United States Association for Energy Economics

USAEE Dialogue

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PRESIDENT'S MESSAGE

The USAEE is a nationwide non-profit organization of business, government, academic and other professionals. We advance the understanding and application of economics across all facets of energy development and use, including theory, business, public policy and environmental considerations. To carry this out, we provide a forum for the exchange of ideas, advancements and professional experiences. We promote the development and education of energy professionals. And we foster an improved understanding of energy economics and energy related issues by all interested parties. This is our mission. And since the events of September 11, 2001, it has never been more relevant.

The importance of energy security, not only reducing U.S. dependency on unstable oil supplies, but also securing the interdependent U.S. energy infrastructures that transmit and deliver our energy supplies, has become paramount. Yet, at the same time we cannot lose sight of the importance of adequately protecting the U.S. and global environments or maintaining cost competitive energy supplies to fuel our economic growth and development, now and in the future. Nor can we lose sight of the actual and potential role of technology in changing fundamental economic structures, as well as directly and indirectly affecting the structure of energy companies, markets and the environment.

Many believe that the role of electricity in our energy markets will become increasingly important in the future, as the silicon and cyber economy continues to grow. U.S. electricity markets are in the process of being restructured to increase competitiveness and improve efficiency. The restructuring process involves a complex patchwork of federal and state jurisdictions, laws and regulations, and since the difficulties of the California restructuring and the Enron/ Arthur Anderson problems, this process has become more circumspect.

The Bush Administration released its national energy policy recommendations in May 2001. In August, the House of Representatives approved an energy policy bill, and this month, the Senate began deliberations on its energy policy bill, which must be reconciled with the House version and signed by the President to be implemented.

It is difficult for me to imagine a time of greater need for our association, our mission and our membership. And it is a great honor for me to serve as your President for 2002.

We have an outstanding USAEE Council. Mark Schwartz, Shirley Neff and Adam Sieminski have joined us, and we have retained Hung-Po Chao, Steve Connors, John Felmy, Michelle Foss, Wumi Iledare and Cliff Mangano. I'm also delighted that Guy Caruso, Bob Ebel and Paul Joskow have agreed to serve as my Advisory Board.

The Council has approved an ambitious strategic business plan developed by Council and our strategic planning group (Arnie Baker, Dave DeAngelo, Hill Huntington, John Jimison, David Knapp, John Felmy, Cliff Mangano, Chris Jablonowski and Marianne Kah). A summary of our key strategies appears on page 6. As you will see, that plan intends to better serve you and to grow our member base. Among other things, we shortly will institute a member public policy survey, on a trial basis, to help our membership's collective voice be better heard in the public policy community. We have redesigned our web site (USAEE.org) to provide members with additional information on Chapters and conferences and we will initiate issue-focused policy discussions through a chat room there. We also plan to co-sponsor a policy forum in Washington, DC with the National Capital Area Chapter (NCAC) and the Paul H. Nitze School of Advanced International Studies, Johns Hopkins University

Interest continues to grow in integrating North American energy markets. With this in mind, Mark Jaccard and his team have developed an excellent program for our October 6-8 North American Conference in Vancouver, Canada, "Energy Markets in Turmoil: Making Sense of It All".

Planning is already underway for our 2003 North American

(continued on page 2)

Editor's Corner

This issue of ***Dialogue*** brings you excellent papers by Joe Dukert and Thomas Drennen.

Mr. Dukert's article provides an excellent perspective on North American energy interdependence. He addresses both the successes and the impediments.

Mr. Drennen's paper describes a computer model that has been developed to aid in assessment of the impacts of various possible changes in energy policy, especially the sort of changes that might be associated with implementation of policies designed to mitigate emissions of carbon dioxide.

I would also like to commend our colleague, Gerry Westbrook, for his continuing efforts to bring more reality to the debate over global warming. His latest article, "The Hockey

(continued on page 2)

President's Message *(continued from page 1)*

Conference in Mexico City, co-sponsored by the Asociación Mexicana para la Economia Energetica. In 2004, our North American Conference will return to Washington, DC.

We also hope many of you will attend the June 26-29 IAEE conference in Aberdeen, Scotland. This conference, developed under the excellent leadership of Professor Alex Kemp, is focusing on "Innovation and Maturity in Energy Markets: Experience and Prospects."

So please join us for an exciting year. Energy issues are front and center on the public policy agenda. Better education and communication are needed. The USAEE is strong and vibrant, and during 2002, my Council members and I hope make it even more so. This association belongs to all of us, and with your support, active involvement and honest feedback, I know we'll be successful.

Arnie Baker

Editor's Corner *(continued from page 1)*

Stick, the Little Ice Age and the Medieval Warm Period" is available at www.co2science.org/edit/v5_edit/v5n8edit.htm.

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 (proberts@reliant.com or proberts@alumni.rice.edu), by Fax (713-207-0705), or by regular mail (15709 Singapore Lane, Jersey Village TX 77040-3035). If you have questions, comments, or suggestions, I can be reached by phone at 713-207-5059.

Paul Roberts

Dialogue Disclaimer

USAEE is a 501(c)(6) corporation and neither takes any position on any political issue nor endorses any candidates, parties, or public policy proposals. USAEE officers, staff, and members may not represent that any policy position is supported by the USAEE nor claim to represent the USAEE in advocating any political objective. However, issues involving energy policy inherently involve questions of energy economics. Economic analysis of energy topics provides critical input to energy policy decisions. USAEE encourages its members to consider and explore the policy implications of their work as a means of maximizing the value of their work. USAEE is therefore pleased to offer its members a neutral and wholly non-partisan forum in its conferences and web-sites for its members to analyze such policy implications and to engage in dialogue about them, including advocacy by members of certain policies or positions, provided that such members do so with full respect of USAEE's need to maintain its own strict political neutrality. Any policy endorsed or advocated in any USAEE conference, document, publication, or web-site posting should therefore be understood to be the position of its individual author or authors, and not that of the USAEE nor its members as a group. Authors are requested to include in an speech or writing advocating a policy position a statement that it represents the author's own views and not necessarily those of the USAEE or any other members. Any member who willfully violates the USAEE's political neutrality may be censured or removed from membership.

CALL FOR PAPERS

5th USAEE/IAEE
Allied Social Science Associations Meeting
Washington, DC – January 3 - 5, 2003

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 a paper, please send an abstract of 200-400 words to Carol Dahl at (cadahl@mines.edu) by May 25, 2002. If you are willing to be a paper discussant, email your interest by June 15, 2002.

Preliminary decisions on papers presented and discussants will be made by July 1. The program including abstracts will be posted at www.iaee.org by September 1, 2002. Papers and comments will be published with those for the North American meeting of the USAEE/IAEE that follows the January meeting.

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

USAEE

*** USAEE WEBSITE UPDATED ***

If you have not been to usaee.org lately you are in for a surprise. Our new site has been rebuilt from the ground up, including a streamlined design, cleaner navigation and an easier search for information. We encourage you to visit usaee.org when looking for association happenings, news, conference and chapter information.

Some of the information you will find on our site includes:

- √ Online Energy Discussion Forum
- √ Overview/Objections of USAEE
- √ Council and Chapter Presidents Listing & Contacts
- √ Chapter News and Conference Information
- √ Full Issues of USAEE's Dialogue
- √ USAEE North American Conference Information
- √ Links to IAEE's Energy Web Links and Member Database
- √ USAEE/IAEE Membership Database

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 we can improve and expand our website.

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, global uncertainty, market restructuring, sustainability imperatives, policy constraints and technology

Plenary Sessions

Energy Security in the 21st Century

California Fallout: What Useful Lessons Can be Learned

Continental Energy Markets Prospects

Canada-U.S. Natural Gas Trade

Offshore Petroleum Industry: Reflections on Moving Forward

Fossil Fuels and Sustainability: Like Oil and Water?

North American Regulation: Are We Getting It Right?

**** CALL FOR PAPERS ****

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. The lead author submitting the abstract MUST include complete contact details (e.g., mailing address/phone/fax/email coordinates). 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
Interested in touring Vancouver?? Visit www.tourismvancouver.com today!!

British Institute for Energy Economics
International Association for Energy Economics
25th International Conference
Aberdeen Exhibition and Conference Centre, Aberdeen, Scotland
June 26th – 29th, 2002

Innovation and Maturity in Energy Markets: Experience and Prospects

***** Program & Social Activities *****

On behalf of the British Institute for Energy Economics it is our pleasure to invite you to Scotland for the 25th International Conference of the IAEE. Please mark your calendar for this important event, the silver jubilee conference, and the first time that the IAEE has come to Scotland.

Session Themes and Topics

Renewable Energy: The pace of development of all forms of renewables. Barriers to development. Technical progress, reduction of costs and government incentives.

The Role of Government: Government regulation in all stages of the energy industries. The impact of environmental policies on energy. Taxation of energy. The evolving geopolitics of energy.

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.

Conference Registration

Registration may be made electronically via the special conference website at http://www.abdn.ac.uk/iaee. This gives the full details of the fees payable. Alternatively payment can be made by mail to Fiona Flockhart, IAEE Conference Secretariat, Room 104, University of Aberdeen, Regent Walk, Aberdeen AB24 3FX, UK. Fax No. +44 (0) 1224 272576. Email: f.j.flockhart@abdn.ac.uk. Cheques should be made payable to University of Aberdeen – IAEE Conference.

Hotel Reservation

Favourable rates for delegates have been made with 4 hotels. Bookings should be made through Aberdeen and Grampian Convention Bureau, 27 Albyn Place, Aberdeen AB10 1YL. Tel. No. +44 (0) 1224 288815. Fax No. +44 (0) 1224 581367 or electronically at http://www.abdn.ac.uk/iaee.

Visit the conference website at www.abdn.ac.uk/iaee.

Brief Program Overview

Thursday, 27 June 2002

9am-10.30am	Opening Session – Plenary One - Towards a New Global Energy Policy. Lord Lawson*, BIEE President, Gordon Brown*, UK Chancellor of Exchequer, Vicky Bailey*, Assistant Secretary, US DOE, Robert Priddle, Executive Director, IEA, Gerald Doucet, Sec – Gen. World Energy Council.
10.30am-11am	Coffee Break
11am-12.30pm	Plenary Two - The North Sea in a Global Context. Tony Hayward*, Group Vice-President and Group Treasurer, BP, Brian Wilson*, UK Minister for Energy, Kjell Pedersen, CEO, Petoro
12.30pm-2pm	Lunch - Lord Lawson on Energy Privatisation; IAEE Awards
2pm-3.30pm	Co-plenary Three - Middle East - Chair: Herman Franssen; Nader Sultan, Kuwait Petroleum; Fadel Chalabi, COGES, London; Rashid al Barwani, Ministry of Petroleum, Oman; Paul Stevens, University of Dundee; Paul Tempest, Windsor Energy Group; Fereidun Fesheraki, East-West Center Co-plenary Four - US Regulation - Chair: Michelle Michot Foss; Shirley Neff, US Senate Committee on Energy and Natural Resources, Brett Perlman, Texas Public Utilities Commission, Donald Santa, Troutman Sanders
3.30pm-4pm	Tea Break
4pm-5.30pm	Parallel Sessions 1 to 5 - 1.Student Session: Chair: Chang Youngho; 2 Renewables: Chair: Elizabeth Marshall; 3. European Energy Issues: Chair: J-P Cueille; 4. Climate Change: Chair: David Laughton, University of Alberta 5. Potential for the International Companies: Chair: John Holding, Saudi Arabian Texaco
7pm-10pm	Gala Dinner, Ardoe House Hotel, South Deeside Road, Blairs, Aberdeen

