



US AEE

United States

United States Association for Energy Economics, An Affiliate of the IAEA

Dialogue

A Survey of Federal Energy Tax Incentives 6

15 Alaska North Slope Natural Gas Politics

PEMEX: Challenges and Opportunities; Time for Reform? 19

24 Russia, Ukraine and EU Trade Dispute: Implications on the Atlantic LNG Market

Integrating the Regulation of Natural Gas Utilities 29

US AEE Mission Statement

The United States Association for Energy Economics is a 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.

Vol. 14, No. 3

November 2006

Developing & Delivering Affordable Energy in the 21st Century

September 16-19, 2007 Post Oak Hilton Houston, Texas - USA
27th USAEE/IAEE North American Conference

United States Association for Energy Economics
Conference Structure

International Association for Energy Economics

This year we have chosen conference themes that we believe reflect the key policy challenges and uncertainties for developing necessary infrastructure in North America as well as the world. We would like the concurrent sessions to expand on these themes, and are actively soliciting papers that address the suggested bullet points. Papers on other topic ideas are, of course, welcome, and anyone interested in organizing a session should propose the topic and possible speakers to: **Wumi Iledare, Concurrent Session Chair (p) 225-578-4552 (f) 225-578-4541 (e) wumi@lsu.edu**. The conference will also feature technical tours, workshops, public outreach and student recruitment sessions.

LNG

- Upstream access and supply
- Downstream infrastructure development
- Shipping capacity and costs
- Contracts, project financing, gas market integration, risk management

Supply and Access

- Oil – conventional & unconventional resources, geopolitics
- Refining – capacity, technology
- Natural gas – access and geopolitics
- Role of National Oil Companies

Legal and Regulatory Considerations

- Siting energy facilities
- Increasing regulatory efficiency
- Managing legal uncertainties
- EPAAct 2005: an initial evaluation

Alternative Energy & Efficiency

- Mass-scale solar power
- Coal gasification
- Biofuels – amount, timing
- Wind power

Science and Technology Policy

- Role of IT (upstream oil & gas, DSM, smart metering, smartgrid)
- Frontier technologies: nanotechnology, biotechnology, material sciences
- Science of climate change

Electricity Market Design

- Importance of market design
- Market design policy evolution in the USA
- Comparison of different market structures
- Regulatory versus market (in)efficiency

Electricity Infrastructure

- Building transmission – who? how? new technologies?
- Managing grids: ISO, RTO or traditional utilities
- Building new generation including alternatives, nuclear, coal and DG

Energy Trading

- Oversight – veracity of price data
- Volatility – impact, management
- Oil, gas, coal, electricity linkages
- Impact of market structure

Human Capital

- Trends in skills needed
- Impact of demographics and societal trends on career choice
- Role of educational institutions

Energy Reporting and Education

- Role of media in public opinion
- Reporting on complex technical information
- Energy in school curricula

*** CALL FOR PAPERS ***

Abstract Submission Deadline: April 27, 2007

(Please include a short CV when submitting your abstract)

Abstracts for papers should be between one to two paragraphs (*no longer than one page*), giving a concise overview of the topic to be covered. 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 provide complete contact details - mailing address, phone, fax, e-mail, etc. Authors will be notified by June 1, 2007, of their paper status. Authors whose abstracts are accepted will have until August 4, 2007, to return their papers for publication in the conference proceedings. While multiple submissions by individuals or groups of authors are welcome, the abstract selection process will seek to ensure as broad participation as possible: each speaker is to present only one paper in the conference. No author should submit more than one abstract as its single author. If multiple submissions are accepted, then a different co-author will be required to pay the reduced registration fee and present each paper. Otherwise, authors will be contacted and asked to drop one or more paper(s) for presentation. 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

Students: Submit your paper for consideration of the USAEE Student Paper Awards (cash prizes plus waiver of conference registration fees). Students may also inquire about our scholarships for conference attendance. Visit <http://www.usaee.org/USAEE2007/paperawards.html> for full details.

Travel Documents: All international delegates to the 27th USAEE/IAEE North American Conference are urged to contact their consulate, embassy or travel agent regarding the necessity of obtaining a visa for entry into the U.S. If you need a letter of invitation to attend the conference, contact USAEE with an email request to usaee@usaee.org. The Conference strongly suggests that you allow plenty of time for processing these documents.

Visit our conference website at: <http://www.usaee.org/usaee2007/>

President's Message



President's Message

As this year rolls forward into next, the USAEE will also be moving forward with some major new initiatives we hope will create greater opportunity for networking and interaction among the membership. Most importantly, we are forming a new Communications Committee to explore and implement new strategies – from an expanded and more active “Blog” to an energy puzzler to an Ask an Expert forum. See the separate article on the Strategic Plan and Organizational Changes in this issue for

more information. I would like to encourage anyone in the organization who would like to become more involved to consider supporting this effort. We need creative ideas and members willing to engage and support implementation of new programs.

A year ago, attention was on the aftermath of the hurricanes in the Gulf. High oil prices and the decline of the major U.S. auto manufacturers kept energy front and center most of this year during the electoral campaign. The outcome of the midterm election will have a significant impact on U.S. energy politics and the policy discussion. The new Democratic majority has embraced an energy independence mantra. They know independence from imported energy is not realistic, as did the previous Republican majority. Frustrating as it is to professionals in the energy sector, touting “energy independence” is politically expedient and the polling reinforces the effectiveness. The major difference in the new Congress will be a greater emphasis on efficiency and alternative domestic energy sources from biofuels to renewables to “clean” coal. Domestic oil, gas and coal production will remain very important. Most significantly, I believe the prospects for serious action in the U.S. have changed dramatically.

In 2005, the Senate adopted a Sense of the Senate resolution proposed by Jeff Bingaman, the returning Chairman of the Energy and Natural Resource Committee. The resolution stated the “Congress should enact a comprehensive and effective national program of mandatory, market-based limits and incentives on emissions of greenhouse gases that slow, stop, and reverse the growth of such emissions at a rate and in a manner that will not significantly harm the United States economy; and will encourage comparable action by other nations that are major trading partners and key contributors to global emissions.” A similar Sense of the Congress resolution was adopted earlier this year by the House Committee on Appropriations in the Interior-Environment bill. The provision was later dropped by the Republican leadership on the House floor.

The Stern Review on the Economics of Climate Change, following on the publicity this summer from Vice President Al Gore’s film “An Inconvenient Truth”, has served to refocus attention on the lack of national policy in the U.S. The Democratic majority removes an impediment – the former Republican House leadership – the momentum for action is bipartisan. The focus will now shift in earnest to the specifics of a framework. In fact, there will be competition for leadership on the issue in the Senate. A number of Senators have already put forward climate change legislation – McCain, Lieberman, Byrd, Bingaman, Domenici, Lugar to name a few. There has been less focus in the House, but that may change under the new Speaker from California. Just months ago a comprehensive climate change law was enacted and embraced by Republican Governor Schwarzenegger to international acclaim.

This creates an opportunity for USAEE members to inform the debate. The analytical work of our community is increasingly sought out by policy makers.

Hill Huntington and John Weyant with the Energy Modeling Forum, recipient of the USAEE Adelman-Frankel award last year, are actively consulted in Wash-

(continued on page 4)

Dialogue

Vol. 14, No. 3 (\$10.00)

November 2006

www.usaee.org

Dialogue

Dialogue is a tri-annual publication of the United States Association for Energy Economics. Subscriptions are dependant on membership with USAEE. Reprints are available for \$10 US and Canada.

Editor: Wumi Iledare

Submissions

Articles, notices, news of chapter events and relevent energy news can be sent to the editor.

Wumi Iledare
LSU Center for Energy Studies
Energy Coast & Environment Building
Baton Rouge, LA 70803-0001
wumi@lsu.edu
Fax: (225)578-4541
Tel: (225)578-4552



Contents

Features

President's Message	3
Editor's Corner	4
Calendar	35

Articles

A Survey of Federal Energy Tax Incentives <i>Joseph C. Mandarino</i>	6
Alaska North Slope Natural Gas Politics <i>Doug Reynolds</i>	15
PEMEX: Challenges and Opportunities; Time for Reform? <i>Justin Dargin</i>	19
Russia, Ukraine and EU Trade Dispute: Implications on the Atlantic LNG Market <i>Obindah Wagbara</i>	24
Integrating the Regulation of Natural Gas Utilities <i>Jon Ludwigson, Frank Rusco and W. David Walls</i>	29

President's Message (continued from page 3)

ington and around the world. Other USAEE members are being called on for their work specifically on energy efficiency. Skip Laitner and Neal Elliott at ACEEE in Washington, DC have been leading an effort to review energy modeling and its use in the public policy context. Stanford University just received a \$30 million commitment from an alumnus in the oil and gas sector to establish the Precourt Institute for Energy Efficiency. Jim Sweeney will be the inaugural director.

In my 20 years in the energy sector, this is without question the most exciting and vibrant time. Not since the 1970's have we seen such interest and focus on the economics of all aspects of the energy sector from oil and gas development, to refining and fuels – conventional, unconventional fossil and biofuels, to power technologies – coal, nuclear and renewables, energy efficiency and full cycle environmental aspects. My barometer is not the fickle politicians, it's the students. We have a record number of student members and participants at our North American and international conferences. The fact so many have presented research on various aspects of energy efficiency I view as a positive indicator for the future.

Finally, I want to acknowledge our student participants in the expanded paper award program this year at the North American conference in Ann Arbor. We received 24 submissions; nine of which received paper awards. Pedram Mokrian of Stanford University received the Dennis O'Brien Best Paper Award after some stiff competition in the student paper concurrent session. Details on the student paper award winners and program for the coming year are posted on the website. I am confident we will see even more student participation at the Houston conference in 2007.

Shirley Neff

Middle Eastern energy dependency, energy supply disruptions from terrorism, nor rising energy prices underlies the strong push from Washington on the Alaskan State Legislature to start building a natural gas pipeline from Alaska's North Slope to the Lower 48 states.

Justin Dargin in his article describes Mexico's PEMEX as one of the key global energy players to watch. According to Dargin, PEMEX needs to be restructured to prevent severe and perpetual economic damage to Mexico's economy. Dargin, premises his assertion on the likelihood of a self-sufficiency crisis in Mexico's petroleum economy by 2010.

Also in this edition, Obindah Wagbara attempts to explain the consequences of the Russia-Ukraine-EU gas trade dispute on the Atlantic LNG market. Mr. Wagbara describes how the EU's signal to loosen long-term contracts between Gazprom and EU buyers could undermine the stability of the regional market.

The article by Jon Ludwigson, Frank Rusco and W. David Walls shows a wide disparity in gas purchasing practices of gas utilities and reports that many residential gas consumers were left quite exposed to the two most recent large price spikes. The authors raise some questions on the extent to which utilities and regulators act in the interest of residential customers. They present a brief description of tools which, gas utilities can use to hedge against price spikes.

Finally, members are invited to submit short articles for publication in the USAEE Dialogue Online. The editor welcomes policy or analytical debates on topical issues of energy concerns between two experts. Further, we want to publish short articles on research centers (academic, government laboratories, etc) around the country working on energy economics and related fields. Please, send abstracts of your most recent working papers, unpublished and published research papers, news articles, notices, news of chapter events, and relevant energy news to the editor via e-mail at wumi@lsu.edu or usaee@usaee.org.



**USAEE News
Editor's Corner**

USAEE Dialogue Online presents a broad survey of the U.S. Federal energy tax incentives by Joseph Mandarino. Mr. Mandarino classifies federal tax incentives into three main categories—conservation incentives, alternative fuels incentives and production incentives. He explained the difference between tax credit and tax deductions for each category of incentives and explained why nearly all of the incentives for alternative fuels take the form of tax credits. The effectiveness of these incentives, according to Mandarino, depends significantly on the complexity of the tax rule and the ability to assign incentives to unambiguous beneficiaries.

Professor Doug Reynolds of the University of Alaska, Fairbanks reviews the current political pressure on the Alaskan State Legislature to set off the Alaska North Slope gas project. Dr. Reynolds postulates that the most persuasive argument in support of the new focus from Washington on the Alaska pipeline project is the daunting risk-averse nature of several key energy players abroad. He argued that neither the fear of

!!! Congratulations to 2007 USAEE Officers & Council Members !!!

