriate press releases. Items can be sent via E-mail (paul-roberts@reliantenergy.com or

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President's Message (continued from page 1)

thought it was just a case of over-exuberance, like the Romans."

Admittedly (hopefully?), my scenario is a flight of fancy. It's easy during this time of Chaos in California, with attendant pressures across so many parts of our energy industry and with the phrase "energy crisis" on so many lips, to assume that we're having déjà vu all over again, and are in an energy fix that calls for immediate action. And, in many respects, action may be warranted. But, in this time of yet another peaceful change of government in the U.S., it's useful to reflect on just how much consensus there actually is as to the root cause of some of the energy disruptions we see. It's possible to detect an opening, even if it's just a little one, for constructive conversation on what it is, exactly, that we should consider doing. It's fortuitous that we'll have an opportunity with the combined IAEE/USAEE conference here in Houston, April 25-27, to have that conversation.

For all of us who are members of the USAEE and IAEE, who are interested in the role economics plays in the discovery, exploitation, transportation, conversion and end use of energy, we have some obligations. This is as good a time as any to exercise them, and our upcoming conference should serve as a visible platform.

- We have the obligation to remind our elected officials, peers, fellow citizens, civic and environmental leaders, that open competitive markets entail both rights and responsibilities. The rights include freedom of choice, innovation and improvements in quality of life. The responsibilities include letting the process of transparent price discovery work, encouraging consumer education, thinking of ways that are not market distorting but rather market embracing to help those who are most sensitive to abrupt changes in energy prices. We heard that there were four solutions to the current dilemma, "price caps, price caps, price caps and price caps." We know this is wrong. We have to say it. And we have to demonstrate how to avoid that final showdown.
- We have the obligation to improve our research, to rethink the fundamentals of energy markets, but to avoid becoming wedded to our own theoretical biases. Challenges exist to neoclassical theory; regardless of whether they seem viable, they can provide clues to behavior that help us understand why our preconceptions about the markets we are designing may be wrong.
- We have the obligation to understand the political and policy processes and their dynamics. This is, perhaps, the greatest criticism of economics and economists. However, only through full understanding can we help to influence decision-making in the right directions.
- We have an obligation to participate. You know the old adage – an economist is the best free rider? All of us that live in states that are experimenting with retail choice for electricity and/or natural gas should choose, because only then will we really know the problems first hand. Otherwise, we're no better than the trail of gossips in Norman Rockwell's famous painting, making no useful contribution to our professions or society.

- Perhaps most importantly, we have the obligation to point out that chaos can be good.

Yeah, yeah, I know. Coming from Texas, the land of the "Energy Cartel," this last observation may seem a bit trite, if not downright conspiratorial. Truth is, we are learning a great deal from the myriad of experiences taking place around the U.S. and the world. Most interesting are the clear signs of adaptation as consumers and businesses respond to supply disruptions, even if so many others appear to be not only oblivious but ready to lay blame elsewhere rather than where it belongs, at our own doorsteps. It turns out that conservation may not be such a bad idea, after all. It might even make us more competitive, more flexible and able to deal strategically with a future that might be energy short rather than comfortably long.

We have a full plate for the USAEE this year. The April conference is our most vital forum for networking to exchange ideas, to dialogue. These associations, USAEE and IAEE, are you, me and all other fellow members. We all create depth and richness through sharing our own experiences, and the Houston planning team is working hard to ensure that this conference is the best it can be to encourage this most vital element of our organizations. But as we all work to continuously improve the associations and the value they return to all of us who are members, to encourage best practices in energy economics research and education and to deploy our knowledge within our own businesses and organizations, we have to be mindful of what we represent. Like government, we get the kind of markets we deserve. We represent the knowledge base to ensure good results.

Be sure to check out the latest developments on the Houston conference, *2001: An Energy Odyssey?*, on the IAEE Web site, www.iaee.org. See y'all in Houston!

Michelle Michot Foss

***** USAEE WEBSITE *****

USAEE is on-line. Come visit us at www.usaee.org Some of the features available on the website include the following:

- Overview/Objectives of USAEE
- Council Member Listing & Contacts
- Chapter President Listing & News
- Full Issues of the USAEE Dialogue
- Events/Speakers List
- Calendar of USAEE/IAEE & Other Conferences
- USAEE On-Line Discussion Forum
- Membership Database

Of interest is the Yahoo! USAEE discussion group. We want to foster active discussion within the field of energy economics. Complete instructions on how to get registered for participation in this on-line discuss group are located at the USAEE website.

We're sure that you will find our new site full of up-to-date information. Please feel free to drop USAEE Headquarters an email at usaee@usaee.org if you have any suggestions on how to improve the site.

!!! MARK YOUR CALENDARS — PLAN TO ATTEND !!!

2001: An Energy Odyssey?

24th IAEE International Conference – April 25 – 27, 2001
Houston, Texas, USA – Omni Hotel

If you're concerned about the future of the energy industry and profession, this is one meeting you surely don't want to miss. The 24th IAEE International Conference will detail current developments within the energy industry so that you come away with a better sense of energy supply, demand and price. Some of the major conference themes and topics are as follows:

**Energy Business Metamorphosis
Sustainable Development**

**Technology Transformation – Evolution or Revolution?
New Politics and Energy**

International Political Hearing: Should Government Stay Out of Energy Price Formation?

Volatile fuel prices, market restructuring, globalization, privatization and regulatory reform are having significant impacts on energy markets throughout the world. Most major energy industries are restructuring through mergers, acquisitions, unbundling and rebundling of energy and other services. This conference will provide a forum for discussion of the constantly changing structure of the energy industries.

At this time, confirmed and/or invited speakers include the following:

Robert L. Bradley, Institute for Energy Research
Eugene P. Coyle, Eco-Economics
R. Skip Horvath, Natural Gas Supply Association
Vello Kuuskraa, Advanced Resources International
Edward Morse, Hess Energy Trading Co. LLC
R.K. Pachauri, Tata Energy Research Institute
Maxine Savitz, Honeywell
Vahan Zanooyan, Petroleum Finance Corporation
Jim Payne, Devon Energy Corp.
Hoesung Lee, Council on Energy & Environment, Korea
A. Denny Ellerman, MIT

Leonard L. Coburn, U.S. Department of Energy
Philip Verleger, The Brattle Group
John W. Jimison, Berliner, Candon & Jimison
Kevin Lindemer, CERA
Oystein Noreng, Norwegian School of Management
Marvin Zonis, Marvin Zonis + Associates, Inc.
Jerome Taylor, CATO Institute
Robert Harvey, Reliant Energy
David Teece, Univ. of California at Berkeley
Michael Grubb, Imperial College
Jean (Pogo) Davies, Conoco, Inc.

K. Kobayashi, International Affairs, Natural Resources and Energy, METI

Dr. Kenneth Lay, Chairman of Enron Corp., will open the conference on April 25, with a keynote luncheon presentation. **Steve Miller, Chairman, President & CEO**, Shell Oil Company will speak at a special breakfast on Thursday, April 26 and **Shirley Neff, Senior Economist**, U.S. Senate Energy and Natural Resources Committee, will provide an overview of U.S. energy politics and policy at a special breakfast on Friday, April 27. In addition, 18 concurrent sessions are planned to address timely topics that affect all of us specializing in the field of energy economics.

The conference will feature an opening reception in the world-renowned Wiess Energy Hall at the Houston Museum of Natural Science. On Friday afternoon, April 27, two skills sessions will be arranged on real options and electric power trading. On Saturday, April 28, there will be a special tour and program on oil history and future trends using the occasion of the Spindletop anniversary.

Houston, Texas is homebase to many worldwide energy companies and a great place to meet. Single nights at the Omni Hotel are \$139.00 (contact the Omni Hotel at 713-871-8181, to make your reservations). Conference registration fees are \$500.00 for IAEE members and \$600.00 for non-members.

For further information on this conference, please fill out the form below and return to IAEE Headquarters.

2001: An Energy Odyssey?

24th Annual International Conference of the IAEE

Please send me further information on the subject checked below regarding the IAEE Conference.

Registration Information Sponsorship Information Accommodation Information

NAME: _____

TITLE: _____

COMPANY: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

COUNTRY: _____ **Phone/Email:** _____

**IAEE Conference Headquarters
28790 Chagrin Blvd., Suite 350
Cleveland, OH 44122 USA**

Phone: 216-464-2785 Fax: 216-464-2768 Email: iaee@iaee.org

Visit the conference on-line at: <http://www.usaee.org/conferences/index.asp>

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CALL FOR PAPERS

4th USAEE/IAEE/Allied Social Science Associations Meeting

Atlanta, GA – January 4 - 6, 2002

The IAEE annually puts together an academic session at the ASSA meetings in early January. This year's session will be structured by Carol Dahl of the Colorado School of Mines.