Friday, 28 June 2002

8am-1pm	Registration at Aberdeen Exhibition and Conference Centre

9am-10.30am	Co-plenary Five - Topic to be confirmed. Chair and Lead speaker: David Newbery*, University of Cambridge, Jonathan Stern, RIIA, L. Hunt, D. Hawdon, P. Levine & N. Rickman, University of Surrey, UK, Reinhold Hass, Austria, other speakers to be confirmed Co-plenary Six - Energy Deregulation and Liberalisation in Developing Countries. Chair: Paul Stevens, University of Dundee, John Besant-Jones, The World Bank, Peter Pearson, Imperial College, London, Francisco Barnes-Regueiro, Mexico, Matthew Leach, UK and Matthias Ruth, USA
10.30am-11am	Coffee Break
11am-12.30pm	Co-plenary Seven - Asia: Joint Chairs: Hoesung Lee and K. Yokoburi; Robert Ebel, CSIS, Washington, DC; Ho-Seok Kim and Eui Soon Shin, Korea, Keun-Wook Paik, UK, Ken Koyama, Japan Co-plenary Eight - Trans-European Issues - Chair: Arild Nystad; Jonathan Stern, Imperial College/RIIA; Aad Correlje, Netherlands, Hans Auer, Germany, VA Krykov and KN Milovidov, Russia.
12.30pm-2 pm	Lunch – The Perils of Forecasting - Lead Speaker: Michael Lynch
2pm-3.30pm	Parallel Sessions 6 to 10 - 6. Oil Issues, Chair: Andre Plourde; 7. Natural Gas Issues, Chair: Jonathan Stern; 8. Unsustainable Development; 9. Nuclear Issues, Chair: Chris Anastasi; 10. Market Instruments, Chair: Adrian Gault
3.30pm-4pm	Tea Break
4pm-5.30pm	Parallel Sessions 11 to 15 - 11. The Role of Government, Chair: David Jones, BIEE; 12. Efficiency of Transport, Chair: Lee Schipper; 13. OPEC and Related Matters, Chair: Fereidun Sioshansi; 14. IT and the Energy Industries, Chair: David Rose; 15. De-Regulation and Re-regulation, Chair: Maureen Crandall
7pm-10pm	Scottish Gala Evening, Beach Ballroom, Aberdeen

Saturday, 29 June 2002

9:00 – 9:40am	Plenary Nine - Malcolm Brinded, Group Managing Director, Shell Group
9:50 – 10:30am	Plenary Ten – Peter Davies, Chief Economist BP, plc. A Global Energy Overview and Launch of the 2002 Annual BP Statistical Review
10.30am-11am	Coffee
11am-12pm	Parallel Sessions 16 to 20 - 16. Petroleum Taxation, Chair: Alex Kemp, Aberdeen; 17. Electricity, Chair: Peter Pearson; 18. Macro-Economics of Energy, Chair: Inje Paik; 19. Market Forces in EU, Joint-Chairs: Benjamin Hobbs and Frits van Oostvoorn; 20. Renewables 2, Chair: Katherine Mitchell
12pm-12.45 pm	Plenary Eleven – IAEE Past Presidents: Reflections on Twenty-Five Years of the World of Energy Chair: Leonard Coburn, IAEE President

***** Subject to final confirmation

Social Delights

The Conference will be held in Aberdeen, Scotland, the "Oil Capital of Europe" and operations centre for North Sea oil. Major and smaller oil companies and serve companies have prominent presences in the city. The timing of the conference ensures that attendees can enjoy daylight for nearly 24 hours per day. June is also generally the warmest month of the year. Aberdeen has many attractions including an ancient University. It is also the ready gateway to magnificent scenery, many castles, ancient and modern, malt whisky distilleries and golf courses.

The welcome reception on the evening of 26 June will be held in the Elphinstone Hall at the ancient University of Aberdeen. This will give delegates an opportunity to see the campus, including the unique King's College chapel.

On the evening of 27 June the gala dinner will be held at Ardoe House, a magnificent 19th century Baronial Mansion with modern ballroom facilities. It is located in beautiful surroundings beside the river Dee about 4 miles from the city.

On the evening of the 28th there will be a Scottish evening featuring a reception with Scottish food and entertainment.

Cultural Programme

Three social tours will be available. During the conference on 27th June a coach tour of Aberdeen for partners has been arranged. This will include a visit to some of the ancient buildings in the city including the University (founded 1495), the spectacular beach and the famous Winter Gardens. On 29th June, after the conference, a visit to Royal Deeside has been arranged. The highlight of this tour is a visit to Crathes Castle which dates to the 16th century. This castle has unique turrets and interiors and beautifully laid out gardens. On Sunday 30th a tour has been arranged to visit Fettercairn malt whisky distillery and Fasque House. This involves a journey over spectacular highland scenery. A sample of the whisky will be available. Fasque House dates to the 19th century. It was and is the family house of the Gladstone family, including the UK Prime Minister William Ewart Gladstone. The interior has been extremely well preserved to illustrate how he lived back in the 19th century.

Getting to Aberdeen

Aberdeen is served with 11 daily direct flights from London (Heathrow and Gatwick). There are also several direct flights from London Luton (Easyjet), London City airport, Manchester, Newcastle, Birmingham, Leeds/Bradford, Humberside, Norwich and Glasgow. There are direct international flights from Amsterdam and Stavanger. A special deal has been struck with KLM/Northwest for conference delegates. For full details see the special website at www.abdn.ac.uk/iaee. The airport is 20 minutes drive time to the City Centre or the Conference Centre. There are direct train links from London and many other cities in the UK to Aberdeen.

(continued on page 6)

USAEE 2002 – 2006 Strategic Plan – Announced

Throughout 2001, USAEE members of the Strategic Planning Group met and discussed with the USAEE Council a long range Strategic Plan for the association. At the January 2002 USAEE Council meeting, Council voted unanimously to accept the plan. Below please find the mission statement for the association as well as a brief overview of the tasks under development as well as their goals within the Strategic Planning Group.

MISSION STATEMENT

The United States Association for Energy Economics is a nationwide non-profit organization of business, government, academic and other professionals that advances the understanding and application of economics across all facets of energy development and use, including theory, business, public policy and environmental considerations.

To this end, the United States Association for Energy Economics:

- *Provides a forum for the exchange of ideas, advancements and professional experiences.*
- *Promotes the development and education of energy professionals.*
- *Fosters an improved understanding of energy economics and energy related issues by all interested parties.*

KEY STRATEGIES

- Increase and broaden our regular and sustaining membership base through improved member products and services and marketing outreach to other professional organizations concerned with energy.
- Support energy policy community dialogue by:
  - Hosting one or more daylong energy policy seminars each year on front-burner topics
  - Conducting regular member energy policy surveys and disseminating the results
- Stimulate North American Conference attendance and Sponsorships through improved programs and conference services, broader marketing, improved media coverage, increased student participation and expanding benefits of sponsoring organizations.
- Provide increased support to current Chapters and Chapter start-ups as needed.

If you are interested in becoming involved in one of the strategies listed above, please contact Dave Williams at USAEE Headquarters, email: usaee@usaee.org

USAEE Online Discussion Forum

USAEE Council is pleased to now offer a new energy dialogue section at our website (www.usaee.org). Members may now post their energy questions online for general dialogue. To view this new discussion group, visit the following web link and below procedures:

Visit www.usaee.org

Take the "Forum" option from the listing on the left
Click on "USAEE Discussion Forum"
Click on "Post New Topic"
Once inside the message box enter your "Username" (your first and last name)
You may ignore the Password field
Enter your topic to be discussed and your text message and click "Post Reply"

Log on today and post your questions/comments online at our online energy forum.

Do You Want to Start Your Own USAEE Chapter?

The requirements for starting a USAEE Chapter are straightforward – You must have a viable group of at least 20 individuals all of whom need to join USAEE and have organized to the point of adopting a set of bylaws and a group of elected officers. Sample bylaws can be requested and obtained by calling USAEE Headquarters at 216-464-2785. USAEE dues are $60.00 per person, per year for a subscription to The USAEE *Dialogue*, *The Energy Journal* and *IAEE Newsletter*. Student membership is $30.00. USAEE bills members directly for their membership in the Association. Chapter membership must be open to all individuals whose work or interest is in the field of energy economics. If you have any further questions regarding the establishment of a USAEE Chapter, please do not hesitate to contact David Williams at USAEE Headquarters, phone: 216-464-2785; email: usaee@usaee.org A complete Chapter start-up kit can be mailed to you.

Aberdeen Program *(continued from page 5)*

Queries: (excluding Social Tours)

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wellspj@compuserve.com

**** CONFERENCE SPONSORS TO-DATE**: Shell, BP, UK Department of Trade and Industry, Aberdeen City Council, Scottish Power, Conoco, TotalFinaElf, Ernst & Young.

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

Energy Markets in Turmoil: Making Sense Of It All

22nd USAEE/IAEE Annual North American Conference – October 6-8, 2002
Vancouver, British Columbia, Canada – Sheraton Wall Centre Hotel

We are pleased to announce the 22nd Annual North American Conference of the USAEE/IAEE, ***Energy Markets in Turmoil: Making Sense Of It All***, scheduled for October 6-8, 2002, in Vancouver, British Columbia at the Sheraton Wall Centre Hotel.

Please mark your calendar for this crucial conference. Some of the key selected themes and sessions for the conference are listed below. The plenary sessions will be interspersed with concurrent sessions designed to focus attention on major sub-themes. Ample time has been reserved for more in-depth discussion of the papers and their implications.

Energy Security in the 21st Century
Session Chair: Robert Ebel
- Geopolitical Risks
- Growing Asian Import Dependence
- Reliable Suppliers – Russia, Central Asia, the Caspian

Offshore Petroleum Industry: Reflections on Moving Forward
Session Chair: Merete Heggelund, Norsk Hydro
- Economics of Offshore Projects
- Local Procurement for a Global Industry
- Environmental Issues

Continental Energy Markets Prospects
Session Chair: Leonard Coburn, U.S. Department of Energy
- Enhanced Regional Integration
- Common Energy Picture
- Harmonization on Standards

Canada – U.S. Natural Gas Trade Prospects
Session Chair: Campbell Watkins
- Resource prospects
- Market considerations
- Transmission expansion

California Fallout: What Useful Lessons Can Be Learned?
Session Chair: Perry Sioshansi, Menlo Energy Economics
- What Went Wrong?
- Resolving the Situation
- Lessons for Other Jurisdictions

Fossil Fuels and Sustainability: Like Oil and Water?
Session Chair: Mark Jaccard, Simon Fraser University
- Decarbonating Fossil Fuels
- Sequestering Carbon
- Technology Synergies

Energy Regulation Trends and Prospects in North America
Session Chair: Michelle Foss, University of Houston
- What Kind of Markets are Being Built?
- How is Success Measured? By Price?
- How Much Restructuring is Needed for Electricity?

There are 24 planned concurrent sessions (note the enclosed information on Call for Papers for this meeting – the abstract cut-off date is May 1, 2002. Conference organizers are open to setting aside some concurrent sessions to cover joint submissions by a group of authors (maximum 4 per concurrent session). Given the location of the meeting in Vancouver, we anticipate an even larger draw to our concurrent sessions. The conference organizers STRONGLY SUGGEST that you get your abstract in extra early so that prompt follow-up can be given.