Nominations chair Marianne Kah and committee members David Dismukes, Alex Farrell, Chris Jablonowski and Troy Thompson are pleased to announce the following 2007 USAEE Officers & Council Members:

- | | |
|-------------------------------|----------------|
| President-Elect | Wumi Iledare |
| VP, Conferences | Joe Dukert |
| VP, Chapter Liaison | Mina Dioun |
| VP, Academic Affairs | James Smith |
| VP, Communications | Mary Barcella |
| Secretary-Treasurer | Jonathan Story |
| Council Members | Rick Karp |
| | Glen Sweetnam |
| Student Representative | Jennie Rosthal |

Other Officers/Council members during 2007 will be Peter Nance, 2007 USAEE President, Shirley Neff, 2007 USAEE Past President and Council members Alex Farrell and Charles Rossmann.

Special OFID/IAEE Support for Students from Developing Countries

IAEE is pleased to announce a special program which combines resources from the OPEC Fund for International Development (OFID) and the International Association for Energy Economics (IAEE). The support will consist of a cash stipend of up to \$1500.00 plus waiver of conference registration fees for a limited number of eligible students, who are citizens of developing countries, to attend either the 30th IAEE International Conference in Wellington, New Zealand, February 18-21, 2007; the 9th IAEE European Conference in Florence Italy, June 10-12, 2007 or the 27th USAEE/IAEE North American Conference, Houston, Texas, September 16-19, 2007.

Application deadlines for each of the conferences is as follows: Wellington Conference – application material cut-off date, January 19, 2007; Florence Conference – application cut-off date, May 11, 2007; Houston Conference – application cut-off date, August 17, 2007.

Please submit the following information electronically to iaee@iaee.org to have your request for support considered.

- Full name, mailing address, phone/fax/email, country of origin and educational degree pursuing.
- A letter stating you are a full-time graduate/college student, a brief description of your coursework and energy interests, and the professional benefit you anticipate from attending the conference. The letter should also provide the name and contact information of your main faculty supervisor or your department chair, and should include a copy of your student identification card.
- A letter from your academic faculty, preferably your faculty supervisor, recommending you for this support and highlighting some of your academic research and achievements, and your academic progress.
- A cost estimate of your travel/lodging expenses to participate in one of the above conferences.

Please note that students may apply for this support at only one of the above conferences. Multiple requests will not be considered.

Applicants will be notified whether their application has been approved within 15 days of the respective application cut-off dates. After the applicant has received IAEE approval, it will be their responsibility to make their own travel (air/ground, etc.) and hotel accommodations, etc. to participate in the conference. Reimbursement up to \$1500 will be made upon receipt of itemized expenses.

For further information regarding the OPEC Fund for International Development and IAEE's special support for students from developing countries to participate in our conferences in 2007, please do not hesitate to contact David Williams at 216-464-5365 or via e-mail at: iaee@iaee.org

Conference Proceedings

26th USAEE/IAEE North American Conference

Ann Arbor, Michigan – September 24-27, 2006

“Energy in a World of Changing Costs and Technologies”

This CD-Rom publication includes articles on the following topics:

Natural Gas Industry	Energy Data and Modeling Demand Estimation
Economics of Electric and Gas Utilities	Economics of New Energy Technologies, Conservation & Efficiency
International Energy Economics	Energy and the Environment
Energy Industry Finance	Oil Industry: E&P, Transportation, Refining, etc.

Payment must be made in U.S. dollars with checks drawn on U.S. banks. Complete the form below and mail together with your check to: Order Department, USAEE, 28790 Chagrin Blvd., Suite 350, Cleveland, OH 44122, USA.

Name _____

Address _____

City, State, Mail Code and Country _____

Please send me _____ copies @ \$130 each (member rate) \$180 each (nonmember rate).

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

A Survey of Federal Energy Tax Incentives

By Joseph C. Mandarino*

In the United States, one of the main sources of energy incentives is the Internal Revenue Code (the "Code"). The Code contains numerous incentives to encourage the development, production and/or conservation of energy. This article provides a broad survey of these incentives and attempts to describe some policy concerns that may be relevant.

As an initial matter, this article sorts the incentives into three main categories: conservation incentives, alternate fuel incentives, and production incentives. In addition, a fourth category containing miscellaneous and administrative provisions appears at the end of this article.

In some cases, the classification is arbitrary. For example, the Code contains a special incentive for new nuclear power generation facilities. This is classified as a production incentive, although some would argue that given the prospect of new nuclear power facilities in the U.S. today this should be classified as an alternate fuel incentive.

It is also important to recognize that this article surveys only federal tax incentives. State and local governments provide additional incentives, some of which are modeled after the federal rules, but many of which are not. Furthermore, some state income tax systems incorporate federal provisions (and thereby include the federal incentives), while others do not.

The vast majority of incentives discussed below take the form of tax deductions or tax credits. Some background may be helpful to understand the difference. A deduction reduces the tax base on which taxes are levied. For example, a \$100 tax deduction will have the effect of reducing taxable income by \$100. If the marginal tax rate is 40%, this tax deduction has a benefit of \$40, because that is the amount by which it reduces tax liability (i.e., \$100 x 40%). A tax credit, in contrast, represents a dollar for dollar reduction in tax liability. Thus, a \$40 tax credit will reduce a taxpayer's tax liability by the same amount as a \$100 tax deduction. There are various technical details, however, that can limit the use of credits and deductions, making the comparison even more difficult.

In addition to income taxes, the Code also contains various excise taxes on fuel (e.g., the federal gasoline excise tax). The structure of the excise tax rules contains various incentives. Where relevant, this article discusses excise tax provisions that contain energy incentives.

To simplify matters, the format of the various sections is first to present a simplified table of the relevant incentives, and second to discuss important features at greater length.

I. Conservation Incentives

Incentives for energy conservation typically focus on the use of more efficient technology (i.e., vehicles with better fuel economy) or on efforts to reduce fuel waste (insulated windows, etc.) The Code contains tax credits, tax deductions and

*Joseph C. Mandarino is a partner with Balch & Bingham LLP, in Atlanta, GA. He specializes in tax and financial planning for a variety of clients, including energy market participants.

an excise tax rule that serve as conservation incentives. These are discussed separately in the following sub-sections.

A. Conservation Incentives -- Tax Credits

The following table summarizes the provisions of the key tax credits available for conservation efforts. Note that several limitations are applicable to most credits and are not reproduced in the table. For example, in most cases a credit can only be utilized to the extent the taxpayer has taxable income. If a taxpayer has no income in a given year (i.e., because of losses), the credit generally carries forward for use in a subsequent period (although there are limitations on how many times a credit can be carried over). In addition, in many cases the credit is reduced by other government assistance, such as other credits or subsidies. Also, a taxpayer generally must reduce the tax basis of property by the amount the tax credit associated with that property. This will reduce the cost recovery deductions permitted with respect to such property.

section	general	description	limitations
25C	energy efficient systems and improvements	credit equals the sum of: • 10% of qualified energy efficiency improvements • 100% of residential energy expenditures	<ul style="list-style-type: none"> • \$500 lifetime max per taxpayer • applies only to individuals • must be occur before 2008 • only applies to improvements & expenditures for dwellings
45L	energy efficient home credit	credit is \$1,000 to \$2,000 per home depending on energy efficiency • also applies to manufactured homes and to existing homes for which there is substantial reconstruction and rehabilitation • credit is for owner, not builder	<ul style="list-style-type: none"> • purchase or expenditures must occur before 2008
45M	credit for energy efficient appliances	credit for the manufacturer of certain energy efficient appliances: • dishwashers – at least \$100 • clothes washers – \$100 • refrigerators – \$75 to \$175 depending on efficiency	<ul style="list-style-type: none"> • only applies to units produced in 2006 or 2007 • only applies to units produced in excess of averaged number of same type produced in prior 3 years (in case of refrigerators, only applies to excess over 110% of 3-year base) • lifetime credit per manufacturer = \$75 million (special additional limits for certain refrigerators) • annual credit cannot exceed 2% of the average annual gross receipts for the 3 prior years • computed on an affiliated group wide basis

Energy Efficient Systems and Improvements

This credit is intended to make the purchase of energy efficient home improvements more attractive. However, because the credit is granted to the homeowner rather than the contractor, there is no "point of sale" effect. Instead of experiencing a price or cost reduction at the front end, the homeowner makes full payment and then must apply for the credit on his or her own. As with most tax credits, the rules and recording keeping requirements are complex and may discourage full utilization. In addition, the credit has a relatively modest lifetime cap and expires in 2008.

Energy Efficient Home Credit

This credit is intended to make the purchase a new energy efficient home (or the substantial reconstruction of an existing home) more attractive. However, as above, the credit is available only to the homeowner, so the benefit is deferred and can be obtained only after navigating the tax rules.

Energy Efficient Appliance Credit

This credit is intended to make the purchase of energy efficient appliances more economical. Because the credit is granted to the manufacturer, however, the “point of sale” problems addressed above are eliminated. Presumably, a manufacturer will be better positioned than a consumer to capture the credit. However, because the manufacturer is more sophisticated in tax matters than the consumer, it is unlikely to do more than the absolute minimum necessary to obtain the credit.

B. Conservation Incentives -- Tax Deductions

The following table summarizes the provisions of the key tax deductions available for conservation efforts. As with credits, most tax deductions have taxable income limitations (the unused portion carried over to another year) and a similar basis reduction rule often applies. In addition, the tax deduction rules frequent have “placed-in-service” date limitations. These rules require the property associated with the deduction to be ready for use by a certain date.

Energy Conservation Subsidies

Many utility companies provide special incentives and subsidies that encourage customers to conserve energy. Typical examples include incentives for the purchase of more efficient water heaters, for home insulation, etc. As a technical matter, these incentives probably constitute taxable income. This provision is important because it excludes such subsidies from income. However, because the exclusion is limited to subsidies in connection with dwelling units, subsidies to businesses are not covered.

Energy Efficient Commercial Buildings

Ordinarily this deduction would seem to suffer from the same “point of sale” problem that afflicts homeowner credits. However, this deduction is for the owners of commercial buildings who can be presumed to be more sophisticated in tax matters. In

section	general	description	limitations
136	energy conservation subsidies	Exclude from income any subsidy provided by a public utility to a customer for the purchase or installation of any energy conservation measure.	<ul style="list-style-type: none"> • limited to subsidies in connection with dwelling units • no deduction or credit allowed for any expenditure for which such an energy conservation subsidy was provided
179D	energy efficient commercial buildings	deduction equals cost of property installed as part of: (i) interior lighting systems, (ii) heating, cooling, ventilation, and hot water systems, or (iii) the building envelope <ul style="list-style-type: none"> • must be installed as part of a plan to reduce energy and power costs by 50% or more (alternatively, can meet lower standards set by IRS, but with lower cap) • must comply with certain industry standards 	<ul style="list-style-type: none"> • lifetime cap for building = \$1.80 x square footage of building (\$0.60 if meet lower reduction standards) • must be business property • building must be located in the U.S. • designer gets deduction if owner of building is a governmental organization • PIS date = must be placed in service during 2006 or 2007
280F	depreciation for luxury automobiles	limits otherwise permissible depreciation on luxury cars to the amount that could be taken on a mid-priced car <ul style="list-style-type: none"> • tends to make large SUVs (which frequently are not energy efficient) unattractive for business purchases • but, limits are tripled for clean-fuel passenger cars 	inapplicable after 2006

addition, because the cap is based on square footage, rather than a fixed dollar amount, this deduction can be significant.

The main drawback is that the deduction is not assignable. Because a significant portion of the U.S. commercial office fleet is owned by tax-neutral entities (typically pension funds), this deduction may be lost. If the deduction were assignable to, say, tenants or builders, then greater utilization would occur.

Depreciation for Luxury Automobiles

Although the policy behind this deduction limitation is not clear, it has two general consequences for energy conservation. First, to the extent that lower efficiency vehicles (such as SUVs) are more expensive than the average vehicle, this limitation tends to diminish the tax benefits from using such a vehicle for business purposes. Second, the depreciation deduction limitation is tripled in the case of clean-fuel passenger vehicles. (Importantly, the effect of this tax section is not to reduce the total depreciation for a given vehicle, but to change its timing. Thus, the net effect is a present value difference: expensive cars (including SUVs) receive less accelerated depreciation, while clean fuel vehicles receive more accelerated depreciation.)

C. Conservation Incentives -- Excise Tax Provisions

There appears to be only one major excise tax provision that relates to conservation incentives, the so-called “gas guzzler tax.” Its key provisions are summarized below:

section	general	description	limitations
4064	gas guzzler tax	<ul style="list-style-type: none"> • excise tax on cars (GVW of 6,000 or less) based on fuel economy • tax ranges from \$1,000 (if less than 22.5 mph) to \$7,700 (if less than 12.5 mph) 	

The manufacturer of a “gas guzzler” is required to pay a significant excise tax upon the sale of the vehicle. Although the tax is borne by the seller, it would be expected that a substantial portion of the tax is passed through to the customer and would make such vehicles less attractive. However, this tax does not apply to a vehicle with a gross vehicle weight of over 6,000 pounds. This would seem to subvert the policy goal of making vehicles with poor fuel economy less attractive. Heavier vehicles typically have lower fuel economy, but if a vehicle is heavy enough, it is not subject to the tax.