The theme for the session will be "*Current Issues in Energy Economics and Modeling.*"

If you are interested in presenting please send an abstract of 200-400 words to Carol Dahl at cadahl@mines.edu (cadahl@mines.edu) by May 25, 2001. Preliminary decisions on papers presented and discussants will be made by July 1. The program including abstracts will be posted at iaee@iaee.org by September 1, 2001. Please send abstracts in electronic format that is easily converted into program information. (e.g. word, wp, text).

For complete ASSA meeting highlights and pre-registration information please visit: <http://www.vanderbilt.edu/AEA/index.htm>

Professor John Lohrenz

John Lohrenz died last April, two weeks after suffering a severe stroke. News of his untimely death has tended to be confined to the engineering fraternity. And indeed it is in the engineering field that John was most well known. But his abilities were broad ranging, and he was able to apply his quantitative skills, allied to his strong petroleum engineering background, to the economics of the upstream petroleum industry. And in this way he became known to the energy economics fraternity.

John's career spanned industry, government and academia. He started as a junior chemical engineer (in 1952) and progressed through service with Continental Oil (as Research Group Leader), with International Petrodata (as Executive Vice President), with the U.S. Geological Survey (Chief Applied Research and Analysis Section), with Gulf Exploration and Production Division, and with Chevron Oil Field Research Company. Given his focus on applied research, it was fitting that John's final position, commencing in 1989, should be academic, with his appointment as Professor of Chemical Engineering at Louisiana Technical University.

John had great expertise in reservoir modeling and simulation, which he taught at Louisiana Tech, but he also taught courses in oil and gas exploitation economics, offshore oil and gas development economics and applied statistics. His contributions to the engineering literature were many, but he also made his mark in petroleum economics, publishing in *The Energy Journal* most recently a paper on horizontal drilling, as well as participating in AIEE conferences. He was also a diligent referee for *The Energy Journal*. Here he brought a lot to the table since his skills in petroleum economic analysis were backed up his very extensive engineering knowledge - not many individuals were blessed with such a combination.

He was a lively reviewer of manuscripts, a vigorous disputant, and was willing to spend time as a peer reviewer, quite apart from more formal refereeing chores. His contributions were always valued by those fortunate enough to get his advice.

He is a great loss to the petroleum engineering and economics. We know of no one with his portfolio of skills.

Morry Adelman and
Campbell Watkins, March 13, 2001

Conference Proceedings 20th North American Conference Orlando, Florida, August 29 to September 1, 1999

The Proceedings from the 20th Annual North American Conference of the USAEE/IAEE held in Orlando, Florida, are now available from USAEE Headquarters. Entitled *The Structure of the Energy Industries: The Only Constant is Change*, the proceedings are available to members for \$85.00 and to nonmembers for \$105.00 (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. To order copies, please complete the form below and mail together with your check to:

Order Department, USAEE/IAEE Headquarters, 28790 Chagrin Blvd., Suite 350 Cleveland, OH 44122, USA

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Address _____

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Please send me _____ copies @ \$85.00 each (member rate) \$105.00 each (nonmember rate).

Total enclosed \$ _____ Check must be in U.S. dollars and drawn on a U.S. bank, payable to IAEE.

22nd USAEE/IAEE NORTH AMERICAN CONFERENCE

Hosted by:
United States Association for Energy Economics

Energy Markets in Turmoil: Making Sense Of It All

Sheraton Wall Centre Hotel – Vancouver, British Columbia, Canada
October 6-8, 2002

Conference Objective

To explore the forces driving the dramatically changing energy landscape – including price volatility, market restructuring, sustainability imperatives, policy constraints and technology

Suggested Session Themes and Topics

Sessions are currently proposed in:

Electricity markets: lessons from California

Natural gas markets: demand, supply and prices

North American energy policy: Canada, Mexico and U.S. relationships

Can fossil fuels be sustainable?

****** CALL FOR PAPERS / SESSION PROPOSALS ******

Abstract Submission Deadline: May 1, 2002

(include a short CV when submitting your abstract)

Anyone interested in organizing a session should propose topics, motivations, and possible speakers to:

Mark Jaccard – (p) 604-291-4219 / (f) 604-291-5473 / (e) jaccard@sfu.ca

Abstracts for papers should be 200 words or less. At least one author from an accepted paper must pay the registration fees and attend the conference to present the paper. All abstracts should be submitted to:

David Williams, Executive Director, USAEE/IAEE
28790 Chagrin Blvd., Suite 350, Cleveland, OH 44122 USA
Phone: 216-464-2785 / Fax: 216-464-2768 / E-mail: usaee@usaee.org

General Conference Chair: Arnold B. Baker

Program Chair: Mark Jaccard

Arrangements Chair: David L. Williams

AGAIN THIS YEAR: USAEE Best Student Paper Award (\$1,000 cash prize plus waiver of conference registration fees). If interested, please contact USAEE Headquarters for detailed applications / guidelines.

STUDENT PARTICIPANTS: Please inquire also about scholarships for conference attendance.

CONTACT: Dave Williams, Phone: 216-464-2785 / Fax: 216-464-2768 / E-mail: usaee@usaee.org

Power Price Volatility and Power Asset Valuation

*By Kemm C. Farney**

Over the past forty years, the power industry has gone through one grand dislocation after another. The nuclear build out began in the 1960s, and suffered through cost overruns and schedule slippage in the 1970s before winding down in the early 1980s. Critical pressure steam generation followed a similar but compressed expansion and contraction during the latter portion of this period. In the late 1970s, PURPA resulted in the decriminalization of industrial cogeneration by about 1985. Post-1987, the focus of interest was “enhancing shareholder value,” and the rehabilitation of the industry’s common stock prices. Almost simultaneously, the industry wrestled with the early demands of compliance with environmental regulations. Most recently, the thrust has been deregulation – which in practice seems to have translated into the commoditization of wholesale power markets.

Each of these great episodes – dislocations – has led to a complete rewrite of the industry’s institutional relationships. Nuclear led to huge capitalized and amortized regulatory assets. PURPA allowed new power producers into the game. Environmental controls fundamentally changed the economics of power production, and transferred huge amounts of value to the rail transportation industry. Enhancing shareholder value left us with more than a decade long overhang of deferred maintenance. In today’s market, commoditization is brutalizing inefficient producers and heaping rewards on those who are agile.

Each of these changes in the rules of engagement resulted in dramatic changes in the value of generating assets. In today’s freewheeling power market, the single most controversial issue is asset valuation. And just as at each of the prior watersheds, the stakes are high and there will be big winners and big losers.

Real Assets as Real Options

Modern financial theory teaches that a real asset may be viewed as a portfolio of real options. These individual options can then be valued – using one of the many valuation models derived from the Black-Scholes literature – in order to obtain an assessment of the fair market value of the asset. Of course, the price that an asset might actually bring in a sale may not be equal to its calculated fair market value, but the promise of economic and financial analysis is that the two will usually be closely related.

WEFA finds that the biggest single problem faced by power project developers is accurately representing the fair market value of the real option they’re offering the market. Those evaluating project economics have a strong inclination to use traditional tools – such as discounted cash flow – in assessing a proposal’s attractiveness. Using traditional methods in itself is not bad, but it generally treats the forecast of realized prices as a point forecast – that is, as if future prices are known with certainty to always take on the average value of the forecast, with no variation around the forecast.

This is an unfortunate error. In the power industry, it ignores much of the real economic value that these projects offer. It ignores the opportunity to earn larger margins at

Kemm C. Farney is Vice President, Electric Power, WEFA, Inc.

those times when price is high and to avoid incurring production costs when prices are low. It ignores the option value of the investment.

The opportunities offered by price volatility are quite significant. In a recent study of power markets in Texas, WEFA calculated that a project that has an annual capital servicing cost of \$49,483/mW could have earned as much as \$91,495/mW in incremental margins during 1999 by exploiting volatile periods. The potential is literally enormous.

By way of contrast, in the arithmetic of option valuation, the single most important factor in determining fair market value is the volatility of the underlying price. In fact, relative to final valuation, the level of volatility is much more important to the Black-Scholes calculation than the choice of an interest rate is to discounted cash flow. [For the record, price volatility is defined in one of two ways. Theoretically, it is the value that solves Black-Scholes given a forward price and a price on an option on the forward (implied volatility). In practice, it is often the annualized standard deviation of the log of the daily returns on price (historical volatility).]