Vancouver, British Columbia is a wonderful and scenic/tourist place to meet. Single nights at the Sheraton Wall Centre Hotel are $224.00 Cdn. (approximately $150.00 U.S. dollars – a phenomenal rate) per night. Contact the Sheraton Wall Centre Hotel at 604-893-7120, to make your reservations). Conference registration fees are $500.00 for USAEE/IAEE members and $600.00 for non-members. Your registration fee includes two lunches, a dinner, three receptions and numerous coffee breaks, all designed to increase your opportunity for networking. Special airfares have been arranged through Air Canada. Please contact Air Canada by calling 800-361-7585 (or 514-393-9494) and reference our group #CV625181. These prices make it affordable for you to attend a conference that will keep you abreast of the issues that are now being addressed on the energy frontier.

There are many ways you and your organization may become involved with this important conference. You may wish to attend for your own professional benefit, your company may wish to become a sponsor or exhibitor at the meeting whereby it would receive broad recognition or you may wish to submit a paper to be considered as a presenter at the meeting. For further information on these opportunities, please fill out the form below and return to USAEE/IAEE Headquarters.

Energy Markets in Turmoil: Making Sense Of It All

22nd Annual North American Conference of the USAEE/IAEE

Please send me further information on the subject checked below regarding the October 6-8, 2002 USAEE/IAEE Conference.

____ Submission of Abstracts to Present a Paper(s) _____ Registration Information _____ Sponsorship Information _____ Exhibit Information

NAME: _____
TITLE: _____
COMPANY: _____
ADDRESS: _____
CITY,STATE,ZIP: _____
COUNTRY: _____ Phone/Fax: _____

USAEE/IAEE Conference Headquarters
28790 Chagrin Blvd., Suite 350, Cleveland, OH 44122 USA Phone: 216-464-2785 Fax: 216-464-2768 Email: usaee@usaee.org

The U.S. Energy and Greenhouse Gas Model: A Dynamic Simulation Modeling Approach to Policy Education

[SAND No. 2002-0485J]

By Thomas E. Drennen

Sandia is a multi-program laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under Contract DE-AC04-94AL85000.

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Abstract

This paper introduces the U.S. Energy and Greenhouse Gas Model (USEGM), a new type of real time learning tool for those business executives, policy makers, teachers, and students interested in energy, economic, and environmental issues. USEGM is intended as a high-level model that quickly allows the user to explore fundamental energy, economic, and carbon emissions trade-offs.

The models forecast energy demand by economic and electric power sectors through 2020. Key drivers for the USEGM include energy prices, GDP and population growth. The goal in development of USEGM was to keep the structure relatively simple and transparent, but yet to produce long term, base case results similar to the National Energy Modeling System (NEMS), developed and maintained by the Department of Energy.

This paper discusses the basic model structure and benchmarking results. The model is then used to explore various policy questions. Three examples are shown: the first and second examples explore options for meeting Kyoto type targets for carbon reductions; the third demonstrates the effect of a significant oil price increase on oil import requirements and carbon emission reductions.

Introduction

Energy, economic and environmental issues are highly complex and interrelated. Yet frequently these subjects are considered independently, and national and international policies are made the same way. As a result, energy, economic and environmental policies frequently work at cross-purposes that undermine the successful achievement of their intended objectives and result in misallocation of public and private resources.

Some of this confusion is due to political processes and deliberate segmentation of policy-making responsibility. But much is due to the energy-economic-environment system complexity and the difficulty of understanding their intertwined dynamic processes and consequences in a real time, hands-on way. This latter problem is particularly critical for time pressed public policy makers and their staff, as well as harried business executives. It is also important in university and advanced high school classrooms, since these produce our future business executives and policy makers.

Consider the international issue of climate change. Faced with scientific warnings that human activities may cause significant global warming, international negotiators have been working towards a global agreement to limit key greenhouse gases. In November 2001, negotiators from 165 countries agreed to move forward with implementation of the 1997 Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) even though the U.S. has officially dropped out of the negotiations. If the Kyoto Protocol becomes binding international law, it will require about 40 industrialized nations to reduce emissions of GHGs, on average, 5.2 percent below 1990 levels by the period 2008-2012. Had the U.S. agreed to participate, it would have had to reduce its emissions to 7 percent below 1990 levels. These reductions by industrialized nations will not guarantee that total global emissions will decrease over time because developing countries are exempt from the Kyoto targets.

While the Kyoto Protocol relies on emission targets as the policy tool for pushing countries towards domestic action to reduce greenhouse gas emissions, it is difficult to grasp the level of commitment necessary to meet either the Kyoto targets or some other targets. Does meeting the target mean more expensive fuels? A modest shift to nuclear or renewable energy? Or a complete elimination of fossil fuels?

The purpose of this paper is to introduce a new type of real time learning tool for those business executives, policy makers, teachers, and students interested in energy, economic, and environmental issues. While we've developed a suite of these new learning tools,[1] this paper focuses on the U.S. Energy and Greenhouse Gas Model (USEGM). We discuss the basic structure, key drivers, user options, basic results, and key sensitivities. We also provide examples of how this can serve as a learning tool, focusing on Kyoto type targets. We conclude the paper with some thoughts on the proper roles and limits of such models.

Model Overview[2]

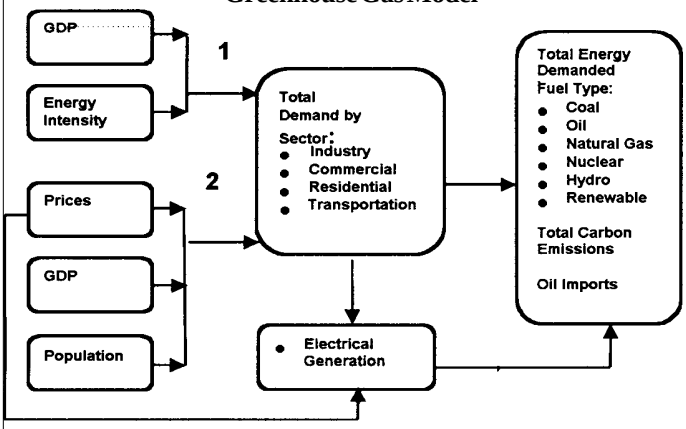
The U.S. Energy and Greenhouse Gas Model (USEGM) is designed as a high-level dynamic simulation model to facilitate U.S. policy discussions on a real-time basis. It is not meant as a substitute for more detailed models, such as the National Energy Modeling System (NEMS), developed and maintained by the Energy Information Administration (EIA) of the Department of Energy. The EIA uses NEMS to develop annual 20-year forecasts of energy use. While NEMS is a very powerful modeling system, its complexity makes it difficult for policy makers and their staffs to use it for interactive policy discussions. The goal in developing the USEGM was to keep the structure relatively simple, based on reduced form equations, but yet to produce long term, base case results that are similar to NEMS.[3] The model allows users to vary key parameters in order to understand their potential impact; however, all results should be further explored with more complex models before relying on the results for making policy decisions.

The model focuses on U.S. energy demand by economic and electric power sectors through 2020. The USEGM focuses solely on the demand side. USEGM allows the user to calculate sectoral energy demand by fuel type through 2020 in two ways, as indicated in Figure 1: 1) an energy intensity approach; and 2) a distributed lag approach. Using the first method, demand is a function of GDP and energy intensities. Under the

[1] See endnotes at end of text.

distributed lag approach, energy demand is a function of energy prices, GDP, and population growth. The lag structure allows demand to change over several years in response to price and GDP changes in a given year. Once sectoral demand is calculated, this demand is allocated to fuel types. Fuel allocation in the electricity sector is determined using a logistic formulation that takes into account relative electricity costs and existing capital allocation. Model outputs include energy demand by sector and type, carbon dioxide emissions, and oil import requirements.

Figure 1
The Structure of the U.S. Energy and Greenhouse Gas Model



The model provides two methods for calculating energy demand; 1) energy intensity; or 2) distributed lag. Model outputs include fuel demands by sector, total carbon emissions and oil import requirements.

The model relies on historical data for 1990 through 1999. [4] In order to provide a frame of reference for policy discussions, the model is benchmarked to the EIA *Annual Energy Outlook 2001* (AEO 2001). Benchmarking is discussed in more detail later in this paper, but the basic process involves tuning the USEGM to come close to the forecasted energy intensity trends and fuel requirements for the five main AEO2001 model scenarios.

Energy Demand

The two methodologies for calculating energy demand have their own uses, advantages and disadvantages. Both approaches calculate energy demand for the four sectors: industrial, commercial, transportation, and residential. This section will discuss each methodology in more detail and provide examples of their use.

Energy Intensity Methodology

In this approach, sectoral energy demand is a function of total GDP and that sector's historical or projected energy. The energy intensities (Table 1) and fuel shares are derived from the EIA AEO2001 reference case.

When using the energy intensity methodology, the model is more like a sophisticated energy balance model. Left unadjusted, it mimics the EIA AEO2001 reference case. But it can also be used as a flexible "what-if?" tool. Energy demand is calculated based on the relative shares of projected energy types used; shares can be adjusted or locked at a specified level beginning in any year. The value of this methodology is it allows the user to see the implications, in terms of carbon emissions and oil import requirements, of pursuing policies leading to specific shares. For example, one can step forward to the year 2010 and try alternative combinations of fuel shares that might meet Kyoto type targets given the projected energy demand. Other uses of this methodology include examining the potential impact of energy efficiency improvements or alternative GDP paths. Examples are discussed later in this paper in the section "Policy Examples."

Table 1
Derived Sectoral Energy Intensities
(thousand Btu/$)

	Industrial	Commercial	Transportation	Residential
1990	4.3	1.7	3.1	2.3
2000	3.5	1.6	2.7	1.9
2010	2.9	1.4	2.4	1.6
2020	2.4	1.2	2.2	1.4

The disadvantage of this methodology is it doesn't consider the influence of prices on future policy decisions; it simply tells the user what would have to happen to get a specific policy outcome. The distributed lag approach, discussed next, allows the user to then explore the role of prices and lags in determining the U.S. energy picture. For example, if oil remains fairly inexpensive, oil captures a larger market share over time, which, unless domestic production increases, results in increased energy imports. This could have implications for national energy security.

Distributed Lag Methodology

This approach uses a Koyck distributed lag to calculate total energy demand as a function of energy prices and assumed GDP levels:

$$E_{ijt} = \alpha\left(E_{ij(t-1)}\right)^{\lambda}\left(GDP_t\right)^{\gamma}\left(GDP_{t-1}\right)^{-\lambda\gamma} P_{ijt}^{\beta ij} P_{kjt}^{\beta kj} \qquad (1)$$

where E_{ijt} is energy consumption by fuel type i in sector j in time period t; GDP_t and GDP_{t-1} are the U.S. gross domestic product in FY2000 dollars for years t and $t-1$ respectively; P_{ij} is the price of i^{th} fuel in that sector; β_{ij} is the short-run price elasticity of the i^{th} fuel type; P_{kj} is the price of a substitute fuel; and β_{kj} is the short-run cross price elasticity of that substitute. There may be other substitute fuel prices and elasticities in the equation as well. The variable λ is an adjustment parameter, with 1-λ indicating the proportio λ is constrained between 0 and 1; values close to 0 imply that demand adjusts quickly to changing prices, while values of λ close to 1 imply that demand is slow to adjust. The value of λ is determined by the short-and long-run price elasticities for the fuel under consideration:

$$\lambda = 1 - \beta_i / \theta_i \qquad (2)$$

where β_t is the short-run and θ_i is the long-run price elasticity for the ith fuel.