II. Alternate Fuel Incentives

In the U.S. the most common fuel sources are probably crude oil and coal, but there are a variety of alternate fuel and alternate fuel technologies. The Code contains a variety of incentives to encourage the development and use of such fuels.

A. Alternate Fuel Incentives -- Tax Credits

The following table summarizes the provisions of the key tax credits available for alternate fuels. The same caveats with respect to tax credits apply here as noted in Section I.A.

As an initial matter, it is worth observing that almost all of the incentives for alternate fuels take the form of tax credits. There may be several reasons for this, but undoubtedly part of the reason that newly favored alternate fuel incentives are done

section	general	description	limitations
25D	solar-- photovoltaic	credit = 30% of qualified photovoltaic property expenditures (max = \$2,000 p.a.)	<ul style="list-style-type: none"> • applies only to individuals • only for expenditures before 2008
25D	solar -- other	<ul style="list-style-type: none"> • credit = 30% of qualified solar water heating property expenditures • max credit = \$2,000 p.a. 	<ul style="list-style-type: none"> • same as above
25D	fuel cells	<ul style="list-style-type: none"> • credit = 30% of qualified fuel cell property expenditures • max credit = \$500 per ½ kwh per year 	<ul style="list-style-type: none"> • same as above
30	qualified electric vehicle credit	<ul style="list-style-type: none"> • credit = 10% of the cost of any qualified electric vehicle • vehicle must be powered primarily by an electric motor drawing current from rechargeable batteries, fuel cells, or other portable sources of electricity 	<ul style="list-style-type: none"> • max per vehicle = \$1,000 • reduced by certain other credits • original use must commence with taxpayer • acquired for use and not resale • terminates after 2006
30B	qualified fuel cell motor vehicle credit	<ul style="list-style-type: none"> • credit = \$8,000 to \$40,000 per vehicle depending on weight • \$1,000 to \$4,000 additional credit depending on fuel efficiency • vehicle must be propelled by power derived from one or more fuel cells 	<ul style="list-style-type: none"> • if personal property, credit is subject to taxable income limitation and no carryover • property must be used within the U.S. • original use must commence with taxpayer • acquired for use and not resale • terminates after 2014
30B	lean burn motor vehicle credit	<ul style="list-style-type: none"> • credit = \$400 to \$3,400 per vehicle depending on fuel efficiency • vehicle must have an internal combustion engine which meets lean burn technology criteria 	<ul style="list-style-type: none"> • same, but terminates after 2010 • phase-out after 60,000 vehicles sold
30B	qualified hybrid motor vehicle credit	<ul style="list-style-type: none"> • for passenger automobiles and light trucks, credit = \$400 to \$3,400 per vehicle depending on fuel efficiency • for other vehicles, credit = 20% to 40% of the "qualified incremental hybrid cost," depending on fuel efficiency • vehicle must draw propulsion energy from onboard sources of stored energy which satisfy hybrid power criteria 	<ul style="list-style-type: none"> • same, but terminates after 2010 (2009 for other vehicles category) • phase-out after 60,000 vehicles sold

45	credit for electricity from renewable resources	<ul style="list-style-type: none"> • credit = 1.5¢ per kwh of electricity sold by one of the following facilities: <ul style="list-style-type: none"> • wind facility • closed-loop biomass facility • open-loop biomass facility • geothermal energy facility • solar energy facility • small irrigation power facility • landfill gas facility • trash combustion facility • qualified hydropower facility • refined coal production facility • Indian coal production facility <p>special rules</p> <ul style="list-style-type: none"> • closed loop biomass credit adjusted based on thermal content ratios • for refined coal, credit increased by \$4.375 per ton of qualified refined coal • for Indian coal, credit increased by \$1.50 per ton of Indian coal (\$2 per ton after 2009) 	<ul style="list-style-type: none"> • credit applies only to power produced and sold within 10-year period from PIS date • phase out when cost of power produced with equivalent resource exceeds certain threshold • only U.S. production <p>in general, a facility must be placed in service as follows:</p> <ul style="list-style-type: none"> • wind facility, closed-loop biomass facility, open-loop biomass facility, geothermal energy facility, small irrigation power facility, landfill gas facility, trash combustion facility, and qualified hydropower facility -- before 2008 • solar energy facility -- before 2006 • refined coal production facility or Indian coal production facility -- before 2009
45J	credit for advanced nuclear power facilities	<ul style="list-style-type: none"> • credit = 1.8¢ per kwh of electricity produced at an "advanced nuclear facility" • "advanced nuclear facility" = facility with a reactor design approved by NRC after 1993 (excludes similar designs approved before 1994) 	<ul style="list-style-type: none"> • only applies to power produced during first 8 years after placed in service (which must occur before 2021) • annual national credit cap = \$125 million • IRS to select which reactors can qualify, but max megawatt capacity of approved reactors cannot exceed 6,000 megawatts
45K	credit for producing non-conventional fuel	<ul style="list-style-type: none"> • credit = \$3 per barrel-of-oil equivalent of the following qualified fuels: <ul style="list-style-type: none"> • shale/tar sands oil • gas from geopressured brine, Devonian shale, coal seams, tight formations, or biomass • liquid, gaseous, or solid synthetic fuels produced from coal (including lignite), including such fuels when used as feedstocks 	<ul style="list-style-type: none"> • phase out when market price of crude oil rises above certain threshold • fuel must be produced within the U.S. • coke/coke gas -- must be placed in service before 2010 and applied to fuel sold for the 4-year period after the placed in service date (but not later than 2009) • shale/tar sands oil -- credit has phased out • all other qualified fuels -- facility must have placed in service date before 7/1/98 and credit only applies to fuel sold before 2008

40	alcohol fuel mixture credit	<ul style="list-style-type: none"> • credit = 60¢ per gallon of alcohol used by the taxpayer in the production of a qualified mixture which is used by the taxpayer as fuel in a business or sold by the taxpayer as fuel 	<ul style="list-style-type: none"> • in case of ethanol alcohol, credit is 51¢ per gallon • sale or use must occur before 2011
40	alcohol fuel credit	<ul style="list-style-type: none"> • credit = 60¢ per gallon of alcohol not in a mixture which is used by the taxpayer as fuel in a business or sold by the taxpayer at retail as fuel 	<ul style="list-style-type: none"> • same as alcohol mixture credit, but credit is 45¢ per gallon if alcohol is less than 190 proof but at least 150 proof (37.78¢ in case of ethanol alcohol)
40	small ethanol producer credit	<ul style="list-style-type: none"> • credit = 10¢ per gallon of qualified ethanol fuel produced by the taxpayer • taxpayer must use the ethanol (or sell it to another person who uses it) as follows: (i) in a qualified mixture; (ii) as fuel in a business; or (iii) sells the ethanol at retail as fuel 	<ul style="list-style-type: none"> • capped at 15 million gallons per year • producer cannot have capacity for annual production of over 60 million gallons • sale or use must occur before 2011
40A	biodiesel mixture credit	<ul style="list-style-type: none"> • credit = 50¢ per gallon of biodiesel used in the production of a qualified biodiesel mixture • mixture must be sold by taxpayer as a fuel or used by taxpayer 	<ul style="list-style-type: none"> • in case of biodiesel which is "agri-biodiesel" or "renewable diesel," credit is \$1 per gallon • sale or use must occur before 2009
40A	biodiesel credit	<ul style="list-style-type: none"> • credit = 50¢ per gallon of biodiesel (not in a mixture) which is used by the taxpayer as fuel in a business or sold by the taxpayer at retail as fuel 	<ul style="list-style-type: none"> • in case of biodiesel which is "agri-biodiesel" or "renewable diesel," credit is \$1 per gallon • sale or use must occur before 2009
40A	small agri-biodiesel producer credit	<ul style="list-style-type: none"> • credit = 10¢ per gallon of qualified agri-biodiesel produced by the taxpayer • taxpayer must use the agri-biodiesel (or sell it to another person who uses it) as follows: (i) in a qualified mixture; (ii) as fuel in a business; or (iii) sells the agri-biodiesel at retail as fuel 	<ul style="list-style-type: none"> • capped at 15 million gallons per year • producer cannot have capacity for annual production of over 60 million gallons • sale or use must occur before 2009

48	energy credit	<ul style="list-style-type: none"> • credit = following percentages of the cost of the following property: <ul style="list-style-type: none"> • qualified fuel cell property = 30% • solar power property = 30% before 2008; 10% after 2007 • fiber-optic distributed sunlight system = 10% • geothermal power system = 10% • qualified microturbine = 10% 	<ul style="list-style-type: none"> • taxpayer must construct the property or acquire it for original use • must be business property • excludes public utility property • in case of qualified fuel cell property, fiber-optic distributed sunlight system & qualified microturbine, must be placed in service before 2008
48A	qualifying advanced coal project credit	<ul style="list-style-type: none"> • credit = following percentages of investments: <ul style="list-style-type: none"> • integrated gasification combined cycle projects = 20% • other advanced coal-based generation technology projects = 15% 	<ul style="list-style-type: none"> • taxpayer must construct the property or acquire it for original use • national lifetime caps: (1) integrated gasification combined cycle projects, \$800 million in credits; (2) for other advanced coal-based generation technology projects, \$500 million
48B	qualifying gasification project credit	<ul style="list-style-type: none"> • credit = 20% of investments in qualifying gasification projects during the year 	<ul style="list-style-type: none"> • taxpayer must construct the property or acquire it for original use • national lifetime cap: \$350 million • terminates after October, 2015
54	clean renewable energy bonds (CREBs)	<ul style="list-style-type: none"> • CREB is a non-interest-bearing "bond" issued to raise funds to for "qualified projects" • projects include all the facilities listed in §45, above, except for Indian coal facilities • holder is entitled to a tax credit that is based on the yield on outstanding AA rated corporate bonds • credit is paid quarterly 	<ul style="list-style-type: none"> • credit is included in income like interest • face amount of all CREBs cannot exceed \$800 million and no more than \$500 million can be to finance projects of governmental entities • bonds must be issued before 2008

as tax credits is that lobbyists try to replicate the success that older alternate fuels enjoy. Thus, when Congress decided to extend incentives to open-loop biomass, it did so by giving it almost the same treatment as was already granted to closed-loop biomass.

Although tax credits are generally more valued than tax deductions, one of the main drawbacks of this group of incentives (indeed of virtually all the incentives surveyed in this article) is the lack of assignability. Typically the rationale for an incentive is to provide tax benefits to encourage a desired course of conduct. However, in some cases the person to whom the incentive is granted may be tax indifferent. For example, the section 45 tax credit, above, is available to the owners of a variety of alternate fuel facilities. Yet most such facilities lose money at least initially. Thus, the ownership of such a facility is usually structured as a pass-through entity for tax purposes (a limited liability company or limited partnership). Even in such an ownership structure, there may be partners who are tax indifferent. However, it is not always possible to allocate the relevant tax credits to the parties which can use them. Ideally, the credits could simply be assigned to any investor, without regard to ownership interests. In this way, the raising of capital could be simplified and the utilization of the credit greater.

Because of the wealth of tax credits, this article does not attempt to discuss each individually other than the summary above. However, some particular policy issues are discussed in the following paragraphs.

Lean Burn Motor Vehicle Credit and Qualified Hybrid Motor Vehicle Credit (section 30B)

Both these credits suffer from an important limitation. After a manufacturer sells 60,000 vehicles in the U.S., the credit is phased out. This has already happened with respect to Toyota’s hybrids. This results in a credit that applies only to the “front” of a production cycle. While it rewards consumers who purchase vehicles early, in practice it represents a subsidy that is applied erratically across competing product lines. It is therefore less likely to incentivize production of the desired vehicles than a permanent credit would.

Credit for Producing Non-Conventional Fuel (section 45K)

One important limitation is that the credit is phased out when oil prices rise significantly. The rationale is that the credit is really a subsidy and that when main-stream energy prices rise the subsidy is unnecessary. In fact, some believe that the level of oil prices that phases out the credit is not sufficiently high to induce the production of alternate fuel on an unsubsidized basis. Accordingly, the phase-out is a significant risk factor that, in light of the oil price fluctuations in recent years, makes the section 45K credit unattractive.

Credit for Electricity from Renewable Resources (section 45)

As with the section 45K credit, this credit is phased out when commodity prices – in this case electricity – reach certain levels. Again, this is based on the theory that at such level the subsidy represented by this credit is not needed. However, it is not clear that this assumption is accurate, and the phase-out is a

risk factor that can make the section 45K credit unattractive.