Electric power has turned out to be the most volatile commodity ever traded. The volatility of Treasury Bonds is about 9% or 10%. The volatility of the S&P 500 is about 20%. The volatility of natural gas prices is about 160%. The volatility of wholesale electric power prices delivered at regional market hubs usually ranges between 400% and 600%. It frequently spikes well above 1,000%.

The Illiquidity of Power Markets

Most observers agree that the extreme volatility of wholesale electric power prices is driven by the illiquidity of power markets. Take the case of Texas, just as one example. Texas is a big state, bigger than many European countries, but the power market is pretty small. It peaks in August at about 60 gW. In comparison, the AEP system in the Ohio Valley has more than 40 gW of installed capacity all by itself.

The transmission system in Texas is not a neatly symmetrical grid. Instead, the high voltage transmission system forms a crescent moon shape around the eastern edge of the state, running from Dallas to Houston and down to the Rio Grande Valley. The transmission interties were never intended to support commercial traffic, and many bottlenecks exist. During periods of extreme conditions and high loads, these three regions become electrically isolated and no incremental trades between the regions are possible.

On normal days, there are between five and ten possible counterparties to a power trade participating in the Texas market. During times of crisis, however, participating in this market just becomes too risky, and “everyone just goes home.” During disruptions, the only people left in the market are desperate.

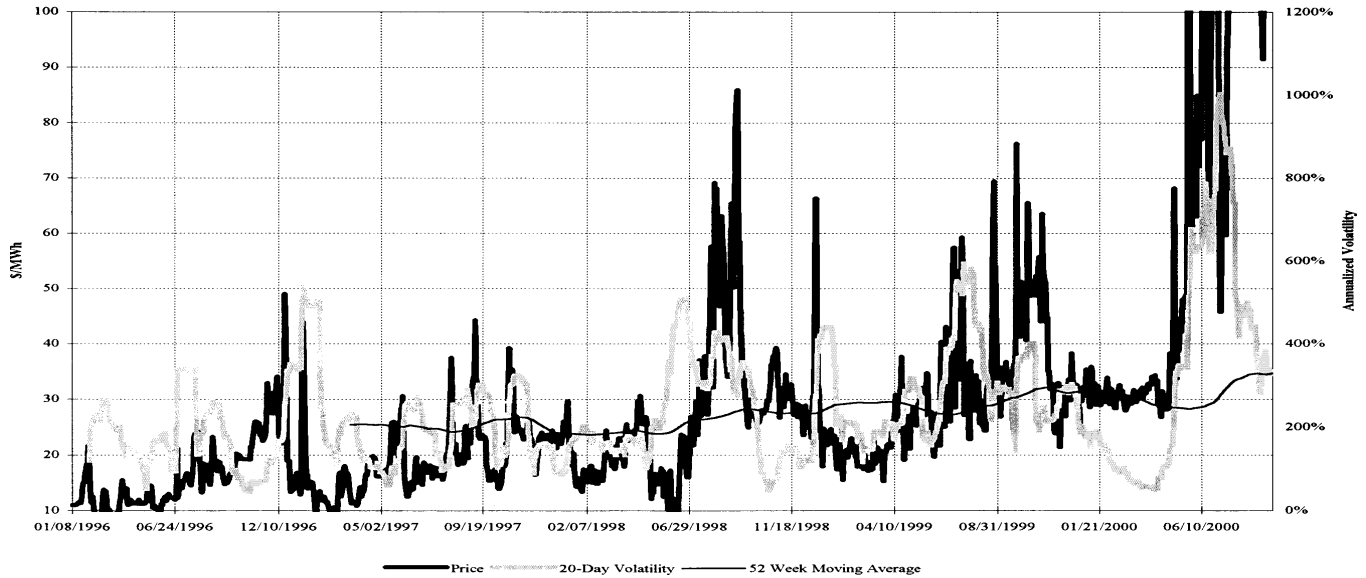
In the year 2000, there were 14 days when prices exceeded \$100/mWh. Of those 14 days, the total volume transacted was only 100 mW – probably one transaction – on 6 of those days and only 150 mW on two other days. It is very clear that during periods of very high prices, there is a shortage of counterparties. Of course, these markets will grow and develop and become more liquid. But will they ever be liquid? They’ll never be liquid markets in the same sense as the market for Treasury Bonds.

Historical Volatility

This first figure depicts the pattern of wholesale power prices – and the volatility of those prices – at the oldest quoted power trading hub in the US – The California Oregon Border, or COB.

Of course, the heat wave and draught in supply-short southern California has caused most of the disruption observed at COB this summer. But we must not fall into the trap of arguing that that makes this a special case. That's not how commodity markets work. Last summer, the problem was in

**COB 20 Day Historical Volatility
And Daily Price**



This is all the history – it starts in January 1996. The red line is 20-day historical volatility, as calculated by WEFA. The blue line is a 52-week moving average of historical volatility, and captures the trend in volatility after the wild seasonal swings have been taken out.

The story is that volatility is expanding over time, spiked above 1,000% this summer, and has averaged between 300% and 400% over the past year.

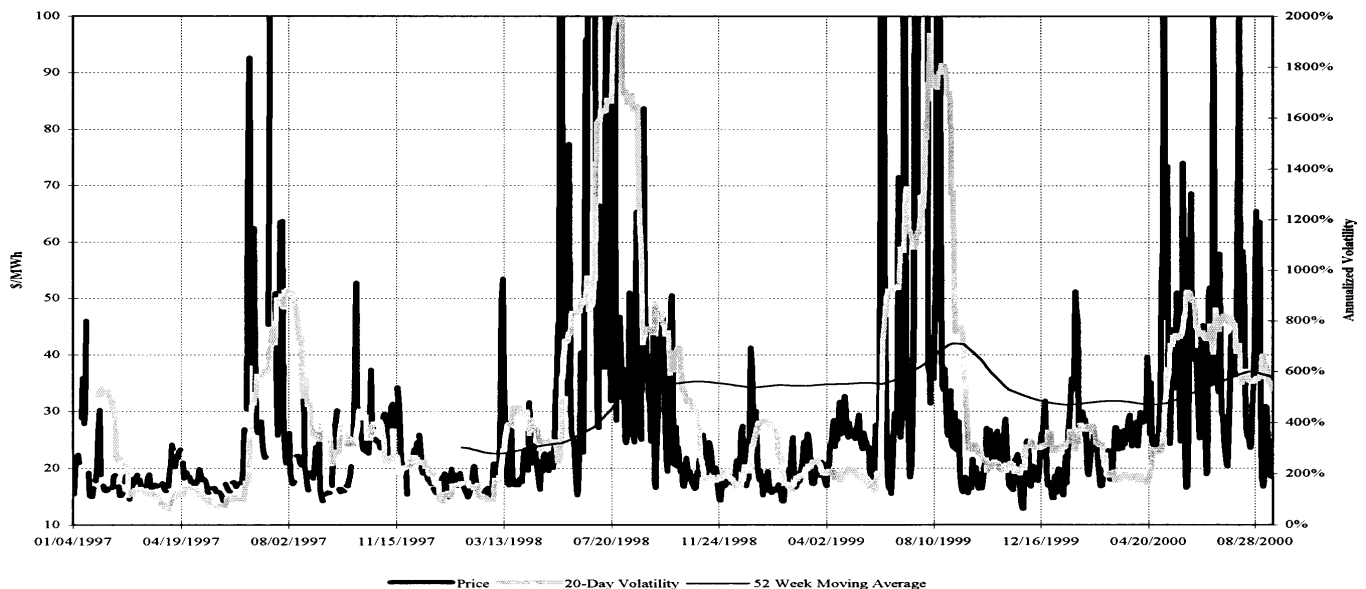
CINergy, and the summer before that it was in Springfield. The lesson of commodity markets is “it’s always somethin’.” Volatility is the one constant feature of commodity markets.

In fact, you can see an exactly comparable pattern developing in CINergy, in the Ohio Valley.

This summer was not as wild as last summer and the summer before, but annualized volatility is still remaining astronomically high, near 600%.