The parameter γ is the income elasticity measure derived from the energy intensities (EI) used in the model. The AEO forecasts energy demand through 2020. In order to benchmark the USEGM to the AEO forecasts, the long-term forecasts of the AEO were used to derive implied income elasticities, which were then used in the Koyck formulation.[5]

(continued on page 10)

Energy and Greenhouse Gas Model *(continued from page 9)*

GDP and Price Feedback

GDP change is determined by historical growth values from 1990-1998. In subsequent years, annual growth rates are a function of assumed annual growth rates and the indirect effect of increased energy prices:

$$GDP_{(t+1)} = (GDP_t)(1 + r_t)(P_{new(t)} / P_{base(t)})^{\alpha} \qquad (3)$$

where r_t is the annual rate of economic growth, $P_{new(t)}$ is a weighted average of the percentage price increases for the fuels; P_{base} are the assumed prices in the reference case; and α is the energy price elasticity of economic growth.

The purpose of the final term in (3) is to capture some of the impact of fuel price increases on GDP growth. This is a simplistic approach to a complex problem, but captures the effect in a fairly transparent manner. User imposed energy price changes, such as a carbon tax, reduce GDP through the α term, the energy price elasticity of economic growth, currently set to -0.02 in the model, as suggested by Cooper et al. (1999). This means that a 10 percent increase in energy prices would reduce GDP by 0.2 percent. Cooper et al. (1999) note that the effect of energy price changes on GDP results from the premature scrapping of capital stock, and declines in total factor productivity as relative prices for capital and labor inputs shift.

Electricity Demand

Total electricity demand is calculated by summing electricity demand for each sector. Fuel shares within the electricity sector are estimated using a logistic (or log-odds) share estimation approach as suggested in Smith and Hill (1982). Implementing this methodology in USEGM required six fuel share allocation equations for six of the fuel types, with coal used as the residual base fuel for determining relative shares for the other fuel types. The form of the allocation equation is:

$$\ln(S_i / S_c)_t = \beta_1 + \beta_2 \ln(P_i / P_c)_t + \beta_3 (S_i / S_c)_{t-1} \qquad (4)$$

This method says that fuel shares will be a function of two things: the levelized price of that fuel, P_i, relative to the levelized price of the coal alternative, P_c, and the existing share of that fuel, S_i, relative to coal's share, S_c. b_2 is the cross price elasticity of P_i for P_c; and β_3 is the lag weight to account for existing capital stock. If a particular fuel type has a large existing share, then the markets will be slower at substituting in alternatives. Holding all else constant, a larger value of β_3 implies a slower shift to that fuel. The higher the value of β_2, the more price responsive is that fuel type.

Benchmarking Results

The summary benchmarking results of the USEGM for 2020 for the five AEO2001 scenarios are shown in Table 2. For the five cases, USEGM is within three percent of the forecasted AEO values in 2020. Sectoral and fuel level details of the AEO2001 reference case benchmarking are summarized in Table 3. Electricity sector benchmarking is summarized in Table 4.

While the USEGM tracks very close to the AEO2001 at the aggregate level, Table 2, and at the sectoral level, Table 3, it tracks less closely at the level of fuel type, especially within the electricity sector, Table 4. For example, the 2020 estimates for nuclear are 16.5 percent (1.0 Quads) higher for the USEGM than the AEO2001 reference case. The basic reason for this is that the AEO2001 includes specific assumptions about the ability to relicense nuclear power plants, while the USEGM relies solely on forecasted prices and existing capacity using equation 4. While (4) tried to capture the importance of existing shares through β_3, it doesn't allow for possible relicensing of existing plants. This is also the issue for oil used for electricity generation; the USEGM estimate is 744 percent higher (1.3 Quads) than the AEO2001 (0.18 Quads), based on forecasted prices and existing capacity.

Table 2
AEO2001 Scenario 2020 Benchmarking
(Quadrillion BTUs/year)

Scenario	AEO 2001	SNL USEGM	% difference
Reference	127.0	126.9	-0.1%
Low Econ Growth	119.0	114.8	-3.5%
High Econ Growth	135.9	138.3	1.8%
Low Oil Price	127.4	131.5	3.3%
High Oil Price	126.4	124.2	-1.7%

Table 3
AEO2001 Reference Case 2020 Detailed Benchmarking
(Quadrillion BTUs/year)

	AEO 2001	SNL USEGM	% difference
Sector (Quads)			
Industrial	43.39	43.41	0.0%
Commercial	20.75	20.74	0.0%
Transportation	38.54	38.44	-0.3%
Residential	24.36	24.41	0.2%
Total	127.04	127.00	0.0%
Fuel (Quads)			
Coal	26.20	24.69	-5.8%
Oil	50.59	51.77	2.3%
Natural Gas	35.57	34.61	-2.7%
Nuclear	6.13	7.12	16.2%
Renewable	8.31	8.80	5.9%
Electricity(*)	46.20	46.20	0.0%
Carbon Dioxide (MtC)	2040.60	2011.98	-1.4%
Oil Imports (Mbd)	16.51	17.2	4.2%

*Fuel used for electricity generation is included in above fuel categories.

Table 4
Electricity Sector Benchmarking
(Quads)

	AEO2001	SNL USEGM	Difference (Quads)
Coal	23.46	21.59	-1.9
Oil	0.18	1.52	1.3
Natural Gas	11.55	11.07	-0.5
Hydro	3.06	3.31	0.3
Nuclear	6.13	7.12	1.0
Wind	0.13	0.29	0.2
Solar	0.03	0.03	0.0
Other Renewable	1.44	1.27	-0.2
Total	46.2	46.20	0.0

Conclusion

The purpose of this paper was to introduce a new type of real time learning tool for those business executives, policy makers, teachers and students interested in energy, economic and environmental issues. The U.S. Energy and Greenhouse Gas Model is intended as a high-level model that quickly allows the user to explore fundamental energy, economic, and carbon emissions trade-offs. The model runs on basic PC lap top computers that can be connected to a projector for lectures or group discussions.

Our own experiments and demonstrations with the U.S. and other similar models have shown that this modeling approach provides an excellent learning tool. At the same time, we would underscore the need for great caution to be taken when using them with high-level business executives and policy-makers. These are high level learning tools that facilitate discussion and learning around fundamental relationships. Perhaps the biggest risk of such learning tools is that they themselves are taken too literally, just as the predictions of the Club of Rome were. **Their worst possible use would be for high level executives or policy-maker to make critical decisions based solely on their results, without knowledgeable staff advice and interpretation.** Such tools are not substitutes for real world political, economic and technical knowledge about how the subject areas operate. But combined with appropriate knowledge, we believe they can create new learning that will lead to better-educated students and better-informed business and public policy decisions.

How to Obtain a Copy of USEGM

The USEGM software is available on CD-ROM. Contact the author for more information.

Endnotes

[1] Other models we've developed include: the Global Nuclear Futures Model, the China Energy and Greenhouse Gas Model, and the Marketable Emission Permit Trading Model. Additional information about these models is available from the author.

[2] More detailed information about the model structure and its use are available in Drennen et al. (2001a, 2001b).

[3] The USEGM can be tuned to other long term energy models. NEMS was selected as a widely available, relatively transparent projection set. EIA management and staff have not been involved in development of the USEGM.

[4] Historical data from EIA's *Annual Energy Review* 2000 (AER).

[5] Model tuning and benchmarking was accomplished using Powersim Solver, a multivariate dynamic optimization tool, which allows one to tune a model to historical or projected outcomes by varying user-specifed changeable model variables.

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North American Energy Interdependence —A Critical Survey

By Joseph M. Dukert[1]

(This article has been adapted and updated from a presentation at the Center for Strategic and International Studies (CSIS), in Washington, DC, on January 15, 2002.)

The North American energy market is more firmly established today than the most optimistic observer could have predicted realistically in 1990. Nevertheless, it has faced obstacles during the past year and a half that the most dogged pessimist might not have foreseen. Some momentum has been lost. Still, the future seems bright for the largest contiguous energy market on Earth.

The terrorist attacks on New York and Washington on September 11, 2001, exacerbated a global economic downturn. Corporate investment priorities have been shuffled, and the attention of governments is temporarily monopolized. In December, McGraw-Hill's research unit reported that cancellations of new generating plants in the United States significantly exceeded new project announcements.[2] U.S. industrial demand for gas has fallen off, and this helps explain why normal Canadian withdrawals from gas storage almost vanished this season[3] and net withdrawals from U.S. storage at the end of January were the lowest ever recorded for the Department of Energy's weekly series.[4] Mexico's President Fox has been thwarted in his desires to modernize his country's state-run energy enterprises and to open new avenues for private involvement where it could help most; and the three major Mexican political parties all face internal realignments that may stall any such changes this year.

Yet all that did not discourage Canada's then-Minister of Natural Resources, Ralph Goodale, from personally leading an energy business mission to Mexico City in mid-October as planned – having urged each of the companies whose executives accompanied him to "showcase its expertise and technologies, learn more about doing business in Mexico, and network with high-level Mexican government and business representatives."[5]

Mr. Goodale has rarely passed up an opportunity to insist that Canada is not pursuing a "North American energy policy", however; and this trip was no exception. He told the Mexican press that he believes trilateralism will never substitute for bilateral relationships. At the same time, he reaffirmed his country's intention to continue the integration of continental energy markets.[6] So, we should probably disregard the political rhetoric and score that as an upcheck for energy interdependence.

The three-country market has survived what some portrayed as a continental crisis in energy supply and pricing during 2000-2001. With that behind us and an economic recovery beginning to show, there is no reason why the movement toward North American energy interdependence should not surmount some continuing challenges:

- √ The intragovernmental impasse over regulatory reform in Mexico;
- √ Some hesitation in industry restructuring[7] by the other two NAFTA countries; and even
- √ The financial collapse of Enron (the corporation that pioneered modern energy marketing, but whose troubles appeared to lie within its own management rather than in industry reordering and the concept that competition can safely foster efficiency).

The North American energy market is far from perfect. Given the political, economic, geographic, historic, and cultural differences among Canada, the United States, and Mexico, it probably never will be. The critical point is that it is still headed generally in the right direction – a long-term but inexorable trend toward more effective operation. That trend may be perceived more clearly in the private sector now than in the halls of national government, whether they be in Washington, Ottawa, or Mexico City.

Early this year, the U.S. Federal Energy Regulatory Commission (FERC) gave final approval for a couple of interconnections that will tie the Maritimes Pipeline from Sable Island into a longer, Stateside pipeline that will service more of New England with Canadian offshore gas. Another new route (the Northwinds Pipeline, planned jointly by TransCanada and National Fuel Gas Company) is scheduled to bring gas within less than four years all the way from Western Canada to an import site near Buffalo and then transport it to Leidy, in central Pennsylvania – which should then be a hub for gas from at least three directions.

Northwinds was announced less than a week before September 11, with a target date of late 2004; but in mid-January TransCanada told me it had already been delayed until November 2005. The company's marketing survey assured sponsors of continued "genuine interest", but found that "prospective customers were not willing to commit to the project in a time frame to allow a 2004 startup."[8]

Offshore oil drilling in Canada's Maritime Provinces is being similarly slowed because of lower demand – which translates into lower prices. By mid-February, Chevron Canada Resources, Ltd. (the operating partner) announced that it would not move ahead "at this time" to develop the Hebron-Ben Nevis oil field it shares off Newfoundland with ExxonMobil Canada, Petro-Canada, and Norsk Hydro Canada Oil & Gas, Inc.[9] This particular project may remain on the shelf for some time now. Unlike the Hibernia and Terra Nova fields nearby, Hebron seems to contain primarily heavy oil – more difficult technically and more expensive than light oil or gas to produce. But whenever it is tapped it is safe to assume that much of its output will go into satisfying U.S. demand.