B. Alternate Fuel Incentives -- Tax Deductions

The following table summarizes the provisions of the key tax deductions available for alternate fuels. The same caveats with respect to deductions apply here as noted in Section I.B. In contrast to the tax credits available as incentives for alternate fuels, there appears to be only two tax deductions, one for clean-fuel vehicles and one for the refueling equipment (typically recharging equipment) for such vehicles. Because these are business deductions, we would expect that the user of the deduction will be more sophisticated in tax matters than individual consumers. Thus, the point-of-sale problem is probably reduced.

section	general	description	limitations
179A	clean-fuel vehicles	<ul style="list-style-type: none"> deduction = cost of any qualified clean-fuel vehicle property cap = \$500 to \$12,500 depending on gross vehicle weight (prior to 2006, cap was 4 times higher) 	<ul style="list-style-type: none"> if vehicle can be propelled by both a clean-burning fuel and any other fuel, only the incremental cost of permitting the use of the clean-burning fuel can be deducted does not include “qualified electric vehicle” as covered by the §30 credit taxpayer must acquire the property for original use
179A	clean-fuel vehicle refueling property	<ul style="list-style-type: none"> deduction = cost of any qualified clean-fuel vehicle refueling property cap = \$100,000 per location 	<ul style="list-style-type: none"> same

C. Alternate Fuel Incentives -- Excise Tax Provisions

The federal government imposes a variety of excise taxes on various commodities, including gasoline, alcohol, kerosene, etc. There are a variety of incentives incorporated into the federal excise tax rules. The following table summarizes the key incentives that relate to alternate fuels.

section	general	description	limitations
4041	exemption from basic tax	excise tax on retail sale of diesel fuel, kerosene, special motor fuels, other alternative fuels, and compressed natural gas – contains reduced rates for methanol and ethanol fuels	
5181	alcohol used for fuel	various steps to ease administrative burden of starting facility to produce alcohol to be used in fuels, including waiving of bond and other rules applicable to production of alcohol for consumption	
5214	tax-free withdrawal of alcohol used for fuel	permits tax-free acquisition of alcohol if used for fuel	
6426	alcohol fuel mixture credit	credit against §4081 tax for alcohol fuel mixtures – credit is product of: <ul style="list-style-type: none"> gallons of alcohol in the mixture, and 60¢ (if none of the alcohol consists of ethanol) or 51¢ otherwise 	<ul style="list-style-type: none"> does not apply after 2010
6426	biodiesel mixture credit	credit against §4081 tax for biodiesel mixtures – credit is the product of: <ul style="list-style-type: none"> gallons of biodiesel in the mixture, and \$1 (if agri-biodiesel) or 50¢ otherwise 	<ul style="list-style-type: none"> does not apply after 2008
6426	alternative fuel credit	<ul style="list-style-type: none"> credit against §4041 tax for alternative fuel credit is the product of: (i) gallons of alternative fuel, and (ii) 50¢ alternative fuels include: liquefied petroleum gas, P Series Fuels, compressed or liquefied natural gas, liquefied hydrogen, certain liquid fuels derived from coal, and liquid hydrocarbons derived from biomass, but does not include ethanol, methanol, or biodiesel 	<ul style="list-style-type: none"> does not apply before October, 2006 generally does not apply after September, 2009
6426	alternative fuel mixture credit	<ul style="list-style-type: none"> credit against §4041 tax for alternative fuel mixture credit is the product of: (i) gallons of alternative fuel mixture, and (ii) 50¢ 	<ul style="list-style-type: none"> does not apply before October, 2006 generally does not apply after September, 2009

Note that several of the foregoing incentives consist of exemptions or credits against existing excise taxes, rather than some other form of subsidy.

III. Production Incentives

Production incentives help spur production of existing types of power. They generally focus on fuels that have already been accepted in the market. Thus one initial criticism is whether there should be any incentives for the production of fuels that are already profitable. Arguably any type of production incentive distorts the market.

A. Production Incentives -- Tax Credits

The following table summarizes the provisions of several tax credits that provide production incentives. These credits are generally given to energy producers, as opposed to energy consumers. Thus, the point-of-sale problem described above is likely avoided.

The credit for low sulfur diesel fuel is designed primarily to assist small-volume refiners. However, it may not be advisable to create incentives available only to smaller firms. In particular, we would expect more economic efficiencies from larger refiners, but this incentive may have the effect of subsidizing less-efficient market participants. In addition, smaller firms are less likely to be able to utilize tax incentives that are not fully assignable.

section	general	description	limitations
43	enhanced oil recovery credit	credit = 15% of certain costs in connection with a "qualified enhanced oil recovery project" -- defined as any U.S. project-- <ul style="list-style-type: none"> • which involves the application tertiary recovery methods to increase the amount of crude oil recovered, and • the first injection commenced after 1990 	<ul style="list-style-type: none"> • phase out when market price of crude oil rises above certain threshold
43	Alaska gas facility credit	credit = 15% of construction cost of a gas treatment plant in Alaska which: <ul style="list-style-type: none"> • prepares Alaska natural gas for transportation through a pipeline with a capacity of at least 2 trillion Btu of natural gas per day, and • produces carbon dioxide which is injected into hydrocarbon-bearing geological formations. 	<ul style="list-style-type: none"> • same as above
45H	credit for low sulfur diesel fuel	credit = 5¢ per gallon of low sulfur diesel fuel produced	<ul style="list-style-type: none"> • lifetime credit = 25% of qualified costs of facility (but lifetime credit reduced to extent refiner has large capacity) • qualified costs are costs for compliance with applicable EPA rules • only available to "small business refiners"
45I	credit for marginal oil and wells	credit = \$3 per barrel of crude oil and 50¢ per 1,000 cubic feet of natural gas if produced from "marginal" well	<ul style="list-style-type: none"> • phase out when market price of crude oil rises above certain threshold

Note that in the case of the enhanced oil recovery credit (section 43) and the credit for marginal oil and wells (section 45I), the incentives could also be viewed as conservation incentives in that the credits encourage the greater utilization of existing energy resources.

B. Production Incentives -- Tax Deductions

The following table summarizes the provisions of tax deductions that provide for production incentives.

Several aspects of the foregoing deductions are highlighted

in the following paragraphs.

Private Activity Bond Rules and Exempt Facility Bond Rules

The net effect of these rules is to exempt from income any interest paid on bonds used to finance, among other things, various power generation facilities and attendant projects. However, the rules are so complex and require the use of so many transactional intermediaries that it raises the issue whether different incentives might be more efficient. For example, it might be more effective to provide for credits or special deductions for the cost of certain power projects, rather than creating exceptions from the private activity bond rules.

Accelerated Depreciation

Accelerated depreciation is listed here as an energy incentive. In fact, an argument could be made that accelerate tax depreciation is an across the board incentive to all firms, and that the energy sector does not benefit to a greater degree than any other sector.

Pollution Control Facilities Rules and Deduction for Costs of EPA Sulfur Rules

These deductions soften the cost of complying with certain environmental regulations. As such, these incentives permit a firm to shift part of this cost to the public at large, rather than to a narrower population.

Election to Expense Certain Refineries

This provision is intended to spur the construction of additional oil refineries and is a direct response to a determination by Congress that high fuel prices were attributable, in part, to a failure to increase domestic refining capacity.

Tertiary Injectants

This is an indirect subsidy to encourage oil recovery through the use of "tertiary" (as opposed to primary or secondary) recovery methods. As with many of the production incentives described here, it clearly evinces Congress' intent that the consumption of oil and gas is acceptable, but that help may be needed to keep the cost of such fuel low. It could also be viewed as a conservation measure because it increases the output of an existing resource.

Domestic Production Deduction

As with accelerated tax depreciation, this is a general application deduction that benefits many industries. Indeed, it could be argued that the failure of the deduction to cover the transmission of fuel or electricity is a burden on the energy sector that is not imposed on other industries.

Corporate Preference Items

Although this article is addressed to incentives, this Code section claws back (but does not eliminate) several tax deductions that otherwise serve as incentives.

Nuclear Decommissioning Funds, Percentage Depletion, Mining Exploration Expenditures, and Coal Gain or Loss

These are all deductions that are highly specific to the en-

section	general	description	limitations
141	private activity bond rules	<ul style="list-style-type: none"> interest payments on certain bonds are tax-exempt bonds issued to finance nongovernmental, private activities do not warrant tax-exempt treatment unless they are "qualified bonds" qualified bonds include: exempt facility bonds 	<ul style="list-style-type: none"> numerous, highly technical limitations, including volume cap, etc.
142	exempt facility bond rules	<ul style="list-style-type: none"> exempt facility bonds include bonds to finance: <ul style="list-style-type: none"> facilities for the local furnishing of electric energy or gas, local district heating or cooling facilities, and environmental enhancements of hydro-electric generating facilities 	<ul style="list-style-type: none"> exempt facility bond rules highly complex "local furnishing" bonds contain special "two county" rule – facility can only furnish electricity to a city and a contiguous county, or to two contiguous counties
168	accelerated depreciation	<ul style="list-style-type: none"> tax deduction for depreciation expense method of tax depreciation generally more accelerated than economic (i.e., most power generation property qualifies for 150% double declining balance method) recovery periods generally shorter than economic life (e.g., recovery period for nuclear reactor is 15 years; for offshore oil drilling platform is 5 years) 	<ul style="list-style-type: none"> various restrictions normalization rules
169	pollution control facilities	<ul style="list-style-type: none"> special accelerated recovery of costs for "pollution control facility" (i.e., a new treatment facility used in connection with a plan) – helpful for utilities required to build scrubbers, etc. to comply with environmental rules: <ul style="list-style-type: none"> if facility placed in service on or before April 11, 2005 – recovery period 5 year (but connected plant must have been in operation before 1976) if facility placed in service after April 11, 2005 -- recovery period 7 years if facility (no restriction on when connected plant began operation) 	<ul style="list-style-type: none"> if facility earns profits from the recovery of waste or otherwise, then benefit does not apply to the extent the costs of the facility are recovered over its actual economic life if useful life of facility exceeds 15 years, then benefit is reduced proportionately
179B	deduction for costs of EPA sulfur rules	deduction = 75% of capital costs for compliance with applicable EPA low sulfur rules	<ul style="list-style-type: none"> only applies to "small business refiner" phase out if average daily refinery run exceeds 155,000 barrels and no deduction if exceeds 205,000 barrels

ergy sector. In many cases, they address unusual tax accounting issues. For example, generally a taxpayer cannot deduct amounts set aside as a reserve, even if required to do so by the government. The opposite is often the case for financial accounting purposes. Thus, utilities required to set up reserves for the future decommissioning costs of nuclear reactors would

179C	election expense to certain refineries	<ul style="list-style-type: none"> deduction = 50% of the cost of any portion of a qualified refinery "qualified refinery" = a refinery located in the U.S. which processes crude oil or qualified fuels 	<ul style="list-style-type: none"> original use of the refinery must commence with the taxpayer refinery must be placed in service before 2012
193	tertiary injectants	deduction for costs incurred for any injectant used as part of a tertiary recovery method (i.e., injecting gas into oil fields to recover additional amounts of crude oil)	<ul style="list-style-type: none"> does not apply if injectant is hydrocarbon based and recoverable does not apply to any cost for which a deduction is allowed otherwise
199	domestic production deduction	<ul style="list-style-type: none"> deduction = 9% of income from certain economic activities, including the production (but not the transportation) of electricity, oil and natural gas effect = lower marginal tax rate on listed activities (i.e. top rate drops from 35% to just under 32%). 	<ul style="list-style-type: none"> deduction rate is only 3% in 2006, and 6% for 2007, 2008 and 2009 cap -- cannot exceed taxable income and no carryover provision cap -- cannot exceed 50% of labor costs associated with the activity
291	corporate preference items	<ul style="list-style-type: none"> many tax benefits are clawed back in the case of a corporation – relevant here are the following reductions: <ul style="list-style-type: none"> the amortizable basis of pollution control facilities is reduced 20% the deduction for intangible drilling costs and mineral exploration and development costs is reduced 20% percentage depletion for coal, iron ore, and lignite is reduced by 15% of the excess of the depletion deduction over the basis in the property 	
468A	nuclear decommissioning funds	<ul style="list-style-type: none"> special deduction for amounts paid into a "nuclear decommissioning reserve fund" absent this rule, this type of reserve likely would not give rise to a tax deduction – effectively permits an accelerated deduction 	<ul style="list-style-type: none"> many requirements must be satisfied, including obtaining a clearance ruling from the IRS to establish the fund and the schedule of payments
613 & 613A	percentage depletion	<ul style="list-style-type: none"> percentage depletion is permitted for many natural resources, including mines and oil and gas wells <ul style="list-style-type: none"> in contrast to cost depletion, which is limited to the cost of the natural resource, percentage depletion is not dependent on the cost of a natural resource – a holder may be permitted to recover in excess of his or her actual investment example – 10% of the income from the production of coal can be taken as a depletion deduction (22% in case of uranium) 	<ul style="list-style-type: none"> percentage depletion generally not allowed for most large and medium sized oil and gas producers generally only applies to small independent oil and gas producers (15% depletion rate) and certain geothermal gas wells (22% depletion rate)
617	mining exploration expenditures	exploration expenditures can be immediately expensed under certain conditions	doesn't apply to oil and gas wells, but does apply to coal and uranium mines
631	coal gain or loss	favorable treatment of certain coal royalty income as capital gain income	

suffer a significant book/tax difference without some remedy.