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**CINERGY 20 Day Volatility
And Daily Price**



Power Price Volatility (continued from page 7)
Boom/Bust Construction Cycle

A second factor becomes more apparent in this chart for CINergy – the rapidly developing business cycle in power industry capital spending. We’re in the middle of a construction boom, especially in selected markets like Texas. At this point in time, huge amounts of construction is underway or about to break ground, and the enthusiasm is still such that there have been very few reported cases of project schedule slippage or project cancellations.

The table below allows us to look at these developments in from a different vantage. It shows the average on-peak prices realized and costs of production – by month – for the past 4 years. Of most interest to me is the difference between the average price for financially firm power and average system lambda. What I’ve called the “Implied Firmness Premium,” or the price the market is willing to pay for firmness alone, over and above the simple cost of production. I realize that the real profit picture is substantially more complicated than this, but I think you will also agree with me that this calculation should be a quick, simple and understandable proxy for the profitability of the next unbuilt power plant.

These calculations really do tell the story. First, realized prices have gone up by a great deal – so much so that they have increased about 80% since 1996, 1997 and 1998. More important, profitability – as measured by the Implied Firmness Premium – has exploded from about \$2.50/mWh as an annual average to \$6.64/mWh in 1998 and \$16.97/mWh in 1999. Prices realized in 2000 have averaged \$44.60/mWh over the first 9 months of the year, and will probably finish the year averaging \$40/mWh. At the same time, average production costs are probably unchanged or slightly lower. The bottom line is that profitability is probably even better this year than last.

Second, the pattern of profitability is very telling.

Profitability is nil – as a rule – from November through May. Profitability peaks – at astronomical levels – in either July/August or August/September, depending upon the weather. Project developers really are expecting for their project to just break even most of the time, but to really make a killing during a very few weeks out of the year.

More important, this period of profitability has widened substantially over the past two years, just as volatility has increased. It is no coincidence that this spate of rapid construction is occurring simultaneously with a widening of the summer volatility storm in power prices. As can be seen in the CINergy chart, the volatility storm started earlier this summer than ever before – in May in most markets – and is extending further into September than we have been used to.

Its this wide open window that makes project developers so enthusiastic about power plant construction right now. As developer’s expectations regarding the prospective severity of these storms become less optimistic, we will begin to see discussion of project schedule slippage, announcements of slipped schedules, and finally project cancellations. The downturn in power industry construction spending will coincide with markets that are no longer as short of supply, followed by less attractive opportunities for project development that result from an expectation of fewer episodes of disrupted markets.

Volatility and Valuation

To illustrate just how important volatility is in determining the fair market value of a real option, consider the construction budget that was begun earlier in this paper. Assume that:

- realized power prices average \$30/mWh when the plant comes on-line in January 2005,
- realized prices go up with the rate of general inflation,
- the cost of gas is \$2.87/mmBTU in 2005, escalating at 2% annually,

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
ERCOT (\$/mWh)													
On Peak 1996													
Power Markets Week Index								21.97	19.27	24.72	27.60	35.01	25.71
On Peak Lambda 1996	19.68	24.48	24.85	22.29	21.71	23.51	24.52	19.81	17.12	21.99	27.20	33.12	23.36
Implied Firmness Premium								2.16	2.15	2.73	0.39	1.89	2.36
On Peak 1997													
Power Markets Week Index	30.44	21.21	18.83	18.50	20.41	21.37	37.39	28.90	34.50	32.59	29.39	19.75	26.11
On Peak Lambda 1997	32.01	19.83	17.19	18.14	20.21	20.70	21.68	24.50	27.85	28.93	28.22	21.76	23.42
Implied Firmness Premium	(1.57)	1.38	1.64	0.36	0.20	0.67	15.71	4.40	6.65	3.66	1.17	(2.01)	2.69
On Peak 1998													
Power Markets Week Index	19.23	18.65	21.45	23.07	24.76	27.66	53.12	47.17	27.10	25.95	18.84	17.85	27.07
On Peak Lambda 1998	19.16	20.18	21.43	23.28	21.31	21.83	22.11	19.07	20.17	19.06	20.13	17.45	20.43
Implied Firmness Premium	0.07	(1.53)	0.02	(0.21)	3.45	5.83	31.01	28.11	6.92	6.89	(1.29)	0.40	6.64
On Peak 1999													
Power Markets Week Index	18.76	18.99	18.11	18.26	23.02	26.36	27.88	41.22	178.77	26.71	27.18	23.78	37.42
On Peak Lambda 1999	19.16	20.18	21.40	23.27	21.35	21.77	22.20	19.15	20.08	19.11	20.16	17.52	20.45
Implied Firmness Premium	(0.41)	(1.19)	(3.29)	(5.01)	1.67	4.58	5.68	22.07	158.69	7.60	7.02	6.26	16.97
On Peak 2000													
Power Markets Week Index	23.14	25.05	25.62	26.12	30.03	43.35	90.25	52.22	85.62				44.60
On Peak Lambda 2000													
Implied Firmness Premium													

- the federal funds rate is at 5.5% and the firm's opportunity cost of capital is 8.6%,
- the plant's heat rate is 7,000 BTU/kWh,
- as has been observed in many commodity industries, the plant's non-fuel O&M costs average 2% of the plant's construction cost, and
- the plant runs with a 95% capacity utilization rate.

The fair market value of the option increases dramatically as annualized volatility increases, especially over the range of about 25% to 175%.

Recall that the present value of construction costs yet to be incurred – the so-called strike price – was calculated to be \$125 million. As can be, the fair market value of the option exceeds the strike price – it's a good deal for the project developer – at all levels of price volatility. But at low levels of price volatility, below 25%, the difference between the premium and the fair market value is the smallest. The danger is that if cost overruns—or benefit underruns – occur, the developer could easily be left with an under earning asset.

Interest Rate Risk

In traditional cost/benefit or discounted cash flow analysis, the biggest single risk to the present value of a project is the choice of discount rate. Seemingly small changes in the rate at which the future is discounted can have a startlingly large impact on the value of a project.

In the present interest rate environment, many analysts are focused on when interest rates will come down. There are important risks, such as the value of the dollar versus the euro, however, that could cause a significant rise in interest rates over the intermediate term.

Consider the case in which the assumed cost of capital is too low by 100 basis points – suppose that both the federal funds rate and the yield on 30-year Treasury bonds both increase to 6.5% and 6.93%, respectively. Our CAPM model of the firm indicates that its opportunity cost of capital will increase to 9.25%. In this higher interest rate environment – but only slightly higher – the strike price of the option falls very slightly to \$123 million.

The higher interest rate environment makes the investment much less attractive at all levels of volatility – by as much as \$50 million. Especially in combination with other factors, interest rate risk can play a key role in turning a good development project into an under-earning asset.

Operating Risk

Instead of a high interest rate scenario, imagine a scenario in which the plant simply does not perform up to the design criteria. Imagine a high operating cost scenario in which the plant endures the following handicaps:

- the plant's capacity utilization rate is only 85%,
- the heat rate is 8,000 BTU/kWh, and
- O&M costs are twice there expected value.

The assumed degradation in performance, while well within the range of possible outcomes, devastates the economics of this project. The real option value of the asset is reduced by about \$150 million for any level of price volatility. Between one-third and one-half of the project's commercial

value is destroyed.

Implications for Capital Budgeting

Prices realized in newly commoditized markets have been a great deal more volatile than anyone ever expected. Viewing the planned construction of a new generating plant as an investment in a portfolio of real options is a critical step in the development of a successful business strategy. Because of the fact that an increase in price volatility raises the value of all real options, one finds that these assets are often much more valuable than their owners – the project developers – believe.

At the same time, WEFA has become aware that a number of new combined cycle plants are delivering poor financial results and already appear to be starved for capital. The plants' financial controllers are managing to the pro forma, and the pro forma simply did not allow for adequate maintenance. The true cost structure of the new advanced gas turbines is simply different from what was assumed in the pro forma.

These capital and operating and maintenance surprises associated with advanced gas turbines are critically important to the economics of gas turbine technology and the presumption that gas combined cycle generation is the clear power generation technology of choice over the foreseeable future. It is now apparent that there is a more or less probable chain of events –

- unexpectedly gas high turbine capital and running costs coupled with
- surprisingly high prices for natural gas and
- a prospective 2.5 micron rule that frees coal plants from the rail freight stranglehold after about 2008
 - that substantially shortens the window during which gas combined cycle is the clear winner.

WEFA now believes that just as green-field coal or nuclear construction is now widely viewed as being non-economic, gas will find similar disfavor no later than about 2010. After approximately 2010 (in our baseline scenario) the 2.5 micron particulates rule will begin to take effect. Surviving coal plants will have installed the technical equivalent of wet FGD at great expense.