Once "normal" progress resumes, the North American market's potential is enormous — whether measured in terms of trade value, reliability, national security, efficiency, or environmental protection. Canada, the United States, and Mexico together produce more than one-quarter of all commercial energy on the planet each year, and we consume nearly 30 percent. Furthermore, this energy market is not restricted to commodities - such as gas, electricity, oil, and refined petroleum products. It includes capital goods (ranging from generating units and storage systems to offshore drilling rigs), as well as investment capital itself. It also involves the media of energy delivery, such as pipelines and power lines. It embraces energy-related services too – from consultation in demand-side management and energy efficiency techniques to the expertise and equipment needed to make 4-dimensional surveys of hydrocarbon deposits.

[1] See endnotes at end of text.

In the long run, the most significant facet of this still-emerging market may be its nascent system to exchange energy information on a continental basis in real time. Conceptually, an electronic market that is supported by suitable delivery infrastructure lets large users search for marginal-cost pricing from distant suppliers . . . and hedge against price volatility in gas and electricity as well as oil, by buying or selling futures and options.

Canada and Mexico are almost 1200 miles apart at the closest point, yet a combination of swaps along the delivery network and computer-assisted settlements shows promise of connecting these two countries within a "seamless" market for such energy forms as gas and electricity (which are increasingly fungible with one another, thanks to the continuing popularity of gas-fired combined-cycle combustion turbines).

As early as 1992, Pemex experimented with purchases of natural gas from Alberta over a period of weeks, via Western Gas Marketing.[10] Five years ago, BC Hydro showed that it was already feasible then to sell Canadian summertime power to Mexico's Federal Electricity Commission.[11] And, in November 1997, Hydro-Quebec was authorized by the Federal Energy Regulatory Commission to market its electricity directly to consumers within the United States.[12]

Last year, though, an important player detoured from continental market pricing when natural gas prices soared in North America. Pemex offered to cut the spot rate it charged domestic enterprises for the fuel . . . if they agreed to contract for equivalent volumes in long-term markets. Technically, that was only a side-step, rather than a retreat. The Mexican government (which had occasionally used hedges itself to lock in favorable prices for its own oil exports) apparently wished some of its country's industries to gain experience with advance planning of the same sort.

A short time later, the concept of an open continental energy market took a more serious blow. Mexican officialdom let domestic political considerations override the national tendency toward market-based responses in energy that had begun with President Salinas and continued under President Zedillo. The government monopoly promised to hold its price for wholesale gas flat for the next few years, instead of basing it on competitive prices along the Houston ship channel.

The price Pemex specified then was below the going price in the United States, but it is well above what U.S. and Canadian natural gas was able to command only a short time later. As Canadian and U.S. suppliers know, industrial demand for the fuel fell off here because of the recession and low oil prices, but gas production was rising at the same time as a result of a sharp, if temporary, increase in the number of drill-rigs operating in known fields.

As of mid-February, the price of gas in Canada and the United States was still well below what Pemex customers were paying. It's true that the futures market were "in contango", with the price for near-term delivery uncharacteristically lower than the price for gas a year ahead; but it's also worth noting that contracts for delivery at the end of next winter were near their all-time lows. And the U.S. Department of Energy (DOE) was projecting that – barring extraordinary weather or other unforeseeable circumstances - wellhead prices in this country would average less than $2.00 this year. With proper regulatory oversight, open access to pipelines limits the added costs of transmission.

Perhaps Mexico will learn from this self-adjustment in the market (which didn't require action from some North American counterpart of OPEC);[13] but we can't be sure. In this country, we have seen a somewhat analogous reaction in respect to electricity. Before last winter, about half of our States had already moved to reform electricity regulation by promoting market competition – which strengthens the incentive for cross-border trade. But now some of the others (e.g., Wisconsin and Minnesota) have delayed such plans out of fear that "deregulation" (which was also blamed for regionally high gas prices) could bring them into an "energy crisis" like the one California may be feeling for years to come. Some Canadian provinces were also shaken in their parallel resolve to restructure their energy industries and regulatory modes.

The debacle in California last year has been compared with "The Perfect Storm" – a coincidence of circumstances.[14] Demand for energy grew faster than had been anticipated, weather was "uncooperative", the rate of capacity growth had been cut back, and delivery infrastructure was anachronistic. Political mistakes (sometimes, but not always, noted in retrospect) were certainly a major contributing factor.

The wholesale price caps imposed by FERC throughout the western United States in a reaction to the flyup were scheduled to remain in effect until September, 2002. If California gets through another summer without power outages there will be pressure to modify them or relax them entirely – which would be consistent with the ideal of a freer continental market. However, if the North American energy market had been operating as close to "seamlessly" as it might some day, last year's price and supply problems could surely have been softened sooner. As it is, continental energy cooperation played at least some role in shortening the most acute difficulties. Yet this leads to what readers of *Dialogue* may consider a controversial point: Economists – acting alone - did not design the national energy policies that now exist. Nor will they do so in the future. Nor, in my opinion, should they.

At the risk of outraging some economist colleagues, I contend that it is not only acceptable but appropriate for societal policies to consider certain goals in addition to the most obvious costs in dollars and pesos . . . and even beyond resource efficiency. For instance, September 11 reminded us all of the value of energy security and reliability; but guaranteeing reliability generally raises costs. There are also dozens of examples of how citizens really care about protecting certain elements of their natural environment and public health in general. In fact, we routinely accept the internalization of certain externalities by paying higher prices for some forms of energy than we might if standards were relaxed. We usually balk only on the timing and degree of the costs associated with new "cleanup" or safety measures.

Yet all this might suggest evenness in gauging and implementing policy goals among the three NAFTA partners; and that would be misleading. Uniformity does not even exist among the states of the U.S.A. or among the Canadian provinces.

This has more to do with federal structure than with national leadership. Nobody would suggest seriously that energy policy in Texas is identical to that in California, so why do we expect three sovereign countries as different from one

(continued on page 14)

Energy Interdependence *(continued from page 13)*

another as Mexico, Canada, and the United States to homogenize their attitudes toward such subjects as OPEC, the Kyoto Protocol, and socioeconomic subsidies? So long as the rules of the game are transparent and relatively stable, policy differences won't prevent pipelines and powerlines across the northern and southern U.S. borders from proliferating – as they have done. Once in place, the strong tendency will be to continue using them.

The Mexican situation is problematic. But, despite tensions among and within Mexico's major political parties (not to mention an unprecedented situation in which the President's party is not leading either house of Congress and state governors are becoming powers to be reckoned with), the time is likely to come when the renewed availability of private risk-capital will be recognized as a key to developing Mexico's northeastern fields of non-associated natural gas. If that occurs, Mexico could again become a net exporter of gas, even though imports will continue and probably grow. U.S. gas (ultimately augmented by gas from Canada) will simply be the most convenient and cheapest source of gas for the electricity generating units that are being added rapidly now in northwestern Mexico - in states such as Baja California, Sonora, and Chihuahua.

Canada and the United States recognized long ago the significance of regional energy trade across their border. Increasingly, this has become a topic of discussion at the meetings of governors and provincial premiers whose bailiwicks adjoin one another in both the Northwest and the Northeast corners of this country.

The U.S. is a net importer of all forms of energy overall, but it could hardly be considered an "energy poor" country. It contains 40 percent of the continent's oil reserves and considerably more than half of North America's natural gas reserves. But even if it were to focus more on increasing energy efficiency (as it should), its large and affluent population, vast distances, relatively extreme weather conditions in both winter and summer, and comprehensive electrification/industrialization would encourage net imports. Thus, within North America, it will remain the core of demand for the foreseeable future.

It may be hard for Canada and Mexico to stop viewing themselves as anything but "normal"-sized players in the continental company of a giant; but I believe U.S. Energy Secretary Spencer Abraham was personally sincere last year when he said the energy relationship within North America could be one that involves no "junior or senior partners".[15] This isn't just benevolence on the part of the United States. In terms of the "power" that each one holds over the others in negotiation (within the market or at official trilateral summits), the traditional image of one overwhelming force and two subordinate companions doesn't hold. Each member of NAFTA is capable of providing some energy elements the others can use – to their mutual benefit. Furthermore, this need not imply an adversarial or confrontational relationship. In itself, a more smoothly functional energy market would represent a net gain for all three countries simultaneously.

Without much fanfare, a North American Energy Working Group was established during the Quebec Summit (at the earlier behest of the three countries' energy ministers). It should make a helpful (and, politically, a somewhat daring) contribution to public understanding of this entire situation this spring when one of its sub-groups completes its first task. It is supposed to offer a composite "Energy Picture of North America". But that document will still be only an initial step – a reference work in agreed-upon language, using standardized units and methods of measurement. It can merely begin to delineate the potential.

Canada and Mexico are both major oil suppliers to the United States. Each sends the U.S. about 1.3 million barrels of crude oil daily, and that volume has changed little on an annual basis during the past three or four years. On the other hand, Canada's additional sales southward of refined petroleum products have been climbing during that same period and they now approach half a million barrels per day. Mexico, by contrast, must import gasoline and other refinery products and it will continue to do so until it can afford to develop the specialized facilities needed to handle its own heavy, sour crude. That would require the sort of fiscal reform for which President Fox has been unable to win legislative approval . . . or a good dose of private venture-capital . . . or both. Incidentally, that type of crude oil would be hard to place in any market other than our Gulf Coast, so this gives Mexico at least one reason to be thankful that it is so close to the United States – in every way.

The geographical situation of a good neighbor helps Canada too. About a million barrels of Western Canadian oil goes through the North Central United States in pipelines whose final destination and consumers are in Eastern Canada. Furthermore, more than half that amount of oil flows from U.S. sources directly into Canada through the Portland Pipeline in New Hampshire.

Gas trade between Canada and the United States is largely one-way. Our northern neighbor supplies approximately one-sixth of total U.S. domestic consumption, having almost doubled its volume of sales to us between 1990 and 1995 and bumped that up by another 35 percent since NAFTA came into effect. At the same time, a small but increasing amount of gas heads into Canada from this side; that figure has roughly doubled in each of the past two years. Our gas imports from Canada will continue to grow. In the latest *Annual Energy Outlook* published by DOE, the Energy Information Administration now projects that they will rise from just over 3.5 trillion cubic feet to 5.5 trillion cubic feet annually during the first 20 years of this century.[16]

U.S. - Mexican gas trade is quite modest by comparison – a mere two or three percent of the U.S. - Canadian volume; but it too is increasing at an impressive rate. Totals for 1999 and 2000 were twice what they were in 1998; and the recession reduced total gas trade between the two countries only slightly during 2001.

As with gas in the south, trade in electricity across either border is more significant for when and how it occurs than for its absolute volume in relation to national consumption. Generally it takes place (in either direction) during those periods when the most convenient (read "cheapest") source of electricity happens to be on the far side of the international border.

To make that possible, Vermont is joined by power lines with Quebec, and Maine with New Brunswick. New York links up with both Quebec and Ontario. Michigan, the home state of our Secretary of Energy, has interconnections with Ontario too. Manitoba shares electricity with Minnesota. And so on.

Problems in California last year (and their solution) taught even casual newspaper readers that our largest state is tied – directly or indirectly – to both Canada and Mexico . . . and thus ought to be interested in (and cooperative with) energy developments in both those countries.