IV. Other Energy Tax Incentives

Some energy incentives do not fit easily into the prior three categories, including several excise tax and administrative provisions.

A. Other Energy Incentives – Tax Credits

The following table summarizes the provisions of several tax credits that provide energy incentives that have not been discussed thus far.

Credit for Certain Excise Taxes

As discussed elsewhere, there are several significant fuel excise tax refund provisions that depend on how fuel is used. This credit is an administrative alternative to actually filing for and receiving such a refund and has the same economic effect.

Carryback and Carryforward of Unused Credits

Because so many of the energy tax incentives are in the form of tax credits, a significant problem that can be encountered is that virtually all of them are non-refundable. That is, they can only be used to the extent that a taxpayer has taxable income. The carryover rules permit a taxpayer to carry unused tax credits to prior and subsequent years to offset tax liability in those years. Hence, the non-refundability problem is reduced.

section	general	description	limitations
34	credit for certain excise taxes	credit equal to refunds that would otherwise be payable for: <ul style="list-style-type: none"> • federal excise tax paid on gasoline used on a farm for farming purposes • federal excise tax paid on gasoline used in a non-highway business use, or gasoline used in a qualified bus use • federal excise taxes paid with on various fuels (e.g., diesel fuel, kerosene and aviation fuel) that are used for a nontaxable purpose or resold 	not applicable to amounts for which the taxpayer actually files a refund claim
39	carryback and carryforward of unused credits	<ul style="list-style-type: none"> • 1 year carryback and 20 year carryforward • 1 year carryback and 20 year carryforward in case of §451 credit 	

B. Other Energy Incentives -- Tax Deductions

The following table summarizes the provisions of several deductions that may effect energy production or consumption and that have not been discussed thus far.

section	general	description	limitations
172	net operating loss deduction	carryback = 2 years carryforward = 20 years	
196	deduction for unused business credits	tax credits that otherwise would expire unused can be taken in a deduction in the year of expiry	only applies to certain credits, including of relevance here: <ul style="list-style-type: none"> • the alcohol fuels credit (§40(a)), • the enhanced oil recovery credit (§43(a)), • the biodiesel fuels credit (§40A(a)), • the low sulfur diesel fuel production credit (§45H(a)), and • the energy efficient home credit (§45L(a))
451(i)	deferral of gain on sale of transmission system	gain that would otherwise be recognized on the sale of an electrical transmission system is taxed as follows: <ul style="list-style-type: none"> • the gain is taxed in the year of the sale only to the extent the gain exceeds the amount that the seller invests in certain types of utility property in the 4 years after the sale, and • the remaining gain is taxed over the 8- year period beginning with the sale year 	<ul style="list-style-type: none"> • only applies to sales before 2008 • sale must be to facilitate government policy

Net Operating Loss Deduction

As with tax credits, one problem with energy incentives that are tax deduction is that the taxpayer may not need deduction for a given year. Deductions in excess of income create a net operating loss which can be carried to other periods and to offset taxable income. Thus, this provision makes the incentive more valuable because it is more likely to be used.

Deduction for Unused Business Credits

Even with the tax credit carryover rules, it is possible that a credit may expire unused. The ability to deduct unused credits

mitigates the loss to some extent.

Deferral of Gain on Sale of Transmission System

This incentive permits a utility to defer paying tax on the gain from the sale of a transmission system to the extent it invests in other utility property. This will tend to encourage the sale of such systems which facilitates a stated policy of the Federal Energy Regulatory Commission (the “FERC”). The FERC has advocated this policy because it believes that ownership of transmission systems by companies that also generate electricity is prone to inefficiencies. Separation of ownership, it is believed, will tend to reduce power prices and increase competitiveness. Arguably it is a production incentive because it may facilitate more electrical generation, and arguably it is a conservation incentive because it may result in more efficient use of existing power.

C. Other Energy Incentives -- Excise Tax Provisions

The following table summarizes the several excise tax provisions that may effect energy production or consumption.

As noted above, the Code contains various excise taxes on fuel and the structure of these taxes contains incentives for certain types of fuel and types of users. In addition, the Code contains various procedural rules that have an effect on energy market participants.

Excise Tax Exemptions

The basic excise tax on gasoline and other fuels contains an exemption for fuel used directly for commercial aviation, for fuel used in school buses, local bus services, and trains, and for fuel used on a farm. These exemptions operate as subsidies for the activities they apply to, a benefit that other industries do not enjoy. However, it is not as clear that this type of energy subsidy has been coordinated with other aspects of federal energy policy.

section	general	description	limitations
4081	exemption for aviation use	excise tax upon removal-at-terminal of gasoline, diesel and kerosene <ul style="list-style-type: none"> • special reduced rate for kerosene removed directly for commercial aviation use 	
4082	exemptions for diesel fuel and kerosene	exemption from tax at §4081 for certain uses of diesel and kerosene, including: <ul style="list-style-type: none"> • use in a school bus or local bus • use on a farm, and • use in a train 	
6050D	energy grants and financing	any government program that provides subsidized financing or grants for projects to conserve or produce energy is required to file information statements with the name and address of each beneficiary and the aggregate amount received	
6420	gasoline used on farms	refund of 4081 excise tax on gasoline used on a farm	
6421	gasoline excise tax refunds	procedural rules permitting refunds of gasoline excise tax for certain uses, including: <ul style="list-style-type: none"> • off-highway business use • intercity, local, or school buses • other miscellaneous exempt uses 	
6427	fuels not used for taxable purposes	rules for refund of excise taxes for fuels not used for taxable purposes, including: <ul style="list-style-type: none"> • §4041 taxes and §4081 taxes for intercity, local, or school buses, and • §4041 taxes for farm use 	

Energy Grants and Financing

While not technically an excise tax, this provision does impose a compliance burden. A government program that provides financing or grants for projects to conserve or produce energy is required to file information statements with the IRS. This will tend to increase the compliance burden of running such programs and thereby reduce the amount available for grants.

Conclusion

As the foregoing demonstrates, there are significant energy incentives in the Code. However, in many cases the complexity of the tax rules or the nature of the person who receives the benefit may reduce the effectiveness of the incentive. Making more benefits freely assignable, or at least conferring the benefit on the party that is more likely to be sophisticated about tax matters may increase the utilization of such benefits.

!!! Congratulations 2006 USAEE Award Winners !!!



From left to right: Michelle Michot Foss, Cutler Cleveland, Mine Yucel, Adam Sieminski and James Ragland

Awards committee chair Mine Yucel and her committee members Amy Jaffe, Fred Joutz, Andre Plourde and Jim Smith are pleased to announce the following 2006 USAEE Award winners:

USAEE Adelman-Frankel Award **Cutler Cleveland**, Boston University

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

USAEE Senior Fellow Award **Michelle Michot Foss**, Center for Energy Economics, University of Texas at Austin
James Ragland, Aramco Services Co
Adam Sieminski, Deutsche Bank AG

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

The above award recipients received their awards and recognition at the 26th Annual North American Conference of the USAEE/IAEE, September 24-27, in Ann Arbor, MI.

DENNIS J. O'BRIEN USAEE BEST STUDENT PAPER AWARD GUIDELINES

USAEE is pleased to continue its Dennis J. O'Brien USAEE Best Student Paper Award program for student papers on energy economics. The awards will consist of a cash prize of \$500 plus a waiver of conference registration fees (a value of \$355) for the 27th USAEE/IAEE North American Conference, September 16-19, 2007. Up to 10 awards may be given. In order to receive the award and the cash prize, the student must attend the conference and present the paper. One paper will be selected at the conference as the *Best* paper and will receive a total cash award of \$1000 (in addition to the waiver of the conference fees). To be eligible for consideration for the USAEE Student Paper Award competition, follow the guidelines below:

- Student must be a member of USAEE or IAEE in good standing.
- Electronically submit COMPLETED paper by **June 22, 2007** to USAEE Headquarters. The submitted paper should be double-spaced on an 8.5 by 11 inch page format and not exceed 30 pages in length. *Any paper that exceeds the page limitation will be subject to disqualification.*
- Paper **MUST** be original work by the student and may not be co-authored by a faculty member.
- Submit a letter stating that you are a full-time student or have completed your degree within the past 6 months and are not employed full-time.
- Submit a letter from your faculty member, preferably your faculty supervisor, confirming the work is your own and recommending the paper for consideration.

Complete applications should be submitted to the USAEE Headquarters office no later than June 22, 2007 for consideration. Please submit all above materials electronically to usaee@usaee.org

Four of the recipients of the USAEE Student Paper Award will be invited to participate in a special session the first day of the conference. The judges for the session will decide which paper receives the *Best* Student Paper Award based on the presentation and the written paper. An award ceremony will recognize all of the students' work later in the conference. 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 recipients.

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

27th USAEE/IAEE NORTH AMERICAN CONFERENCE STUDENT SCHOLARSHIPS AVAILABLE

USAEE is offering a limited number of student scholarships to the 27th 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 recommendation 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 27th 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 electronically to USAEE Headquarters office no later than August 24, 2007. Email to usaee@usaee.org

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

Alaska North Slope Natural Gas Politics

By Doug Reynolds*

There is a strong push right now to start building a natural gas pipeline from Alaska's North Slope to the Lower 48. The main project being advocated is a 4.5 billion cubic feet (BCF)/day line that would stretch 2,000 miles from Prudhoe Bay, Alaska, to Alberta, Canada—a roughly \$20 billion project. The issues surrounding this project are widespread including local hire, national security, and the optimal pipeline route among others. Of paramount importance, though, is taxation. But the tax issue in turn depends indirectly on price expectations. This paper will look only at the tax issue and how price expectations are playing into them.

Interestingly much of today's debate began in 2002 when natural gas prices were considered too low for a pipeline to even be considered. The United States Congress was debating the 2002 energy bill, and one of the interesting parts of that bill was a line item to promote an Alaskan natural gas pipeline project by guaranteeing a price floor for any gas transported through the pipeline, i.e. a subsidy for North Slope gas, should U.S. energy prices decline. That line item did not survive debate of the Joint Conference Committee of the Senate and House.

The energy bill itself did not pass until 2005 and in a much altered state. Still, the debate on the price floor was important. Many, if not most economists, as well as the Bush Administration were against a price floor subsidy for the natural gas pipeline. The thought was that a subsidy would push American energy policy in the wrong direction and would distort the free market system. A loan guarantee and other tax breaks for the pipeline were eventually given in other bills. However, had the price floor mechanism been passed in 2002, we may already be seeing a pipeline take form here in Alaska. As it is, we are still waiting for an agreement.

Meanwhile, since 2004 Alaska has been trying to negotiate a contract with the North Slope oil producers to make a gas pipeline possible. Interestingly, in the midst of the legislative debate on the contract in June 2006 the U.S. Vice President Dick Cheney wrote a letter to Alaska's state legislators saying, "You have it in your hands to help ensure that the Alaska gas pipeline furnishes dependable, affordable, and environmentally sound energy for America's future." The U.S. Congress and other federal agencies, including the Department of Energy, have also made similar statements meant to hurry the Alaskan Legislature along.

The question is, where were all these statements back in 2002 when there was the real possibility that Washington itself could have pushed a gas pipeline through? After all if Cheney, Congress, and federal agencies had pushed through the price floor concept in 2002, then the pipeline legislation would probably be in a much more advanced stage by now and possibly an

*Doug Reynolds is an associate professor of oil and energy economics at the University of Alaska Fairbanks. He can be contacted at ffdbr@uaf.edu. (2002) *Scarcity and Growth Considering Oil and Energy: An Alternative Neo-Classical View*, The Edwin Mellen Press, 240 pages.

agreement would have been reached and permitting started. If the current Administration, Congress, and their advisers believe in allowing markets to be free, then Alaska—which actually owns the oil and gas and has leased it out—and its elected representatives should be allowed laissez-faire treatment and federal entities should leave Alaska alone. Thus if the subsidy was considered such a bad idea, then an equally non-interventionist stance should be taken with Alaska's own political process.