With wet FGD universally deployed, coal plants can burn anything – buffalo chips, if they want – without emissions problems. It is very possible that the economics that now favor Powder River Basin coal will change dramatically at that time and the stranglehold of the railroad robber barons will be broken. After all, with FGD installed, even the worst local coals can be burned with impunity.

Advanced gas turbines are not a panacea to the power industry's long-term need for new generating capacity. In today's market, they monopolize everyone's attention because the economics really do appear to be persuasive. What we've found, however, is that profitability is something of a knife edge – relatively small changes in environmental conditions can move the economics decidedly against the project.

Existing and Proposed “Wind Farms” Cannot Make a Significant Contribution To Wisconsin’s Electricity Supply and Reliability or Pollution Reduction

By Glenn R. Schleede*

Introduction

Various federal and state government officials - as well as “wind farm” developers and “renewable” energy advocacy groups - have touted windmills as an environmentally benign and economically acceptable way to produce electricity. Analysis of the facts, however, leads to opposite conclusions.

Recognizing the facts, it’s hard to understand why advocates of wind energy have been so successful in:

- Convincing the public, the media, regulators and elected officials that windmills can make a significant contribution to electricity supply and to emission avoidance.
- Securing tax shelters and other measures that are so favorable to “wind farm” developers and so unfavorable to consumers, taxpayers, and those who must live near “wind farms.”
- The analysis underlying this paper focuses on one state – Wisconsin – where four “wind farms” have already been built and where two more have been proposed.

Total electricity from “wind farms” would equal about 1/4 of 1% of Wisconsin’s electricity production

The 83 large existing and proposed windmills will generate very little electricity and cannot make a significant contribution in supplying Wisconsin’s electricity or improving its reliability:

- The total output from the 35 windmills on four existing “wind farms” equaled 0.082% of the Wisconsin’s 1999 electricity production,
- The estimated output from the 28 windmills that would make up FPL Energy’s proposed Addison “wind farm” would equal 0.091% of Wisconsin’s 1999 electricity production,
- The estimated output from the 20 windmills that would make up Enron’s proposed Eden (Iowa County) “wind farm” would equal 0.113% of Wisconsin’s 1999 electricity production, and

* Glenn R. Schleede is with Energy Market & Policy Analysis, Inc., Reston VA. This report is the second in a series undertaken by Energy Market & Policy Analysis, Inc. and at its own expense to assess the potential for “wind energy” in individual states. The first state report, *Recently Announced Texas “Wind Farm” Projects Demonstrate that the Potential Contribution of Wind Energy is Limited*, was released on September 13, 2000. A slightly edited version of the report can be found on the following web page: <http://www.poweronline.com/content/news/article.asp?DocID={0025F7C7-9ADD-11D4-8C69-009027DE0829}&Bucket=Features+%26+Case+Studies>

- All six “wind farms” combined — with 83 very large windmills — would produce electricity equal to 0.286% — i.e., just over 1/4 of 1% — of Wisconsin’s 1999 electricity production.

Wisconsin’s electricity demands are increasing rapidly. In fact, the amount of electricity demand by and delivered to electric customers in Wisconsin in 1999 was 3% above 1998 amounts.¹ As recent announcements of plans for new generating facilities make clear, the significant amounts of additional electricity required for Wisconsin’s increasing demands can be satisfied effectively and at reasonable cost only by adding significant natural gas or coal-fired generating capacity. *Those demands cannot be satisfied by building large windmills that produce electricity only intermittently and then in truly insignificant amounts.* Fortunately for Wisconsin electricity users, WEPCO, WP&L, and others have proposed building substantial new gas and coal-fired electric generating capacity in Wisconsin.²

The principal reasons that windmills contribute so little to electricity supply and reliability is because:

- Despite their large size, actual electricity output is small, and
- They produce electricity only when the wind speed is within a certain range. The actual electricity output at any time depends on the wind speed. The full, “rated” output occurs only at speeds of 30 to 34 mph in the case of Wisconsin’s existing “wind farms.”³

A critically important factor when evaluating the potential contribution of windmills is their “capacity factor.” The capacity factor of *any* electric generating unit is calculated by dividing the net electricity output (in kilowatt-hours) by the rated capacity (in kW) times the hours in a year. Because windmills are dependent on the availability and speed of the wind, they have very low (typically 15% to 30%) capacity factors. This means that windmills produce only a small part of their “advertised” nameplate capacity.

On the other hand, the “base load” fossil-fueled and nuclear power plants that Wisconsin depends on for most of its electricity operate at much higher capacity factors – in effect, whenever they are needed — since they aren’t dependent on wind conditions.

Tens of Thousands of Windmills Would be Needed.

“Wind energy” will never be able to make a significant contribution in supplying Wisconsin’s electricity demands. It would take:

- 3,587 windmills of the size proposed for the Addison “wind farm,” operating at a 25% capacity factor, to equal the 1999 electricity output of Point Beach nuclear plant,
- 4,407 windmills of that size and capacity factor to equal the 1999 electricity output of the Pleasant Prairie coal-fired generating plant, and
- 3,267 windmills of that size and capacity factor to equal the output of the planned new gas-fired generating plant at Kenosha, if the Kenosha plant operates only at a 70% capacity factor.

“Wind resource” maps for Wisconsin suggest that the areas with suitable wind conditions for “wind farms” are quite limited. The potential areas are further limited by existing and planned land uses, recreational, scenic and other environmental considerations, the fact that many property owners do not want windmills in their neighborhoods, and the fact that “wind farms” must be located near existing transmission lines.

Any Emissions That Would be Avoided Would be Tiny, at Best.

Wind energy advocates often claim that significant quantities of air emissions – sulfur dioxide (SO₂), nitrogen oxides (NO_x) and carbon dioxide (CO₂) – will be avoided if wind energy is substituted for electricity generated by using coal, natural gas or oil. Even if the amounts claimed by advocates were correct (As explained below, they are not.), those “reductions” are very small compared to either the emissions associated with Wisconsin’s electric generation or with the reductions that could be achieved in other ways.

Anyone seriously interested in reducing or avoiding emissions would not waste time and effort on building windmills to produce electricity. The claimed “avoided emissions” from three operating and one planned “wind farms” (61 windmills) combined would add up to a small fraction of 1% of the emissions from Wisconsin’s existing generating plants.⁴

As explained in detail in an earlier report,⁵ there are several ways in which Wisconsin’s electric generating companies could reduce emissions of sulfur dioxide (SO₂), nitrogen oxides (NO_x) and carbon dioxide (CO₂) that would be much more effective than building windmills. The alternatives include:

- Building modern, gas-fired, combined cycle generating units (like the one now planned for Kenosha, Wisconsin by PG&E’s Badger Company) to supply Wisconsin’s rapidly increasing demand for electricity and, possibly, replacing older generating units.
- Repowering existing, coal-fired generating units with modern gas-fired, combined-cycle generating units.
- Installing additional pollution control equipment on existing coal-fired generating plants (e.g., scrubbers to reduce sulfur dioxide and/or selective catalytic reduction (SCR) and/or low-NO_x burners to reduce nitrogen oxides).

Tax shelters and other subsidies for windmills shift costs from “wind farm” owners to taxpayers and electric customers, with those costs hidden in tax and monthly electric bills.

Apart from tiny contributions that windmills could make to Wisconsin’s electricity requirements and emission reductions, it is important to recognize that even the advocates of wind energy agree that it costs much more to produce electricity using windmills than with generating units using the “traditional” energy sources (e.g., coal, natural gas, hydropower).

In fact, it is the widespread recognition of this fact that has led the wind energy industry and its lobbyists, “renewable” energy advocacy groups, electric generating companies, the DOE, and DOE laboratories to lobby for a wide variety of tax breaks and other subsidies.

These interest groups have been amazingly effective. Their efforts have resulted in a host of federal and state tax shelters and other subsidies that are available to “wind farm” developers. When the effects of these tax shelters and subsidies are considered, “wind farms” are now a highly profitable venture.