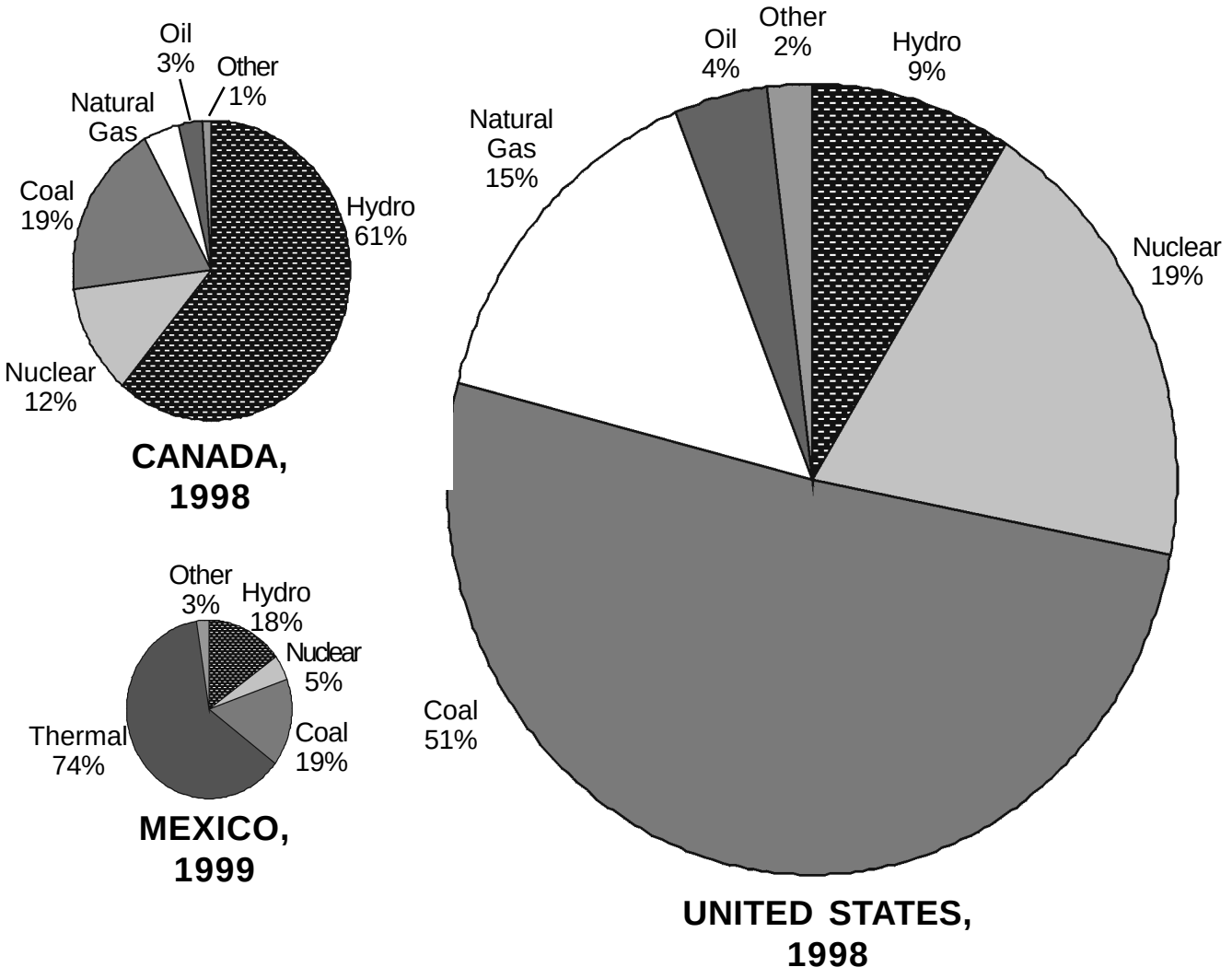
The non-governmental organization (NGO) that works constantly to help tie all this together is the North American Electricity Reliability Council (NERC). As its name suggests, its purpose is to try to ensure reliability – or, to put it another way – to prevent blackouts and brownouts. NERC covers all of the Lower 48 and all of Canada's provinces, and it consults increasingly with Mexico's Federal Electricity Commission.

Looking at North America as a more usefully integrated energy market requires disaggregation – regionally and by consumption patterns. That's why FERC deserves support in trying to establish Regional Transmission Organizations (RTOs). The fact that public utility commissions (PUCs) still call most of the shots on a state-by-state and province-by-province basis explains why legislation was pending in Congress at the time of this writing to give NERC (with a new name and slightly different structure) effective sanction power to enforce – at least in this country - the decisions on reliability policies reached on a voluntary basis. If such legislation is adopted, the U.S. Energy Association (another NGO) has urged that Canada and Mexico be encouraged to achieve roughly the same thing in their own respective, preferred ways.[17]

Minister Goodale tacitly accepted this concept. His actual words, in the text of a speech before the Toronto Board of Trade on September 6, 2001, were, "There is support at all levels on the Canadian side for an International Self-Regulating Reliabil-

(continued on page 16)

Fig. 1 — Net Electricity Generation (by Fuel) in Canada, Mexico, and the U.S.



Adapted from data supplied by the Canadian Electricity Association. "Other" includes biomass combustion and other non-hydro renewable energy.

Energy Interdependence *(continued from page 15)*

ity Organization to develop and enforce mandatory standards." But passing the pivotal U.S. legislation was seen from the outset as difficult. Inclusion in the package of any provision for FERC to exercise some version of "eminent domain" in connection with power lines as well as gas pipelines draws opposition from a variety of interests across the political spectrum.

Nobody can foretell just where all these threads will lead. In considering measures to improve the North American energy market, however, practical economists should recognize that economics alone will not determine how policies are either adopted or implemented. Next, it's helpful to note that problems and solutions in respect to energy interdependence both occur most often on a regional basis. Finally, it's useful to recall that the three countries involved are quite different from one another. A single set of comparisons in a single energy form should be enough to illustrate this point.

The numbers in Figure 1 (previous page), were taken from a presentation by the Canadian Electricity Association at a public Symposium on "Electricity and the Environment" in La Jolla, California November 29-30, sponsored by the trilateral Commission for Environmental Cooperation (CEC). The sizes of the "pies" are adjusted here so that their areas suggest relative volumes. It is significant in many ways that a relatively modest share of U.S. generation makes as much difference in primary energy input and environmental impact as all of Mexico and Canada combined.

It is worth noting also that more than half of all U.S. generation is based on coal, while well over half of Canada's comes from hydro facilities. This ought to be considered when comparisons are made between plant emissions in the two countries. But hydro output is notorious for its unforeseen fluctuations from one year to the next. And, even though hydroelectricity adds no pollutants to the air, some U.S. states refuse to recognize large dams as "renewable energy sources" because they consider them environmentally unacceptable for other reasons – thus denying Canadian hydro certain preferential treatment. We should never assume that energy interdependence is simple!

In absolute terms, very little of the electricity generated in North America enters international trade now; and even in a "perfect" market that's likely to remain true. So Figure 1 also comes close to representing primary energy consumption in the electricity sector on a continental basis. It will be useful if the Working Group's "Energy Picture" showcases the comparable statistics for other consumption sectors as well. For instance, more than half of all Mexico's energy consumption (and nearly half of Canada's) takes place in industry – compared with only about 35 percent in the United States. On the other hand, transportation's share accounts for about 50 percent more of the total energy budget in this country than it does in Canada – although Mexico devotes almost as large a percentage to transportation as Statesiders do.

Considering the great disparity in both capacity and demand for electricity between Mexico and Canada, the difference in the volumes of their current energy trade with the United States is not surprising. Nearly 10 percent of all the electricity generated in Canada moves into the United States in a typical year, while about one-third that volume (still a significant amount) is being exported to Canada by this country. By contrast, the handful of existing interconnections between the United States and Mexico are capable of accommodating only about 1,000 megawatts of power in either direction at any given time. Applications for the "presidential permits" required in this country for international trade in electricity indicate, however, that this capacity will multiply before long.

The latest wrinkle is to build a plant just south of the border (using U.S.-supplied gas), operate it independently (at least under long-term lease), and split its output by prearrangement between U.S. and Mexican customers. Meanwhile, Texas has been building new generating facilities at a rapid rate; and, if in-state demand falters, it's a cinch that arrangements will be made to share power from those plants with Northern Mexico.

Although the cost of energy to consumers is not the sole criterion, improved efficiency in both its production and its application ought to be the starting point in all policy planning. That puts energy efficiency near the top of any list of options. But a thorough understanding of how production and consumption breaks down – continentally, nationally, and regionally – is also an invaluable tool. It is necessary to look at the whole picture through both ends of a telescope, so to speak – being aware of local interests and powers while not losing sight of large national objectives or overall continental potential.

There is considerable wisdom in Mr. Goodale's remark in respect to trilateralism and bilateralism. We need a trilateral energy vision and cooperative energy planning, but the market system itself is likely to evolve in large measure through a series of bilateral arrangements. We won't go far wrong if we strive to discover and do "what works" for all concerned.

The U.S. and Canadian governments must remain sensitive to Mexico's Constitutional provisions in regard to hydrocarbon resources as a "national patrimony" – regardless of how awkward this makes negotiations. Any effort from "outsiders" to suggest specifically how this arrangement might be modified in order to attract the private (even foreign) venture capital that will be needed to help meet Mexico's own energy needs in the future is likely to fail. Nor should U.S. observers become too upset at possible inconsistencies in Canadian attitudes toward our drilling in Alaska's Arctic National Wildlife Reserve and their exploiting the Mackenzie Delta region or pressing for an offshore pipeline from Alaska's North Slope to a point farther east, where it could hook up with a basically Canadian pipeline headed southward. We all have foibles; we all look out for our own interests.

Energy bonds continue to cross our borders, even though some of the schedules published earlier may be delayed. With the price of natural gas relatively low and demand for the fuel currently soft, the opportunity cost of capital will be a factor. So will regulatory obstacles. Not too long ago, TransCanada withdrew applications for two Ontario pipelines that were to be part of a larger project to reach New York State; and a company spokesman attributed the move to "U.S. regulatory delays and to market uncertainties". But the template exists, and we can be reasonably sure that the cross-border network in both gas and electricity will be much more fully developed. To optimize effectiveness of the grids, each country will have to bolster its own infrastructure as well.

Nobody really knows how long this will all take. Timing is a function of investment priorities, which have been skewed by

recent events. But timing is an important factor in framing workable national energy policies; and cross-border cooperation quite often saves time. Essentially, that is why the market has grown as quickly as it has and why it almost certainly will recover its momentum toward broader and more transparent competition.

North American energy interdependence is not a zero-sum game. Advantages to one partner do not generally come at the expense of the other two, and there can be net benefits for all three countries. But it is not necessarily a zero-loss game either. A recent publication[18] outlined some pluses and minuses of a more intimate continental energy effort, which illustrated some trade-offs associated with not "going it alone". This will not satisfy everyone, but it is the way free markets operate anywhere. As Winston Churchill said of democracy, this is not a perfect format . . . but it is the best one that has been demonstrated to date.

Endnotes

[1] The author has been an independent energy consultant since 1965, serving both government and private-sector clients, and is a past-president of the National Capital Area Chapter of USAEE. He welcomes comments on the data, interpretations, and conclusions in this article, addressed to dukert@erols.com.

[2] Rebecca Smith, "Power industry cuts new-plant plans", *The Wall Street Journal*, January 4, 2001.

[3] Deutsche Bank Alex. Brown, Inc., "Looking for Silver Linings in US Gas", *Global Energy Wire*, January 10, 2001.

[4] U.S. Energy Information Administration, *Natural Gas Weekly Update*, February 11, 2001.

[5] "An Invitation from Ralph Goodale, Minister of Natural Resources, Canada", posted on the Internet at www.nrcan.gc.ca in mid-August, 2001.

[6] David Shields, "Canada seeks hints from Martens on energy policy," *The News* (Mexico City), October 17, 2001 (taken from the Internet – http://www.thenewsmexico.com - on November 9, 2001).