Nevertheless it is surprising to hear such concern about the Alaska natural gas pipeline coming out of Washington because there has been such staunch free-market, neo-conservative rhetoric there for so long. Clearly something must have changed. I can think of four main reasons why this sudden pressure on Alaskan Legislators has come:

ONE: Dependency. The current policy is seeking to reduce our dependence on overseas energy supplies, especially those in the volatile Middle Eastern. Such a policy is at best too little too late. Already 27% of the world's oil comes from the Middle East and whether the U.S. buys that particular oil or not, since oil is fungible, it really doesn't matter who sells what to whom. Simply put, much of the world's energy comes from the Middle East and Americans will have to learn to deal with that fact. But the odd thing is the world received much of its energy from the Middle East back in 2002, so the mere fact that possibly more energy will come from the Middle East—say in the form of Liquefied Natural Gas (LNG)—could not have changed anything in Washington in the interceding four years. Most experts in the know have always assumed the U.S. would be importing plenty of LNG either directly or indirectly from the Middle East and they knew that back in 2002, yet they did not want the gas pipeline subsidy then.

TWO: Terrorism. Maybe Washington in recognizing that terrorism is on the rise and that it may affect supplies of energy not only in the Middle East, but in many parts of the world where energy supplies are produced, is trying to increase energy security. However, in the long run, energy markets have not been greatly affected by terrorist activities. If one oil supply route is destroyed, others have been able to take their place. Although everyone talks about a terrorist premium in the oil market, the concept started when oil prices were in the \$30 range. So now that prices are \$70 how can terrorism cause a 100% commodity price increase and yet not affect any other commodity by a similar magnitude? Prices have risen because of tight market, not explicitly due to terrorism. Certainly no one worried about terrorism stopping energy and natural gas supplies during the Alaskan price subsidy debate in 2002 even though the 2002 energy bill was being debated after the 9/11 event. So the current pressure from Washington doesn't seem to be related to terrorist fears.

THREE: High energy prices. It may be that because oil and natural gas prices are higher now than in 2002 a search is under way for low cost energy. In fact the U.S. has already reached its peak production of natural gas, which will tighten natural gas supplies in America and raise natural gas prices. High natural gas prices along with already high oil prices means Washington is looking for cheaper energy supplies. But everyone already knew that energy prices are volatile. Critics of peak

oil claim that world reserves of oil are not limited yet and that world reserves of natural gas are almost infinite, therefore as these supplies become available, markets will loosen and energy prices will decline. Natural gas prices went up and down just before 2002, and many energy experts predict the same will happen now. Therefore seeing energy prices suddenly go up now should not be startling to the same people that were against the 2002 subsidy. Nevertheless alarm has risen. So the mere fact that energy prices are high now could not be the reason behind the alarm since there are so many experts who believe that prices will decline soon.

FOUR: Risk Aversion. This is by far the most persuasive argument even though most of Washington isn't talking about it. Washington wants Alaskan gas badly—not because of the terrorist threat, or Middle Eastern dependency, or high prices, but rather due to the “risk averse” problem. Consider how the risk averse problem works. If you observe carefully a region like the Gulf of Mexico, you see two distinct operations, one on each side of the U.S./Mexico border: On the U.S. side you notice about 100 deep water drilling projects and more on the way, as well as all the thousands of shallower wells. On the Mexican side, you see not much, if any, oil and gas exploration and development. Most of the activity on the Mexican side of the Gulf is at the older Cantarell oil field. So why the difference? Mexico has a single constitutionally mandated, state-owned oil and gas monopoly—PEMEX. Pemex must decide all exploration and development activity on the Mexican side. The U.S. side has a free market with as many as one hundred different firms involved in oil and gas activity. Thus the difference between the two sides of the Gulf of Mexico is how these market mechanisms operate.

Pemex, due the very nature of a being a government-owned monopoly, is risk averse to exploration and development; the U.S. side of the Gulf of Mexico hosts a competitive market made up of many risk-taking firms. The point is that whenever there is a monopoly national oil company (MNOC) in control of oil and gas activities, there is more risk aversion and less new activity. Risk averse MNOCs reduce exploration and development. Most OPEC members produce both oil and gas and most of them have created one MNOC to do it. That means they probably will not be developing LNG supplies as quickly as would happen in the U.S., so that there will not be an explosion of LNG on the world market. The same was true in 1973: there wasn't an explosion of oil on the world oil market as soon as the first oil price shock hit in 1973 even though there were no OPEC quotas at that time. And even when the oil prices collapsed in the 1980s it wasn't because new oil was being produced, rather it was that demand for oil declined by 10% from 1980 to 1983, and most of that was due to switching from oil-produced electricity to other power sources.

An unconscious recognition by Washington policy-makers of the risk averse nature of energy players must be dawning. This is probably the only option available to explain the pressure on the Alaskan state Legislature. Washington sees Russia turning into oil and gas monopoly, countries like Venezuela has taken more control of their own oil and gas wealth, and those in

the know would recognize the same happening in Bolivia and a potential for similar actions even in a developed country like Canada. This is making it tougher on international companies that are trying to develop these resources. This bodes badly for Cambridge Energy Research Associates' (CERA) claim that 13 million barrels a day of new oil will come on line by 2010. Much of that new oil would come from MNOCs who will be risk averse. Even if new fields are identified, it does not mean they will be speedily developed to their fullest potential any time soon. MNOCs will be afraid to make a mistake during development and will therefore develop each field more slowly than expected. Thus development within monopoly controlled oil and gas producers is slowing, even as a number of major producing regions are reaching their peak in oil production. That includes Russia itself. In this market environment then it behooves Alaska to negotiate a high oil and gas revenue producing fiscal system!

If we turn now to understanding how an Alaskan natural gas pipeline will eventually be built, then an understanding of price expectations is important since that will determine the best fiscal system which in turn will allow oil companies to profitably build a pipeline. Tax proposals that the Alaska State Legislature face are complicated and the overall fiscal system of taxation is convoluted, including royalties and state, local and federal taxes. The main fiscal system that could be changed is the new Alaskan petroleum profits tax (PPT) for oil and a combined royalty and severance tax for natural gas.

The Alaska State Legislature then must consider a trade off between two opposing points of view: one view is to allow the PPT rate and the natural gas tax rate to be low in order to hurry up an agreement to get a new gas pipeline built. The other view is to hold out for high taxes but then possibly delay the start of building a pipeline. Although there may not be a perfect tax rate for Alaska, the contract that was first proposed looks to have had very low oil and gas taxes compared to the rest of the world especially if oil prices go into the \$200 to \$500 per barrel range and natural gas prices go into the \$20 to \$30 per million BTU range and stay there, as I believe they will. In that case, Alaska's tax rate has a lot to do with future price expectations.

Most proposals on taxation include progressivity so that the percent of profits to be taxed increases (or decreases) in relation to oil and gas price increases (or decreases). Much of the debate has been about how high a base tax there should be, but debate also focuses on how much progressivity there should be. As far as the pressure to negotiate fast is concerned, some experts suggest that Alaska has a small “window of opportunity” to get its project on line before international LNG supplies ramp up and take away too much of the market share. However, since Washington has come to realize Alaskan gas is necessary, it doesn't seem that a loss of a window of opportunity will happen any time soon, especially since North American gas supplies have peaked and may go into a 5% or greater per year decline similar to U.S. oil production. On the other hand every day a contract is delayed causes the state and producers to lose a day of revenue. Such a loss could be a billion dollars a year in present value terms, although making a bad deal could

potentially lose several billions in present value terms.

The argument by the oil and gas producers for why Alaska needs low taxes is that even if oil and gas prices are high now and escalate in the future, they may also come back down again and the producers would lose money. So the producers say they need high side profits to compensate for potential low side losses. This is where price expectations plays such a crucial role. What the producers are saying is that they certainly believe CERA's assessment of oil production increases and also believe that the world's seemingly vast supply of natural gas will be developed. Those two developments together will cause a future reduction in oil and gas prices. Oil companies are putting a relatively high probability on a future price decline event, which combined with their high cost expectations, will cause them to lose money should they invest. However, there is a lot of evidence that oil and gas prices will go high and stay high for decades to come.

On the demand side of the price expectation equation, there is high economic growth rates in Asia as well as the rest of the world. Even major recessions that would stop growth temporarily don't usually lower energy use by much; rather a complete restructuring of how the economy uses energy is the only way to change energy demand. That takes years and even decades to accomplish. Think of how long it would take the U.S. to become more like Europe with densely packed cities, plentiful public mass-transit, and bunches of smart cars. If one looks at the 1980s oil price reduction, it was caused more by a reduction in demand for oil, which was 10% worldwide, than an increase in new oil supplies. Therefore reducing demand looks easy. However, the difference between the 1980s reduction in oil demand and any future reduction in oil demand is incredible.

First, the 1980s demand reduction actually started in 1973 but took ten years to materialize as new coal fired power plants and other power alternatives were built. Second, the world today will require a much higher level of structural transition—a magnitude higher increase in intensity of what needs to change—in order to reduce oil and gas demand. It was relatively easy to change from oil to coal and gas for electricity in the 1970s and early 1980s, but it will be so much harder to change from oil to oil alternatives for transportation now. Plus the U.S. will still need natural gas for peak electric power due to swelteringly hot, “global-warmed” summers. Coal and nuclear power can't beat natural gas for short term peak power needs. On the supply side, the world faces peak oil today and may due to risk aversion have already reached it, even if world ultimately recoverable reserves exceed 3 trillion barrels.

As the price of oil goes up, natural gas prices may nevertheless start to go lower due to the large undeveloped supplies of natural gas worldwide that may come on-line. However, no matter how vast supplies of natural gas are, the price of natural gas will never go below one third of the price of oil in terms of dollars per BTU. If that were to happen then we would see a lot of demand for natural gas for automobiles as people start using compressed natural gas cars. Even SUVs can be converted to use natural gas for about \$5,000. That transport demand would therefore push natural gas prices back up. This means that oil

and gas prices are linked as they always have been on the demand side, but even more intricately than merely as substitutes for electric power production or industrial needs. Thus natural gas price declines below one third of the price of oil are unlikely for any length of time.

The overwhelming evidence suggests that MNOC producers are not aggressive in developing their oil and gas resources due to their risk averse nature. Even Qatar has had discussions that they want to preserve their natural gas for future generations which would lead to a slower build up of the natural gas production. So the world's vast supplies of natural gas will only slowly be exploited. Again, you merely have to look at how several MNOCs have operated over the years to see that this is true. On top of that North America has already reached its peak in gas supplies so that it will be difficult for LNG producers around the world to be able to catch up to the North American demand and supply gap. That suggests a natural gas crisis will be superimposed on top of an oil crisis. No wonder Washington is so concerned.

On the other hand, the oil producers who would build a natural gas pipeline are looking at steel and other costs that are included in not only building a pipeline, but used further in the oil and gas development of the North Slope. Those costs are rising. The producers are concerned that if tax rates are too high along with their costs that they will not be able to invest in a pipeline. Interestingly the same can be said for oil sands production, heavy oil production, and even nuclear power plant construction costs as well as other energy alternatives in competition with North Slope oil and gas. If costs for a simple pipeline are going up, who can imagine how much the costs of complex energy alternative technologies are increasing.

However, the U.S. and the world are heading into a major recession due to high oil and natural gas prices and such a recession will easily last quite some time—similar to Japan's fifteen year economic malaise—due to the difficulty of transitioning to lower energy use patterns. That should create a glut of steel and labor resources which will reduce costs for a pipeline and North Slope development. Also the producers will be hard pressed to find alternative investment opportunities for their current and future profits other than investing in more Alaskan oil and gas. As the world goes into a recession and as other oil and gas countries lock the major oil companies out, those companies will have to invest their profits in Alaska or lose money with other lower performing assets. This gives Alaska leverage.

The oil companies might have known oil and gas prices would rise substantially starting in 2005 (Reynolds 2002) causing the Alaska State Legislature to hold out for higher taxes. Had the natural gas contract been made faster, the oil companies would have probably gotten away with lower taxes. As it is now every time a contract is delayed, energy prices go even higher, then there is a growing sense that those prices will not be coming down soon, which empowers the State Legislature even more. That makes it harder and harder for the companies to get a low tax deal. The North Slope producers should have moved much faster than they did on a contract. But Alaska is

impatient too, so it will come down to who blinks first as to when a contract agreement occurs and a pipeline gets built.