Seldom mentioned, however, is the fact that the net effect of the tax shelters and other subsidies is to shift a large share of the true costs of the projects from “wind farm” owners to ordinary electric customers and taxpayers, and to hide those costs in tax bills and monthly electric bills. This is accomplished in four basic ways:

- Tax shelters (including accelerated depreciation, production tax credits, and property tax exemptions) that reduce the amount of corporate income tax and property tax paid by energy companies that build “wind farms,” with the result that the tax burden is shifted to other income and property tax payers.
- Direct subsidy payments from the federal and/or state governments to wind energy companies (usually for R&D) and advocacy groups (for “studies” and lobbying) with the money coming from tax revenue or so-called “public benefit charges” added to electric bills.
- Statutory or regulatory requirements, including so-called “Renewable Portfolio Standards” that increase the overall cost of electricity generation and, therefore, the rates per kWh charged to all electric customers.
- Premium prices (often called “green pricing” programs) allowed by some state governments, including Wisconsin, wherein electricity producers or suppliers charge customers premium prices for electricity produced by windmills.

The tax shelters and other subsidies now available include the following:

- 1. Federal tax shelters:** Current federal tax law provides two very generous tax shelters to owners of “wind farms.”
 - **Accelerated depreciation.** “Wind farm” owners are permitted to use five-year double declining balance accelerated depreciation to write off their investment. The practical effect of this tax benefit is to permit the company owning the “wind farm” to recover 52% of its equity investment in the first 18 to 24 months and the remaining 48% in the ensuing 36 to 48 months. Thereafter, the return on investment is infinite!
 - **Production tax credit.** “Wind farm” owners receive a production tax credit of 1.7 cents per kWh of electricity produced during the first 10 years of operation. The 1.7 cents is subject to upward adjustment each year for inflation.

The DOE provides direct payments of 1.7 cents per kWh to organizations (e.g., municipal utilities) that own “wind farms” but are exempt from taxation and, therefore, cannot take advantage of the production tax credit tax shelter

- 2. Federal R&D subsidies.** Tax dollars flowing through the

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Wind Farms (continued from page 11)

DOE are provided to various organizations in the wind energy industry (including the DOE's contractor operated laboratories and profit-oriented contractors) to support research, development, demonstration and deployment (RDD&D) activities, and to advocacy and lobbying organizations such as the American Wind Energy Association (AWEA). DOE's FY 1999 budget provided \$34.4 million for wind energy, followed by \$32.8 million in FY 2000 and a request for \$50.8 million for FY 2001. Some of tax dollars that flow through DOE are used to help pay for the cost of "wind farms."

3. State Subsidies. Tax shelters and other subsidies provided by state governments vary widely among states. Depending on the state, they may include:

- Accelerated depreciation paralleling the federal benefit — to shelter profits from state income taxes.
- State production tax credits or direct subsidies (e.g., for R&D). In some cases, subsidies are paid for with funds collected from electricity customers under "public benefit charge" labels. Such charges are, in effect, a "tax" but are collected by utilities rather than the state tax bureau and, therefore, tend to be less visible to electric customers than a charge that is clearly labeled as a tax.
- Property tax exemptions. Some states, including Wisconsin, exempt wind turbines from property taxes and, in some cases, other state or local taxes.

4. Renewable Portfolio Standards (RPS). Renewable portfolio Standards are another way that "wind farms" and other eligible "renewable" energy sources are subsidized. In effect, electric generating companies or other electricity suppliers are required to obtain a specified portion of the electricity they produce and/or sell from "renewable" energy sources. To the extent that electricity from "renewable" energy sources is more expensive than from alternative sources, the cost is still passed through in one way or another to electric customers. In effect, it becomes a tax on electricity produced from "traditional" energy sources (i.e., coal, natural gas, oil, nuclear energy or hydropower).⁶

5. Charging premium prices for "green" electricity. Several states permit "wind farm" owners still another way to profit. Electricity suppliers are allowed to charge a premium price for electricity produced from specified non-hydro "renewable" energy sources to those customers who volunteer to pay the added cost through "green pricing programs." The premium permitted in Wisconsin varies among utilities in the range of \$0.02 to \$0.033 cents per kWh.⁷

As long as such premium charges are voluntary, there is relatively little basis for objection *except that* the full cost of administering the programs probably is not recovered from the electric customers who "volunteer." Costs not recovered from such customers would be spread to other customers of the utility.

Recognizing the truly tiny amounts of emissions that might be avoided (as explained above and below) and the adverse environmental impacts associated with "wind farms," it is truly amazing that public utility commissions would sanction such programs. *Hopefully, those volunteering to pay the premiums recognize that the intrinsic value is limited largely to that which can be derived from cocktail party conversations.*

Wind energy advocates *understate* the true costs of electricity from windmills and *overstate* the amount of emissions that can be "avoided."

When wind energy advocates make claims about the benefits of wind energy, they generally *understate* the true costs and *overstate* the amount of emissions that can be avoided. They assume incorrectly that all electricity produced by windmills offsets an equal amount of electricity generated from other generating plants. This simply isn't the case for two principal reasons:

1. They ignore the need for backup generating capacity.

As indicated earlier, windmills generate electricity only when the wind is blowing at speeds within a certain range. The lower the speed within the range, the smaller the amount of electricity that is produced. Thus, the electricity available from windmills is *highly* intermittent. In the U.S., few people depending on electricity are willing to have it available only intermittently; i.e., only when the wind is blowing at acceptable speeds. Therefore, *other* sources of electric generation must be *immediately* available so that electricity is always available on demand for customers' homes, farms, buildings, factories and equipment, not just when the wind is blowing.

Because of this limitation on wind energy, other generating units, powered by "traditional" sources of energy — coal, natural gas, oil, nuclear energy or hydropower — must be immediately available to "back stop" the wind units and generate needed electricity whenever the windmills are not producing. To provide immediate backup power, the other units must be either:

- Producing electricity for the electric grid but at less than full capacity and efficiency, or
- In "spinning reserve" status (i.e., operating and synchronized with the electric grid but not producing power for the grid) or "hot standby" (i.e., operating but not synchronized with the grid or producing power for the grid).

2. Backup generating units give off emissions and incur costs allocable to wind energy.

Generating units operating in the above modes are incurring costs — even when they are a "back stop" to windmills. The fossil fuel-fired units (coal, natural gas, oil) will also be giving off some emissions — even while operating in their backup role for windmills.

Fortunately, because the cost of generating electricity from windmills is expensive, the electricity produced from the other generating units is almost always *less* costly. However the added cost of the backup units should be allo-

cated to and counted as a part of the true cost of electricity from windmills.

Wind energy advocates overstate the potential benefits and contribution of “wind farms” in other ways.

Unfortunately, the misleading claims made by wind energy developers and advocacy groups, officials of the DOE, and DOE laboratories and other contractors and grantees are not limited to the understatement of the true costs and overstatement of emissions that can be avoided. Instead, these special interest groups routinely engage in other deceptive statements such as the following:

1. Citing “nameplate capacity” of a “wind farm” rather than kWh of electricity produced. Rated capacity, such as the 30 megawatts claimed for the proposed Enron facility is meaningless by itself. The meaningful number is the kWh of electricity that is actually produced and delivered to an electric customer. As explained earlier, windmills produce electricity only when the wind is blowing within an acceptable range and then seldom at their full, rated (“nameplate”) capacity.

2. Numbers that are out of context or otherwise misleading. Claims made by wind energy advocates about electricity output and emissions avoided are miniscule when considered in their proper context. Such comparisons are necessary because wind energy advocates also persist in using numbers that have little real meaning.

For example, “wind farm” developers, advocates and lobbyists often cite the “number of homes” that could be served by the output from “wind farms.” Such numbers appear to be deliberate attempts to mislead. For example, RENEW Wisconsin claims⁸ that the electricity generated during the 12 month period from July 1999 through June 2000 by three Wisconsin “wind farms” was “enough to power 6,500 households.” Such rhetoric is misleading because:

- The electricity was available only when the wind was blowing at the right speeds – not when families in Wisconsin wanted the electricity. Other generating facilities must be kept immediately available and, if not artificially displaced at times by windmills, would be providing needed electricity at lower cost.
- Electric companies in Wisconsin serve about 2,300,000 residential customers. Thus the 6,500 claimed by RENEW Wisconsin equals about 1/4th of 1% of the homes that must be served.
- Residential customers account for only 31% of the electricity used in Wisconsin in 1999. Industrial, commercial, and other customers accounted for 69% of the electricity demand.

FPL Energy’s latest application for a conditional use permit for its proposed Addison “wind farm” provides another example. In what appears to be a desperate attempt to make its claims about “avoided emissions” look significant, FPL Energy showed its claims in *pounds* rather than *tons*.