[7] Professor Mark Jaccard, of Simon Fraser University, has just produced an analysis of lessons Canadian provinces might draw from the California experience and concludes that "cautious, carefully designed reform should continue". Entitled "California Shorts a Circuit: Should Canadians Trust the Wiring Diagram?". It is available as C.D. Howe Institute *Commentary* No. 159 (February 2002) at www.cdhowe.org

[8] Personal e-mail from Les Cherwenuk of TransCanada, January 14, 2002.

[9] David Parkinson, "Newfoundland offshore oil project shelved," *Globe and Mail*, February 14, 2002, p. B-1. The article quoted Chevron Canada's president, Jim Simpson, as tempering the announcement with assurance that "the resource base is a good one that may have longer-range development potential."

[10] For a bit more detail, see Joseph M. Dukert, *The Evolution of the North American Energy Market*, Center for Strategic and International Studies, Policy Papers on the Americas, vol. X, Study 6, Washington, October 19, 1999, p. 17.

[11] North American Commission for Environmental Cooperation, *Issue Study 3. Electricity in North America: Some Environmental Implications of the North American Free Trade Agreement (NAFTA)*, 1 March 1999, pp. 295-6. Available via the CEC website, http://www.cec.org.

[12] Ibid., p. 294.

[13] At the end of January 2002, the Fox administration announced a 25 percent cut in retail electricity subsidies, applying the resultant rate increases on a sliding scale so as to preserve price protection for smaller consumers; but even this modest new gesture toward market-pricing in energy brought howls from Congress. Yet, according to an article by Michael O'Boyle in the January 31 edition of *The News* (Mexico City) headlined "Congress calls for rate hike explanation", even one delegate from the left-wing Party of the Democratic Revolution (PRD) – Rosario Tapia – tempered her criticism of the "unilateral move" with an admission that there was an overriding need to revise power subsidy policies.

[14] Timothy J. Brennan, Karen Palmer, and Salvador Martinez, "Implementing Electricity Restructuring: Policies, Potholes, and Prospects", Resources for the Future Discussion Paper 01-62, pp. 23-37, available at http://www.rff.org. These authors have done an excellent job of reviewing the California crisis objectively and offering guidelines for averting serious repercussions from analogous problems in the future.

[15] Prepared remarks by Secretary of Energy Spencer Abraham at the 5th Hemispheric Energy Initiative Ministerial Conference, Mexico City, March 8, 2001.

[16] U.S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 2002*, p. 6.

[17] U.S. Energy Association, *Toward an International Energy Trade and Development Strategy*, Washington, October 2001, p. 22. For a fuller discussion of USEA views on the trilateral energy trade under NAFTA, see pp. 17-22.

[18] Joseph M. Dukert, "Mutually Reinforcing, but Distinct, National Energy Policies for NAFTA", *Looking Ahead*, published by the National Policy Association, Washington, January 2002 (Vol.XXIII, No. 4), pp. 8-13.

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Energy Markets in Turmoil: Making Sense of it All

22nd USAEE/IAEE North American Conference – October 6-8, 2002
Vancouver, British Columbia, Canada – Sheraton Wall Centre Hotel

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Energy Security in the 21st Century
California Fallout: What Can Be Learned
Offshore Petroleum Industry: Reflections on Moving Forward
Canada-US Natural Gas Trade
North American Regulation: Are We Getting It Right?
Fossil Fuels and Sustainability: Like Oil and Water?

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:

Adam Sieminski, Deutsche Banc Alex Brown
Guy F. Caruso, Energy Information Administration
Merete Heggelund, Norsk Hydro Canada
Moia Cahill, PanMaritime
Michael Rodgers, Petroleum Finance Company
Hillard G. Huntington, EMF, Stanford University
Perry P. Sioshansi, Menlo Energy Economics
Anjali Sheffrin, California ISO
Jim Tracy, Sacramento Municipal Utility District
Roland Priddle, Consultant (invited)
Michael R. Jaske, California Energy Commission
Mark K. Jaccard, Simon Raser University
Robert Williams, Princeton University
Leonard L. Coburn, U.S. Department of Energy
Robert E. Ebel, Center for Strategic & Int'l Studies
Kathy Arthurs, Chevron Texaco
Elisabeth Harstad, Det Norske Veritas
Campbell G. Watkins, University of Aberdeen
J.D. Ebbels, Ministry of Energy and Mines, B.C.
Arthur O'Donnell, Editor, California Energy Markets
Gary Stern, Southern California Edison
Michelle Michot Foss, University of Houston
Paul W. MacAvoy, Yale University
Peter Ostergaard, British Columbia Utilites Comm.
Gerard J. Protti, Pan Canadian Energy Corporation
Jim Dinning, TransAlta Corporation

John Reid, CEO of BC Gas will be the luncheon keynote speaker on Monday, October 7. **Larry Bell,** Chief Executive Officer, BC Hydro will address the conference dinner on October 7. In addition, 24 concurrent sessions are planned to address timely topics that affect all of us specializing in the field of energy economics.

Vancouver, B.C. is homebase to many energy companies and a great place to meet. Single nights at the Sheraton Wall Centre Hotel are $224.00 Cdn. (approximately $150.00 US dollars per night) Contact the Sheraton Hotel at 604-893-7120, 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.

Energy Markets in Turmoil: Making Sense of it All

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

New Members of USAEE

The following individuals recently joined the USAEE in the period October, 2001 to February2002. Welcome!!

J Patrick Adcock
CH2M Hill
Richard Benjamin
California Energy Commission
David C Benson
Allegheny Energy Supply
Chester J Bolling
Detroit Edison
Michael Brandl
University of Texas at Austin
Frederique A Chevrot
EME
Jeff Clopton
Kenneth Costello
National Regulatory Research Inst
Donald Craig
Licensed Real Estate Broker
Tarek A Elshayeb
University of Texas at Austin
Eric Epstein
EFMR Monitoring Group
Mark Finley
BP America
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Mike King
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Pablo Liemann
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Federal Energy Regulatory Comm
Paul B Mohler
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Fuyuhiko Nishimura
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EES Consulting Inc
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Scott Reeves
Advanced Resources International
Michael Roach
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GE Power Systems
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Fluor Corporation
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Ed Segner
EOG Resources Inc
Hilary Smith
US Department of Energy
John D Sneed
TESLA Inc
Stephen St Marie
Navigant Consulting Inc
Vito Stagliano
Calpine Corporation
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Energy Intelligence Group Inc
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Resource Insight Inc
Al Vikmanis
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University of Missouri-Kansas City

USAEE Student Scholarship Fund:A Call for Support

Started in 1997 at the San Francisco North American Conference, the USAEE is proud to continue its student scholarship fund. Funds are used to cover the cost of registration fees for students attending the annual conference of the USAEE/IAEE. Students must submit a written application and letter from their student advisor requesting that funds be granted. At the Houston Conference, thirteen students qualified to have their conference registration fees waived in an effort to share our conference experience, the field of energy economics and networking opportunities with other students. Further, inviting student participation at our conferences is one of the best mechanisms for recruiting new members to the USAEE.

The student scholarship fund has been generously provided by the support of the following organizations/individuals:

Conoco, Inc.
Michael Lynch
Joe Dukert
Andre Plourde
Hirokatsu Sugiyama
Exxon Mobil Corporation

Recognizing the need for interested and qualified graduates, many funding organizations view the program as supporting education as well as recruitment. The USAEE has started its campaign for scholarship funds for the 2002 North American meeting in Vancouver, British Columbia, Canada, October 6-9. Contributions have ranged from $50 to $2500. If you would like to receive information on how your or your company can become a supporter of this program, please contact Dave Williams, USAEE Executive Director at (p) 216-464-2785, (f) 216-464-2768, or usaee@usaee.org

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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.

• **Proceedings**: IAEE Conferences generate valuable proceedings which are available to members at reduced rates.

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_____Yes, I wish to become a member of the International Association for Energy Economics. My check for $60.00 is enclosed to cover regular individual membership for twelve months from the end of the month in which my payment is received. I understand that I will receive all of the above publications and announcements to all IAEE sponsored meetings.

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USAEE BEST STUDENT PAPER AWARD GUIDELINES

USAEE is pleased to once again offer an award for the Best Student Paper on energy economics. The award will consist of a $1000.00 cash prize plus waiver of conference registration fees at the Vancouver 2002 USAEE/IAEE North American Conference, October 6-8. To be considered for the USAEE Best Student Paper Award please follow the below guidelines.

- Student must be a member of USAEE or IAEE in good standing.
- Submit COMPLETE paper by **May 1, 2002** to USAEE Headquarters.
- Paper MUST be original work by the student (at least 50% of work completed by the student seeking award).
- Submit a letter stating that you are a full-time student and are not employed full-time. The letter should briefly describe your energy interests and tell what you hope to accomplish by attending the conference. The letter should also provide the name and contact information of your main faculty supervisor or your department chair. Also, include a copy of your student identification card.
- Submit a brief letter from a faculty member, preferably your main faculty supervisor, indicating your research interests, the nature of your academic program, and your academic progress. The faculty member should state whether he or she recommends that you be awarded the scholarship funds.

Complete applications should be submitted to the USAEE/IAEE Headquarters office no later than May 1, 2002 for consideration. Please mail to:

David L. Williams, Executive Director, USAEE Headquarters
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NOTE: The recipient of the $1000.00 cash prize will receive notification of this award and be presented the award at the Vancouver USAEE/IAEE North American Conference. This individual will also receive a complimentary registration to attend the meeting. Please note that all travel (ground/air, etc.) and hotel accommodations, meal costs in addition to conference-provided meals, etc., will be the responsibility of the award recipient.

For further questions regarding USAEE's Best Paper Award, please do not hesitate to contact David Williams at 216-464-2785 or via e-mail at: usaee@usaee.org

* *

VANCOUVER USAEE/IAEE CONFERENCE STUDENT SCHOLARSHIPS AVAILABLE

USAEE is offering a limited number of student scholarships to the 22nd USAEE/IAEE North American Conference. Any student applying to receive scholarship funds should:

1) Submit a letter stating that you are a full-time student and are not employed full-time. The letter should briefly describe your energy interests and tell what you hope to accomplish by attending the conference. The letter should also provide the name and contact information for your main faculty supervisor or your department chair, and should include a copy of your student identification card.

2) Submit a brief letter from a faculty member, preferably your main faculty supervisor, indicating your research interests, the nature of your academic program, and your academic progress. The faculty member should state whether he or she recommends that you be awarded the scholarship funds.

USAEE scholarship funds will be used only to cover conference registration fees for the Vancouver USAEE/IAEE North American Conference. All travel (air/ground, etc.) and hotel accommodations, meal costs in addition to conference-provided meals, etc. will be the responsibility of each individual recipient of scholarship funds.

Completed applications should be submitted to USAEE Headquarters office no later than September 25, 2002 for consideration. Please mail to: David L. Williams, Executive Director, USAEE, 28790 Chagrin Blvd., Suite 350, Cleveland, OH 44122.

Students who do not wish to apply for scholarship funds may also attend the conference at the reduced student registration fee. Please respond to item #1 above to qualify for this special reduced registration rate. Please note that USAEE reserves the right to verify student status in accepting reduced registration fees.

If you have any further questions regarding USAEE's scholarship program, please do not hesitate to contact David Williams, USAEE Executive Director at 216-464-2785 or via e-mail at: usaee@usaee.org

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The Outlook For Gas in Europe: The Markets Start to Open. (December 2001). 146 pages. Price: $895. Contact: Emerging Markets Online, 7171 Buffalo Speedway #632, Houston, TX 77025. Phone: 713-349-8281. Fax: 713-348-8380. Email: service@emerging-markets.com URL: www.emerging-markets.com

Texas Power Markets: Restructuring/Competition Report. (2002). 130 pages. Price: $995. Contact: PMA, 3304 Dye Dr., Falls Church, VA 22042. Phone: 703-641-0613. Fax: 703-641-9265.