One other idea is to not even have a contract. The Legislature can simply take the parts of the existing contract that they like and that would help a pipeline, make them into law and just wait for the producers to build. After all, the state has rarely passed higher oil and gas taxes over the years, and the current production profits tax that was passed was so difficult

to get through the Legislature that there is little risk of it being changed again. If the producers then don't build a pipeline, the case would go to court over their lease agreements where all the price expectations experts would be deposed. In the end, the case and the pipeline will be determined by whatever the price of oil and gas is at the time of the decision. You can bet that price will be high.

USAAE Student Best Paper Award Scholars Recognized



At the recent Ann Arbor USAAE/IAEE North American Conference 8 students were recognized as part of USAAE's expanded Student Best Paper Award program. Each of these students received a \$500 stipend and complimentary registration to attend the conference. The top four papers competed in a special student Best Paper contest to determine the 2006 Dennis J. O'Brien USAAE Best Student Paper Award recipient. Shown above are several of the students accompanied by USAAE President Shirley J. Neff and USAAE Council Member James Smith and Council Member-Elect Glen Sweetnam.

Shown below is Pedram Mokrian (accompanied by USAAE Council Member James Smith) who received the 2006 Dennis J. O'Brien USAAE Best Student Paper Award. USAAE was pleased to announce in Ann Arbor that its Best Paper award had been renamed in remembrance of USAAE/IAEE Past President Dennis J. O'Brien. Dr. O'Brien was very active in the establishment of USAAE and activities of IAEE for many years and an avid supporter of energy economic student programs.



To view Pedram Mokrian's paper entitled "A Stochastic Programming Framework for the Valuation of Electricity Storage" please visit <http://www.usaae.org/bestpapers.html>

The other students who received Best Paper award stipends:

- Adam Brandt, University of California, Berkeley
- Diana Schwyzer, University of California, Berkeley
- Svetlana Ikonnikova, Humboldt University, Berlin
- Daniel Dempsey, New York University
- Greg Nemet, University of California, Berkeley
- Olusegun Oladunjoye, University of Guelph
- Sophia Ruester, Dresden University of Technology

PEMEX: Challenges and Opportunities; Time for Reform?

By Justin Dargin*

Background Analysis of Mexican Oil Industry: An Overview

Mexico has a unique position among the World's oil producing nations for two reasons: first of all it has a mature oil economy (at one time solely in the hands of foreign interests); second, in 1938, Mexico became the second non-Communist country to expropriate and fully nationalize the upstream and downstream production of crude oil and natural gas from foreign interests. In order to fully understand Mexico's attitudes to its oil industry, it is important that one understand its stance towards production and export of its national treasure.

Mexico drilled its first successful oil well in 1876, and commenced on a roller coaster ride, beset by the interaction of geologic, economic, and political factors. Mexico's Petroleum industry was primarily formed prior to 1910, in a favorable investment climate, when massive oil discoveries led to the creation of a large crude oil industry on the Mexican Gulf Coast. U.S. and British companies were the main force between the foreign investments during this time period. However, Mexico was off to a rocky start between 1910-1920, the twin occurrences of the Mexican revolution, as well as World War One, threw the industry into a frenzy, with unparalleled expansion.¹

The chaos subsequent to the 1917 Revolution forced most non-oil foreign interests out of business. Yet, the fact that American and British oil companies enjoyed enormous profits from Mexican oil provoked the wrath of the Mexican people, already given to view large American companies as financiers, meddlers and manipulators of the Mexican body politic.² Although the era of the WWI was the high point for Mexico's oil industry, Western companies gradually departed because of Mexico's dwindling reserves, its increasingly xenophobic political environment, and massive oil finds in other countries.

Mexican attitudes are best viewed from a paradigm that runs through the country's political fiber. One factor is a deeply entrenched suspicion of its Northern neighbor, the United States, and the other is the resultant economic nationalism. Suspicions towards the United States are rooted in the founding of the United States and in the American expansionism during the period that the US contended it had the "manifest destiny" to consolidate its Southern borders and incorporate massive regions of Mexico as a contiguous part of the United States.³ A military defeat and the loss of over half of its national territory to the US engendered in the Mexican people a profound bitterness that not only became part of the national heritage, but repeatedly surfaced as a complicating factor in the dynamics

* Justin Dargin is a third year law student at Michigan State College of Law specializing in International law and resource law. He has interned in the legal office of OPEC dealing with multiple international legal issues concerning resource sustainability, legal developments in American and EU law, as well as internal assessments. Further, he studied International Petroleum Law at the American University in Cairo, Egypt.

¹ See footnotes at end of text.

between these two powers. Mexico wished to remain free of the perceived exploitation by foreign—especially American—oil companies.⁴

Birth of the Giant: History of PEMEX

PEMEX was born out of the 1938 oil company expropriation. Prior to its implementation, Mexico had used several legal and political methods to constrain foreign oil operators in Mexico. Some of the most pertinent pre-expropriation strategies were:

- **Dual Policy Approach of 1924:** Mexican President Plutarco Calles utilized this campaign as a political maneuver to placate internal nationalistic feelings through xenophobic rhetoric. At the same time he laid the groundwork for a legal basis to secure much needed foreign investment in the oil regions.
- **Article 27 of the 1917 Constitution:** Through this Constitutional provision, Mexico reserved all subsoil resources for the Mexican State.
- **The Petroleum Act of 1925:** Through this Act, Mexico fundamentally changed the landscape for the foreign operators in Mexico. This law required all oil companies to replace the pre-Constitutional unlimited duration agreements with new concessions, limited to fifty years duration,
- **The Land Law:** Mexico enacted this law to break up large estates and, concurrently, limit foreign ownership of large tracts of land.⁵
- **The Calles-Morrow Agreement of 1927:** This amended the Petroleum Act of 1925. The Mexican Congress had written the Petroleum Act of 1925 in the face of enormous US opposition, but the Calles-Morrow Agreement granted confirmatory concessions of unlimited duration upon application from owners and leaseholders who had acquired their subsoil concessions prior to 1917.⁶

March 18, 1938: Petroleum Day

On May 28, 1937, Mexican oil unions initiated a strike with a focus on better wages, but which soon engulfed the whole industry. After the strikers and oil companies reached an impasse, the Federal Board of Conciliation and Arbitration intervened and prepared a preliminary report. The report held the oil companies liable to the employees for pay upwards of 26 million Pesos a year, approximately 12 million more than the companies had been prepared to give. On March 1, 1938, the Mexican Supreme Court upheld the Federal Board of Conciliation and Arbitration's decision, and affirmed its award.⁷ The companies proved themselves to be intransigent and refused to comply. President Cardenas, feeling that he had no other options to appease the Mexican people, signed the order that expropriated all foreign oil companies in Mexico. Thus-- the birth of a giant.⁸

Birth Pangs:

Petroleos Mexicanos (PEMEX) rose June 7, 1938, from the recently nationalized Mexican assets of the U.S. and British oil companies.⁹ Not only was this the non-communist world's first integrated national oil company; it became a model for subsequent nationalizations and formations of national oil companies

(NOC). After more than 60 years of government regulated autonomy, PEMEX, like many NOCs, faces four main difficulties:

- A chronic shortage of cash for exploration, production and investment.
- In comparison with other large oil companies, a bloated work force. This is due primarily to padding blue collar union jobs and an overstaffed middle management.
- A slow technology transfer system, due to a legacy of revolutionary rhetoric and a lack of foreign investment.
- A burdensome mission-- as Mexico entrusts PEMEX with Downstream responsibilities, i. e., production and exploration, and upstream responsibilities, i.e., development, refining oil, and production of petrochemicals. To achieve success, PEMEX would have to devote nearly all of its resources to undertake this mammoth complex of projects unconstrained by its enormous obligations to the state.

With the contemporary debate of reforming PEMEX, it must be remembered that PEMEX's primary aim is not profit, but the achievement of certain social goals, such as a high level of employment and providing petroleum to the domestic market at low and consistent prices. From its very creation, PEMEX has always established strict price controls on domestic sales.

The national oil labor union, Sindicato de Trabajadores Petroleros de la Republica (STPRM), has traditionally had a strong position *vis a vis* PEMEX. Labor has always held that PEMEX's main purpose is to propagate social welfare--specifically, that of its workers. Not only do PEMEX salaries make STPRM workers among the highest paid in Mexico, PEMEX moreover provides subsidies for education, medical care, housing stipends and recreation.¹⁰ Further, it is estimated that more than half of the workers hired by PEMEX have some relation to each other.¹¹

Structure of PEMEX

PEMEX is well known to have a rigid hierarchical structure with all top decision making in the hands of a few dozen officials. PEMEX, in terms of its speed to make decisions, resembles a huge behemoth, as no decision, except those of a minor technical nature, are made below the level of departmental manager.¹² Further, PEMEX has some noted difficulties when it tries to develop coordinated planning strategies among the five directorates that divide the company. The main problem that works against cooperation is that each directorate is an enclave and jealously guards its responsibilities from encroachment.

Past Attitude Towards Foreign Involvement: 1938-1960s

After nationalization, the expropriated oil companies boycotted Mexican crude oil, whose exports fell from 2 million barrels in February 1938 (one month prior to expropriation) to 311,000 barrels in April 1938.¹³ Although the demand for oil in WWII caused the boycott to lose steam, Mexican oil production continued to stagnate due to wartime tanker shortages.

After the end of WWII, Mexico realized that the domestic market could not continue to support the petroleum industry market, for either financing or the supply of capital equipment

necessary to modernize PEMEX's old and worn-out oil field equipment. Mexico took another look into possibly allowing foreign participation in the oil sector. However, the delicate topic soon propelled union and citizen hostility to all things foreign.

Baby Steps to Foreign Participation

PEMEX convinced Labor to allow a small U.S. based company to explore some fields in late 1947. Labor agreed to this as it considered the company not much of a threat, and had no precious involvement in the Mexican Oil industry. This experiment failed, as the company's small size prohibited it from obtaining the necessary drilling equipment. The contract was thus forgotten.

In 1949, PEMEX instituted drilling contracts with a consortium of U.S. firms, which provided drilling operations but had no rights over any oil discovered.¹⁴ The drilling operations were of little technical value as by 1958; less than two percent of PEMEX's productions resulted from reserves developed by U.S. drillers. And there was little technology transfer. This failed project never the less strengthened the government's belief that, perhaps limited foreign participation could be feasible, so long it operated within the constraints of Mexican law and petroleum policy.

Also, in the late 1940's PEMEX applied to the Export-Import bank for a \$500 million dollar loan.¹⁵ The Department of Defense and the State Department both gave their backing to a loan for geopolitical reasons, i.e., to further integrate the Western Hemisphere in an energy-security matrix. The bank refused the loan application, because most U.S. oil companies supported the rejection, on the belief that private Foreign Direct Investment (FDI) should not be displaced with public credits. The oil companies preferred that all future development in Mexico's oil sector come from private capital. The negotiations subsequently fell apart.

The question of foreign participation arose again in the 1950's, when preliminary advances made offshore appeared promising. A private group of U.S based investors tendered an offer to supply the technical equipment needed for Exploration and Production (E&P) of Mexico's marine deposits. The investment group hoped for a *quid pro quo* in which Mexico might relax its resistance to foreign participation, at least relative to seabed rights. This project also proved fruitless as the Mexican government, which made no distinction between subsoil rights and submarine rights, deemed both State properties.

PEMEX Strikes Back

Mexico once more closed the door on foreign participation in November 1958, when it passed a new petroleum regulatory law.¹⁶ The law reaffirmed in clear language that only the state could develop Mexico's oil resources and that concessions would not include the right to produce oil. The law further strengthened State control over downstream activity, such as refining, transportation, and marketing. Although this extension did not bar all foreign participation, it reiterated the well-established public policy that PEMEX had sole authority to award contracts. Though many changes occurred in the Sixties, Mexico's suspicious legacy about foreign investment did not.

Modern PEMEX

Crisis is Opportunity.

To speak about reforming PEMEX is heretical in Mexico today. Every year Mexicans by the thousands celebrate President Lazaro Cardenas's 1938 PEMEX takeover. Trade unionists and activist politicians garner huge support from the street if they rhetorically attack anyone who questions PEMEX. Yet, even with this, PEMEX is on the banks of a proverbial Rubicon. On the one side are those who share an institutional memory of documented financial losses (and the thinly veiled insults they sometimes implied) from asymmetrical negotiations with foreign conglomerates. On the other side are those who recognize that currently elevated market prices barely conceal systemic dysfunctions that actually threaten sustainability. Although Mexico's petroleum sector faces a possible self-sufficiency crisis as early as 2010, PEMEX may avert real damage if Mexico changes fiscal tactics and legislative strategies.¹⁷

The Mexican Congress Prepares Moves Towards its Rubicon:

The Mexican congress recently passed far ranging fiscal reform, intended to support PEMEX's finances, encourage increased investment, and reinforce the company's competitive position. Although these changes signal a bold transition, PEMEX may yet face hardship in long term exploration, development, and production target.