3. Availability of “wind resources.” The American Wind Energy Association (AWEA) often claims that the U.S. or parts of it have such great “wind resources” that it is the “Saudi Arabia of wind energy.” Such rhetoric is totally misleading since it assumes that “wind farms” could be built in all or most of the geographic areas where the wind blows at speeds that are adequate for windmills. In fact, many of the geographic areas counted by AWEA are not viable “wind farm” sites:

- There are conflicting land uses; e.g., for forests, residential, commercial and industrial development, schools, recreation, scenic beauty, wildlife refuges, airports, highways, railroads, and many more.
- “Wind farms” must be located next to existing electric transmission lines and, such lines simply do not exist in many of the areas counted by AWEA, particularly remote and sparsely populated areas that might otherwise be suitable for “wind farms.” The small and intermittent electricity output from windmills does not possibly justify the high cost of constructing new transmission lines, even assuming that such lines could obtain approval and be constructed.
- The greater the distances that “wind farms” are located from the places where the electricity is needed, the poorer the economics of wind energy because electricity is lost during transmission and the greater the distance, the greater the losses.

RENEW Wisconsin, a Madison-based wind energy advocacy group has also made misleading claims. The source of this group’s financial support is not entirely clear, but a page that formerly appeared on its web site indicated that it received significant financial support from Wisconsin utilities and AWEA.⁹ However, the page with that admission was removed when the group revised its web site a few months ago.

In the case of wind energy, federal and state government officials have abandoned the interests of consumers, taxpayers and many property owners.

When looking at the facts about the exceedingly small contribution that can be made by wind energy, its high cost, and its adverse scenic and environmental impacts, it is hard to understand why so many government officials – particularly in the federal and state governments – have been co-opted by the wind energy developers, windmill suppliers and “renewable” energy advocates – *to the detriment of electric customers and taxpayers and some property owners.*

The “analysis” needed to understand *that wind energy cannot make any significant contribution* to electricity supply and reliability or pollution avoidance and is not environmentally benign requires no more than third grade arithmetic and some knowledge of the electric industry.

The facts are really *not* hard to understand. Thus, there must be other reasons why government officials have gone so far in:

- Pretending that wind energy can make a significant con-

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Wind Farms (continued from page 13)

tribution, and

- “Tipping the scales” so far in the direction of “wind farm” developers and “renewable” energy advocacy groups – at the expense of consumers, taxpayers and some property owners.

Perhaps these officials are merely joining what appears to be a trend toward ignoring the interests of consumers and taxpayers and embracing the views (and accepting the misinformation) disseminated by special interest groups. Or, perhaps government officials – including those from the DOE, DOE laboratories, state PUCs, state energy offices, state legislatures and the U.S. Congress simply are unable or unwilling to discern the difference between facts and “spin.”

Endnotes

1 Energy Information Administration, *Electric Power Monthly*, March 2000, Table 47.

2 Lee Hawkins, Jr., “Utility emphasis shifts to providing adequate power,” *Milwaukee Journal Sentinel*, Business Section, p. 1.

3 Wisconsin utilities’ web sites.

4 Claims of “avoided emissions” associated with the DePere windmills (2) and planned Enron windmills (20) have not been reported.

5 Energy Market & Policy Analysis, Inc., *Is There a Better Alternative for the People of Wisconsin than the “Wind Farm” proposed for the Town of Addison*, March 24, 2000, pp. 11-13. A slightly edited version of the report can be found on the following web page: <http://www.poweronline.com/content/news/article.asp?DocID={0025F7C7-9ADD-11D4-8C69-009027DE0829}&Bucket=Features+%26+Case+Studies>

6 The practical effect of “Renewable Portfolio Standards” is explained in detail in an Energy Market & Policy Analysis, Inc paper with the title “Backdoor Btu Tax,” available at the following web address: <http://www.poweronline.com/content/news/article.asp?DocID={B8C34D6D-EE04-11D3-8C24-009027DE0829}>

7 U.S. Department of Energy, EREN web page, “*Summary of Green Pricing Programs*,” September 29, 2000.

8 RENEW Wisconsin press release, July 6, 2000.

9 The American Wind Energy Association (AWEA), the Washington, DC-based lobbying group for the wind energy industry has received tax dollars that flow through the U.S. Department of Energy – despite prohibitions in the Anti-Lobbying Act against using appropriated funds for lobbying purposes.

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Paul Roberts

**British Institute for Energy Economics
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**Innovation and Maturity in Energy Markets:
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The conference will bring together a remarkable set of speakers for its plenary sessions. However, the centrepieces of the conference will be its concurrent paper sessions which will form the heart of the meeting. This is the first call for papers for these sessions. Submissions are welcome in all areas of energy economics, but those which lie within the main themes are particularly welcome. The conference has five such themes:

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- **Natural Gas:** The problems of gas development at global and regional levels. The determination of prices. The reserve position. The place of natural gas within the power generation sector. Security of Supply.
- **The Oil Industry:** Technology and the resource base. The development of the offshore industry. Taxation. New frontiers. The Future of the North Sea Industry. Oil price developments and market mechanisms.
- **IT and the Energy Sector:** How has the impact of IT developed, or is the revolution over? The place of e-commerce. The provision of information by governments and its role. IT and market transparency. IT and its impact on costs.

Abstracts should be between 200 and 1000 words. At least one author from an accepted paper must pay the registration fees and attend the conference to present the paper. All abstracts and inquiries should be submitted to: Professor Alex Kemp, University of Aberdeen, Department of Economics, Edward Wright Building, Dunbar Street, Old Aberdeen, AB24 3QY. Tel: 44 (0) 1224 272168, Fax: 44 (0) 1224 272181, email: a.g.kemp@abdn.ac.uk.

The deadline for submission of abstracts is January 31st 2002.

Visit the IAEE website at <http://www.iaee.org> for the latest information or visit the conference website at www.abdn.ac.uk/iaee

Important Notice: Young Energy Economists Session

One set of concurrent paper sessions will be given entirely to authors under the age of 35. In addition, a prize of \$500 will be awarded for the best paper given in this session, plus the refund of the conference registration fees. Please indicate on the abstract if any author is under 35 years old.

Professor Alex Kemp
Conference General Chair

**INFORMATION ON THE FOURTH ANNUAL MEETING OF THE
“ASOCIACION MEXICANA PARA LA ECONOMIA ENERGETICA”**

The Mexican Association for Energy Economics (AMEE), will hold its fourth annual meeting in June 13 –14 in Mexico City with “The Energy Sector in Mexico facing the 21st Century: Trends, Policy, Supply and Financing. The meeting will be held in the Center for Teaching and Research in Economics (CIDE) and will include invited presentations on the main topics as well as technical sessions with contributed papers. Abstracts will be received up to March 15.

Hotels in Mexico City (4 – 5 stars) cost between 100 and 200 dollars per night, depending on the location. There is not going to be an official hotel for the meeting, but we could assist people arriving from foreign countries with reservations. The people to contact are:

Jose Miguel Gonzalez Santalo e_mail gsantalo@iee.org.mx

Arturo Reinking Cejudo e_mail reinking@servidor.unam.mx

The Technical Program is the following:

June 13

- 8:00 Registration
- 9:00 Inauguration
- 9:45 Main Plenary Conference
The Energy Sector. Vision and Expectations in the 6 to 25 year range
Official from the Department of Energy
- 10:15 Coffee Break
- 10:30 **Energy Resources in Mexico (I). Current State and Long Term Potential**
Environment, technology innovation, hydrocarbons, coal, nuclear, hydraulic,
geothermal and other sources.
- 12:30 **Energy Resources in Mexico (II).**
Technical Papers
- 13:30 **LUNCH**
- 15:00 **Restructuring of the Oil Industry in Mexico and the World (I)**
Current status and perspectives, megamergers, private investment, restructuring of state owned companies
- 17:00 **Restructuring of the Oil Industry in Mexico and the World (II)**
Technical papers
- 18:00 **END OF DAY ONE**

June 14

- 8:30 **Pricing policies and financing in the energy sector (I)**
Pricing mechanisms, regulation, taxes, subsidies, financing sources
- 10:30 Coffe break
- 10:45 **The natural gas industry (I) Natural gas = oil industry?**
Reserves, production, demand, alternate sources of supply, upstream regulation, key point to establish a more competitive natural gas market, gas-electricity integration
- 12:45 **Pricing policies and financing** **The natural gas industry (I)**
 in the energy sector (II) **Natural gas = oil industry?**
 Technical papers Technical papers
- 13:45 LUNCH
- 15:15 **The electrical industry in Mexico and the restructuring of the industry throughout the world (I)**
Demand and supply, impact of deregulation on prices and tariffs, investments in competitive markets, regulation of generation, transmission and distribution, international expectations.
- 17:15 **The electrical industry in Mexico and the restructuring of the industry throughout the world (I)**
Technical papers
- 18:15 Coffee Break
- 18:30 **Panel discussion. Vision of the energy sector towards 2025**
ication and market economy, restructuring of the energy sector
- 20:00 CLOSING ON THE MEETING

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The IAEE currently meets the professional needs of over 3300 energy economists in many areas: private industry, non-profit and trade organizations, consulting, government and academe. Below is a listing of the publications and services the Association offers its membership.