Prospects for Caspian Gas. (September 2001). Price: #1250. Contact: Centre for Global Energy Studies, 17 Knightsbridge, London SW1X 7LY, UK. Phone: 44-20-7235-4334. Fax: 44-20-7235-4338. URL: www.cges.co.uk/caspiangas.htm

The Role of the Federal Government in Distributed Energy. (2002). 70 pages. Price: FREE. Contact: The Center for the Advancement of Energy Markets (CAEM), PO Box 66374, Washington, DC 20005. Phone: 202-496-4972. URL: www.caem.org

The Role of the Default Provider in Restructured Energy Markets. (2002). Price: FREE. Contact: The Center for the Advancement of Energy Markets (CAEM), PO Box 66374, Washington, DC 20005. Phone: 202-496-4972. URL: www.caem.org

Annual Oil Market Forecast and Review 2002, (2002). Price: #650. Contact: Centre for Global Energy Studies, 17 Knightsbridge, London SW1X 7LY, UK. Phone: 44-20-7235-4334. Fax: 44-20-7235-4338. URL: www.cges.co.uk/caspiangas.htm

B2B Energy Trading: The Surge On-Line, (2001). Price: $1195. Contact: Emerging Markets Online (EMO). Phone: 713-349-8281. URL: www.emerging-markets.com

Oil in Texas The Gusher Age, 1895-1945, Diana Davids Olien and Roger M. Olien. (March 2002). 352 pages. Price: $39.95. Contact: University of Texas Press, PO Box 7819, Austin, TX 78713. Phone: 800-252-3206. URL: www.utexas.edu/utpress/

Petro-Dragon's Rise: What It Means for China and the World, Xiaojie Xu. (September 2002). 200 pages. Price: not available. Contact: European Press Academic Publishing, Via Valle Bantini, 4-50050 Fucecchio (Florence), Italy. Fax: 39-0571-296335. Email: orders@e-p-a-p.com

Understanding Iran's Economy And its Oil and Gas Industry, Dr. Manouchehr Takin. Price: #2750. Contact: Marketing Department, Centre for Global Energy Studies, 17 Knightsbridge, London, SW1X 7LY, United Kingdom. Phone: 44-20-7309-6310. Fax: 44-20-7235-4338. Email: marketing@cgees.co.uk URL: www.cges.co.uk

Bossley's Energy Conversions, (March 2002). 96 pages. Price: $110. URL: www.petroleum-economist.com/bossley/

Calendar

8-8 April 2002, The Changing Energy Demand Environment in Asia: The Role for Energy Companies and the Impact on Economic Recovery at New York City, NY. Contact: Nicholas Stein, Asia Society, USA. Phone: 212-327-9360 Email: nicks@asiasoc.org

8-9 April 2002, Fuel Cells 2002: Practical Applications and Commercial Prospects at Stamford, CT. Contact: Sharon Faust, Conference Coordinator, Business Communications Co., Inc., 25 Van Zant Street, Suite 13, Norwalk, CT, 06855, USA. Phone: 203-853-4266. Fax: 203-853-0348 Email: conference@bccresearch.com URL:www.bccresearch.com/fuel_cells2002/

10-12 April 2002, 11th Annual Mineral Economics and Management Society (MEMS) Professional Program and Meeting at Montreal, Quebec, Canada. Contact: Dan Paszkowski Email: dpaszkow@mining.ca (or) space@mines.edu URL: www.mines.edu/Outreach/Cont_Ed/mems.html

10-12 April 2002, Fundamentals of Power Quality at Chicago, IL. Contact: The Association of Energy Engineers, AEE Energy Seminars, PO Box 1026, Lilburn, GA, 30048, USA. Phone: 770-925-9633. Fax: 770-381-9865

17-18 April 2002, Power Markets 2002: Risk and Reward at Las Vegas, Nevada. Contact: Power Marketing Association, USA. Phone: 201-784-5389 Email: info@pmaconference.com URL: www.PowerMarketers.com

21-23 April 2002, ICEED's 29th International Energy Conference on "Risk and Uncertainty: Challenges and Opportunities for the Energy Sector" at Boulder, Colorado. Contact: Dr. Dorothea H. El Mallakh, Director, ICEED, International Research Center for Energy and Economic Development (ICEED), 850 Willowbrook Road, Boulder, Colorado, 80302, USA. Phone: 303-442-4014. Fax: 303-442-5042 Email: iceed@stripe.colorado.edu URL: www.iceed.org

22-23 April 2002, Restructuring Transmission Operations at Alexandria, VA. Contact: CBI Registration, CBI, Registration Department, 500 W Cummings Park, Ste 5100, Woburn, MA, 01801, USA. Phone: 800-817-8601/781-939-2438. Fax: 781-939-2490 Email: kimh@cbinet.com URL: cbinet.com

23-24 April 2002, ICEED's 23rd Annual International Area Conference, "Domestic and Global Dimensions of US Energy Policy" at Boulder, CO. Contact: Dorothea El Mallakh, International Research Center for Energy & Economic Development, 850 Willowbrook Road, Boulder, CO, 80302, USA. Phone: 303-442-4014. Fax: 303-442-5042 Email: iceed@stripe.colorado.edu URL: www.iceed.org

24-25 April 2002, Risk Assessment and Portfolio Management at Houston, Texas. Contact: Katrina Gregory, Senior Marketing Manager, IQPC, Anchor House, 15-19 Britten Street, London, N/A, SW3 3QL, United Kingdom. Phone: +44 (0) 20 7368 9406. Fax: +44 (0) 20 7368 9303 Email: katrina.gregory@iqpc.co.uk URL: www.iqpc.com/NA-1772/ediary

24-25 April 2002, Latin American Regional Farmout & Exploration Promotion Forum 2002 at Sheraton Suites, near the Galleria, Houston, USA. Contact: Babette van Gessel, Group Managing Director, Global Pacific & Partners, 2nd Floor, Regent Place, Cradock Avenue, Rosebank, Johannesburg, 2196, South Africa. Phone: 27 11 778 4360. Fax: 27 11 880 3391 Email: info@glopac.com URL: www.petro21.com

8-9 May 2002, Commercializing Clean Coal 2002 Conference at Pittsburgh, Pennsylvania. Contact: Charles Spear Jr, Conference Director, Intertech, 19 Northbrook Dr, Portland, ME, 04105, USA. Phone: 207-781-9612. Fax: 207-781-2150 Email: chuck@intertechusa.com URL: www.intertechusa.com

14-15 May 2002, Green Trading Summit: Emissions, Renewables & Negawatts at McGraw-Hill Conference Center, New York City. Contact: Marion Yuen, USA. Phone: 718-230-5402 URL: www.global-change.com/conferences.html

14-15 May 2002, Energy and Power Risk Management 2002 USA at Houston, TX. Contact: Adam Jordan, Risk Waters. Phone: 44-0-20-7484-9908 Email: ajordan@riskwaters.com

(continued on page 24)

Calendar *(continued from page 23)*

15-17 May 2002, Fundamentals of Power Quality at Washington, DC. Contact: The Association of Energy Engineers, AEE Energy Seminars, PO Box 1026, Lilburn, GA, 30048, USA. Phone: 770-925-9633. Fax: 770-381-9865

20-21 May 2002, Eleventh Annual Latin American Energy Conference at Hilton La Jolla Torrey Pines, San Diego, California, USA. Contact: Institute of the Americas, Energy Program, 10111 North Torrey Pines Road, La Jolla, California, 92037, USA. Phone: 858-453-5560 x103. Fax: 858-453-2165 Email: susana@iamericas.org

20-21 May 2002, Renewable Energy: Wind, Solar, Biomass — Assess Markets, Policies, Incentives, Investment Costs, Financing, Economics and Tech at Houston, TX. Contact: Registration Dept, CBI, 500 W. Cummings Park, Ste. 5100, Woburn, MA, 01801, USA. Phone: 800-817-8601/781-939-2438. Fax: 781-939-2490 Email: kimh@cbinet.com URL: cbinet.com

30-31 May 2002, 6th Annual Worlwide Independents Forum 2002 at J.W. Marriott, near the Galleria, Houston, USA. Contact: Babette van Gessel, Group Managing Director, Global Pacific & Partners, 2nd Flr, Regent Place, Cradock Ave, Rosebank, Johannesburg, 2196, South Africa. Phone: 27 11 778 4360. Fax: 27 11 880 3391 Email: info@glopac.com URL: www.petro21.com

10-21 June 2002, International Training Program on Utility Regulation and Strategy at Gainesville, Florida USA. Contact: Program Manager, Public Utility Research Center and World Bank, Matherly 205, PO Box 117142, University of Florida, Gainesville, Florida, 32611, USA. Phone: +1-352-392-3655. Fax: +1-352-392-5090 Email: purcecon@dale.cba.ufl.edu URL: www.purc.org

24-27 June 2002, 2nd World Congress of Environmental & Resource Economists at Monterey, California. Contact: Conference Organizer, Association of Environmental and Resource Economists (AERE) URL: www.aere.org or www.eaere.org

27-28 June 2002, The Business Case for Cogeneration at Chicago, IL. Contact: CBI Registrations, CBI, 500 W. Cummings Park Ste 5100, Woburn, MA, 01801, USA. Phone: 800-817-8601/781-939-2438. Fax: 781-939-2490 Email: kimh@cbinet.com URL: www.cbinet.com

27-29 June 2002, 25th IAEE International Conference: "Innovation and Maturity in Energy Markets: Experience and Prospects" at Aberdeen, Scotland. 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

10-12 July 2002, Fundamentals of Power Quality at Lake Tahoe, NV. Contact: The Assocition of Energy Engineers, AEE Energy Seminars, PO Box 1026, Lilburn, GA, 30048, USA. Phone: 770-925-9633. Fax: 770-381-9865

27-29 September 2002, New Directions in the International Conference on Earth Sciences and the Humanities: Experiments in Interdisciplinarity at Colorado School of Mines, Golden, Colorado USA. Contact: Robert Frodeman, Professor, Colorado School of Mines, Liberal Arts & International Studies, Stratton Hall 301, Golden, Colorado, 80401, USA. Phone: (303) 273-3585. Fax: (303) 273-3751 Email: rfrodema@mines.edu URL: www.mines.edu/newdirections

6-8 October 2002, 22nd USAEE/IAEE Annual North American Conference: "Energy Markets in Turmoil: Making Sense Of It All" at Vancouver, BC, Canada. Contact: David Williams, Executive Director, USAEE, 28790 Chagrin Blvd., Suite 350, Cleveland, Ohio, 44122, USA. Phone: 216-464-2785. Fax: 216-464-2768 Email: usaee@usaee.org URL: www.iaee.org

!!! Congratulations 2002 USAEE Award Winners !!!

Awards chair David J. DeAngelo and his committee members Dorothea El Mallakh, Hillard G. Huntington, Mark A. Schwartz, and Jack W. Wilkinson are pleased to announce the following 2002 USAEE Award winners:

USAEE Adelman-Frankel Award

Awarded to an organization or individual for unique and innovating contributions to the field of energy economics.

Energy Information Administration

USAEE Senior Fellow Award

Awarded to individuals who have exemplified distinguished service in the field of energy economics and/or the USAEE.

Theodore R. Eck

David Knapp
Energy Intelligence Group

Michael L. Telson
University of California

The above award recipients will receive their awards and recognition at the 22nd Annual North American Conference of the USAEE/IAEE, October 6-8, 2002 in Vancouver, British Columbia, Canada.

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