- **Professional Journal:** The *Energy Journal* is the Association's distinguished quarterly publication published by the Energy Economics Education Foundation, the IAEE's educational affiliate. The journal contains articles on a wide range of energy economic issues, as well as book reviews, notes and special notices to members. Topics regularly addressed include the following:

Alternative Transportation Fuels	Hydrocarbons Issues
Conservation of Energy	International Energy Issues
Electricity and Coal	Markets for Crude Oil
Energy & Economic Development	Natural Gas Topics
Energy Management	Nuclear Power Issues
Energy Policy Issues	Renewable Energy Issues
Environmental Issues & Concerns	Forecasting Techniques

- **Newsletter:** The *IAEE Newsletter*, published four times a year, announces coming events, such as conferences and workshops; gives detail of IAEE international affiliate activities; and provides special reports and information on an international basis. The newsletter also contains articles on a wide range of energy economics issues, as well as notes and special notices of interest to members.
- **Directory:** The Annual *Membership Directory* lists members around the world, their affiliation, areas of specialization, address and telephone/fax numbers. A most valuable networking resource.
- **Conferences:** IAEE Conferences attract delegates who represent some of the most influential government, corporate and academic energy decision-making institutions. Conference programs address critical issues of vital concern and importance to governments and industry and provide a forum where policy issues can be presented, considered and discussed at both formal sessions and informal social functions. Major conferences held each year include the North American Conference and the International Conference. IAEE members attend a reduced rates.
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3/01 Dialogue

New Members of USAEE

The follow individuals recently joined the USAEE in the period October 1, 2000 to February 28, 2001. Welcome!!

Jeevan Anand

EGOR Llc

William Anderson

US Environmental Protection Agency

Dan Arvizu

CH2M Hill

Steven Avary

Dain Rauscher Wessels

Craig Boice

Boice Dunham Group

Chester Bolling

Detroit Edison

Mark Bononi

ABN AMRO Inc

Lewis Campbell

Lundberg Marshall & Associates Ltd

Janis Carey

Colorado School of Mines

Curtis Carlson

US Department of the Treasury

Kenneth Colburn

New Hampshire Dept Environment Studies

Kenneth Costello

National Regulatory Research Inst

Aric Cunningham

BP Amoco (Alaska)

Floyd Davis

Nexant LLC

Fisoye Delano**Ralf Dickel**

The World Bank

Robert Earle

California Power Exchange

Mark Ellis

McKinsey and Company

Mark Fagan

Great River Energy

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Concept Communiques Inc

Steven Fine

ICF Consulting

Meredith Fowlie

Cornell University

Troy Funk

Central Illinois Light Co

Javier Garcia

University of Texas at Austin

David Gates

PFC Energy

Sharif Ghalib

Energy Intelligence Group

Lauren Giles

Energetics Inc

Joshua Giordano

Caminus Inc

Stephen Grover

ECONorthwest

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Federal Energy Regulatory Comm

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Anne Keller

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Anthony Kenck

Texaco

Mike King

PHB Hagler Bailly

Douglas Koplow

Earth Track Inc

Natalie La Giraudiere

ICF Consulting

Russell Lee

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James Lockhart

US Department of Energy

David Manuel

St Mary's University

Neil McAndrews

Neil McAndrews and Associates

Peter McCabe

US Geological Survey

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University of CA San Diego

Michael Milligan

National Renewable Energy Lab

Edward Mills

Federal Energy Regulatory Comm

Asbjorn Moseidjord

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Karl Nalepa

Railroad Commission of Texas

Octavian Ngarambe

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Jon Piliaris

EES Consulting Inc

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Resource Dynamics Corporation

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E-Meta Venture Inc

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Calendar

20-22 March 2001, Electric Power 2001 at Baltimore, MD, USA. Contact: Heather Haygood, Electric Power Conference & Exhibition, 1220 Blalock Road, Suite 310, Houston, TX, 77055, USA. Phone: 713-463-9595. Fax: 713-463-9997 Email: event@electricpower.com URL: www.electricpowerexpo.com

20-22 March 2001, 2001 e-ProCom for: Utility & Energy e-Business at Baltimore, MD, USA. Contact: The TradeFair Group Inc., 1220 Blalock Road, Suite 310, Houston, TX, 77055, USA. Fax: 713-463-6427 URL: www.e-procomseries.com/energyseries.html

27-27 March 2001, National Energy Modeling System/ Annual Energy Outlook Conference at J.W. Marriott Hotel, Washington, DC. Contact: Susan Holte, Dir., Demand & Integration Division, Energy Information Administration, US Department of Energy, Washington, DC, 20585, USA. Phone: 202-586-4838 Email: susan.holte@eia.doe.gov

2-3 April 2001, Winter's Aftermath: A New Era for Northern & Frontier Gas at Houston, Texas. Contact: Ziff Energy Group. Phone: 403-234-6555. Fax: 403-627-9034 Email: gasconference@ziffenergy.com URL: www.ziffenergyconferences.com

25-27 April 2001, 24th IAEE International Conference, "2001: An Energy Odyssey?" at Houston, Texas - USA. Contact: David Williams, Executive Director, IAEE, 28790 Chagrin Blvd., Suite 350, Cleveland, Ohio, 44122, USA. Phone: 216-464-5365. Fax: 216-464-2737 Email: iaee@iaee.org URL: www.iaee.org/conferences/conferences.asp

14-25 May 2001, New Era in Oil, Gas & Power Value Creation, Houston, Texas, USA at Energy Institute, University

of Houston. Contact: Energy Institute, Bauer College of Business, University of Houston, Houston, Texas, 77204-6283, USA. Phone: 713-743-4634. Fax: 713-743-4881 Email: energyinstitute@uh.edu URL: www.uh.edu/energyinstitute

5-6 June 2001, Strategic Planning for Energy at Fairmont, Hotel - Chicago, IL. Contact: Int'l Quality & Productivity Center, 150 Clove Road, PO Box 401, Little Falls, NJ, 07424, USA. Phone: 973-256-0211. Fax: 973-256-0205 Email: info@iqpc.com URL: www.iqpc.com

24-27 July 2001, Increasing Productivity Through Energy Efficiency at Tarrytown, NY. Contact: American Council for an Energy Efficient Economy, 1001 Connecticut Avenue NW, Suite 801, Washington, DC, 20036, USA. Phone: 302-292-3966 URL: www.aceee.org

10-12 September 2001, Energy Economy 2001 at Houston, Texas. Contact: Nancy Alloway, Event Director, Energy Economy, PennWell, 1521 S Sheridan Road, Tulsa, OK, 74112, USA. Phone: 918-831-9438. Fax: 918-832-9201 Email: nancya@pennwell.com

10-12 September 2001, Energy Economy 2000 at Houston, Texas - USA. Contact: Nancy Alloway, Event Director, PennWell, 1421 South Sheridan Road, Tulsa, OK, 74112-6600, USA. Phone: 918-831-9438. Fax: 918-832-9201 Email: nancya@pennwell.com URL: www.pennwell.com

17-21 September 2001, Fifth International Biomass Conference of the Americas, Orlando, Florida, USA at Rosen Centre Hotel. Contact: Organizers: U.S. Department of Energy, U.S. Department of Agriculture, Nat'l Resources Canada & the Nat'l Renewable Energy Lab. Phone: 321-638-1527 Email: joann@fsec.ucf.edu URL: www.nrel.gov/bioam

Conference Proceedings on CD Rom 23rd International Conference Sydney, Australia, 7-10 June, 2000

The Proceedings of the 23rd International Conference of the IAEE held in Sydney, Australia, are now available from IAEE Headquarters on CD Rom. Entitled *Energy Markets & the New Millennium: Economics, Environment, Security of Supply*, the proceedings are available to members for \$95.00 and to nonmembers for \$115.00 (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. To order copies, please complete the form below and mail together with your check to:

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