While this new package contemplates a new frontier with tax restructuring, the government will also have to make politically sensitive moves in a nation where political parties still jostle in heads-up competition. Neither party can, however, afford to ignore the pros and cons that craft the potential crisis.

- The Mexican government will impose upon PEMEX's subsidiaries a tax, similar in form to a corporate income tax. The largest of these taxes will be an ordinary duty on petroleum revenues minus certain specified deductions (exploration, production, and development costs), to be calculated using a sliding tax scale rate, based on oil prices. For example, the 2006 rate is 78.68% to 87.81% depending on the Mexican Crude Price. After 2010, the rate would level out to 79%.¹⁸ The savings due to the new regime would be estimated to be in the range of U.S. \$1.0 Billion-\$2.0 Billion in the first year and then average out to approximately U.S. \$4 Billion in annualized savings. These savings will allow the company to free up much needed capital for exploration and development from internal funds. Even though the new tax rate will help, PEMEX will likely require additional supplemental third party financing.
- Even with the benefits of a supplier's market, PEMEX has, for a number of years, reported a negative tangible net worth. Given PEMEX'S increasing debt and decreasing equity, reform (as far as it went) was a vital ingredient in much needed relief. However, additional fiscal reform should not only be designed to permit PEMEX to self-finance the majority of its projects, but also to preclude Mexico from deteriorating into a net oil importer by 2010.
- The reality is that PEMEX, which is Mexico's largest

single source of state revenue, pays from annual sales an averaged tax rate of 60.8. Given its centrality to the Mexican economy, PEMEX's chronic difficulty with equipment renovation and E&P take on new dimensions. However critical, the new infusion of funds will deteriorate to mere cosmetics, unless more innovative legislative and Constitutional provisions authorize PEMEX to undertake joint partnerships and allow FDI.

Faced with the reality of this pressing situation, PEMEX Director General Luis Ramirez Corzo is trying to craft lasting changes in relationships with labor union, and apparently to disentangle PEMEX from the burdensome legal and policy strictures that reflect total government control. Even then, the Director General's innovations must stay within the explicit constraints of Article 27 of the Mexican Constitution, which bars full privatization.

Legal Reforms

Does the Law Provide a Gilded Cage?

Mexico's constitution, through the following language, imposes formidable constraints for those who might seek to recast PEMEX or restructure it into a different corporate species:

"In the case of petroleum, and solid, liquid or gaseous hydrocarbons or radioactive minerals, no concessions or contracts will be granted and the Nation shall carry out the exploitation of these products in accordance with the provisions indicated in the law."¹⁹

The constitution further states that "ownership by the nation is inalienable and imperceptible..." In the face of such clear language, any modification or legal proposal to restructure PEMEX, but not amend the Constitution, could be unlawful.

Although, even the most ginger steps might yet still prove unlawful, Mexico does allow foreign equity to participate in service contracts that have permitted both national and foreign funds for new project development. Not that the Constitution is difficult to amend, as the one-party Institutional Revolutionary Party (PRI-Spanish Abbreviation) rule effectuated many changes within the context of implementing separate and autonomous legislation. Rather, the difficulty lay a cultural-socio focus that sees PEMEX as the economic life-blood of Mexico, a legacy enshrined as the automobile is to Detroit.

Mexico Focuses on PEMEX's Capitalization Problems.

Even before Vicente Fox took power in calendar year 2000, international organizations, business people and investors demanded FDI and private participation in PEMEX. Within a year, a short-lived demand surfaced to have the PEMEX board of directors replace its members who were public officials with distinguished entrepreneurs. Because this proposal contravened legal requirements that board members must be public servants, be proscribed from doing business with PEMEX, be required to make proper disclosure and not be a PEMEX supplier, its demise was certain. On the brighter side, Legislation introduced January 2, 2006, would allow for private capital to hold up to twenty percent of PEMEX capital stock.

PEMEX Eyes its Corporate Governance Problems:

A second legal initiative seeks to replace the current PEMEX Board of eleven members with a fifteen member Board of directors: two of whom the President of Mexico would appoint; two of whom the union would appoint; three of whom PEMEX would appoint (including the Director General who would be chairman of the Board); eight of whom the President of Mexico would appoint, subject to Senate confirmation. Advocates contend that Board replacement is the best tool for dissolving the stranglehold of regressive elements, which repeatedly deters steps essential for PEMEX sustainability.

These fiscal and corporate governance reforms have the twin benefits of financing PEMEX with new and private resources that will not saddle the company with new debt, and concurrently insulate PEMEX from the rough and tumble world of Mexico partisan politics.

Barriers to Reform

Although Mexico and PEMEX are taking the right steps towards reform, formidable barriers block substantive change. The leaders of STPRM decline to view PEMEX as a genuine commercial entity, structured to raise value for the shareholder. Along with the Mexican Street, union leaders view PEMEX primarily as an organ that enfranchises its workers or the community, and secondarily as a tool for resource nationalism. PEMEX employs roughly 140,000 workers, which translates to twenty-seven jobs per oil well, almost three hundred percent of the industry average, which hovers around ten workers per well.²⁰ Because even conservative estimates place PEMEX's corruption losses at roughly about \$1 Billion (U.S) annually, fiscal or legislative reform will require more than mere platitudes.²¹

Conclusions and Recommendations:

PEMEX faces two large problems that if not addressed will have a disastrous effect on the organization and the country as a whole: (1) the high levels of debt the company carries; and, (2) the decline of its known oil reserves. Moreover, the first problem delves into the second; without a massive infusion of funds, PEMEX will not be able to invest enough in sufficient exploration and development to offset the anticipated decline of the Cantarell oil field, the World's second largest field after Ghawar field in Saudi Arabia.²²

Mexico Holds the Keys to PEMEX'S Sustainability:

Mexico must boldly recast its basic premises to assure PEMEX'S sustainability. While there are many variations, there are three main strategies:

- **National Autarky:** This strategy requires that the rate of oil development be set by the rate of expansion of PEMEX. PEMEX would maintain firm and total control over every stage of the domestic petroleum sector. The National Autarky Strategy is in accord with Mexican tradition and with the demands of influential parties with a direct vested interest. Because this approach guarantees, at least in the short run, the power of PEMEX workers, its chief proponents are

usually trade unions and nationalists. However, PEMEX'S bottom line vulnerability weakens tremendously this argument. Those who push this line most seriously would likely do so for ideological reasons.

- **Full Development Strategy:** This strategy would allow PEMEX to outsource the production of crude oil (in particular the offshore wells), downstream refining, petro-industry, and transportation related industries to foreign companies. Not only is this strategy contrary to Mexico's recent history and counter to the demands of influential unions, it is precluded by a myriad of laws, especially Article 27 of the Mexican constitution. Discussion of full scale privatization of PEMEX fails to mature beyond the embryonic stage, because it equates to political suicide. Although this strategy appears the most fiscally viable, the current framing of political and ideological considerations makes it the least feasible.
- **Middle Ground:** This strategy allows PEMEX full autonomy over the industry, with circumscribed authority to farm out specific tasks to counter specific difficulties. The Middle Ground is the most realistic option for PEMEX, and indeed for Mexico. With the dire prospect of joining the ranks of net oil importing countries by 2010, Mexico must renovate obsolete equipment, and secure foreign expertise in offshore development. Couple the enormous national demands on oil revenue with the strong domestic opposition to foreign participation, a delicate middle ground would seem most suited to Mexico's national interests.

Mexico should amend its constitution to allow foreign participation in such as downstream activities as refining, transportation and distribution, which are arguably secondary activities that are not directly related to PEMEX's national mandate. In essence national and foreign investors should enter these activities, either in Joint Ventures, or independently with the State supervising the limits of the activity.

Even though Article 27 mandates that all *subsoil* minerals lie in the hands of the people, offshore exploration can be interpreted to lie outside of the term "subsoil." Not only would this balancing act allow full foreign participation in offshore development, it will allow PEMEX to hold true to the letter of the law. Such a construction of Article 27 seems unlikely, given the sensibilities of the Mexican Street and the politically influential unions. In the absence of Constitutional amendments or judicial activism, foreign participation will probably be restricted to secondary downstream activities.

This very moment finds Mexico at an epic crossroads. The 1938 nationalization was to reserve for the people the benefits of petroleum development. The interest of Mexico will be best served if PEMEX received the infusion of funds and foreign expertise necessary for a full development of its resources. Even though this will not be without pain, Mexico's interest will be best fulfilled if all interested parties came to the table and charted a national energy plan beneficial to the investors and truly serviceable to the Mexican people. Time is short, but the proverbial Eleventh hour has not yet arrived. The likely alternative is that Mexico will become a net oil importer nation,

without a significant proactive response.

Footnotes

¹ Mexonline.com the Mexican Revolution of 1910 at <http://www.mexonline.com/revolution.htm>. Last visited 08/30/06.

² Mexican Revolution of 1910 and its legacy at <http://latinoartcommunity.org/community/Gallery/1910/CourseRev.html>. Last visited at 08/31/06.

³ The Mexican War at <http://www.sonofthesouth.net/mexican-war/war.htm>. Last visited 08/31/06.

⁴ This feeling is clearly evident when Mexicans today speak of PEMEX.

⁵ League of Nations Photo Archive at <http://www.indiana.edu/~league/1927.htm>. Last visited 08/31/06,

⁶ Commission for Environmental Cooperation: Summary of Environmental Law in Mexico at http://www.cec.org/pubs_info_resources/law_treat_agree/summary_enviro_law/publication/mx21.cfm?varlan=english. Last visited at 08/31/06.

⁷ The expropriation of the Mexican Petroleum Industry 1938 at <http://www.sjsu.edu/faculty/watkins/pemex3.htm>. Last visited 09/12/06.

⁸ History Matters. "Not so Private Negotiations": Mexico Expropriates the Oil Companies. At <http://historymatters.gmu.edu/d/5170/>. Last visited 08/30/06.

⁹ Oil Biography Archive: History of PEMEX at <http://www.la.utexas.edu/cheny/mena/bibs/oil/1996/0150.html>. Last visited 08/30/06,

¹⁰ Financial Times Change is needed, but far from easy at <http://www.cerium.ca/article1802.html>. Last visited at 08/30/06.

¹¹ Financial Sense Online "Mexico: Oil's next basket case." At <http://www.financialsense.com/editorials/powers/2003/0930.htm>. last visited at 08/31/06.

¹² PEMEX website at <http://www.PEMEX.com.mx/> Last visited 08/31/06.

¹³ Answers dot com: PEMEX at <http://www.answers.com/topic/PEMEX>. Last Visited 09/01/06.

¹⁴ These firms included American Independent Oil Company, (AIOC) and Signal Oil and Gas.

¹⁵ Center for Latin American Studies: "Politics of Petroleum" at <http://socrates.berkeley.edu:7001/Events/fall2002/09-12-02-Alberroetal/tolanremarks.html> Last visited at 08/30/06.

¹⁶ Mexico at http://www-pub.iaea.org/MTCD/publications/PDF/cnpp2003/CNPP_Webpage/PDF/2000/Reports/MEXICO.pdf#search=%221958%20mexico%20petroleum%20regulatory%20law%22. Last visited 08/31/06.

¹⁷ Forbes dot com "Mexico Oil Output could drop sharply" at <http://www.forbes.com/home/feeds/afx/2006/02/09/afx2512329.html>. Last visited 31/08/06

¹⁸ PEMEX website at <http://www.PEMEX.com/index.cfm?action=content§ionID=8&catID=428&subcatID=3706>. Last visited 08/31/06.

¹⁹ 1917 Constitution of Mexico at <http://www.ilstu.edu/class/hist263/docs/1917const.html>. Last visited 031/08/06.

²⁰ The Petroleum Industry of Mexico at <http://www.sjsu.edu/faculty/watkins/PEMEX1.htm>. Last Visited at 08/31/06.

²¹ PEMEX former Director and Union boss both stand accused that they have stolen tens of millions of dollars in PEMEX funds. See Mexico's Corrupt Oil Line at Global Policy Forum at <http://www.globalpolicy.org/nations/laundry/regions/2003/0121mexico.htm>. Last visited 08/31/06.

²² The Cantarell field, residing in the state of Campeche in the southern Gulf of Mexico, pumps 2 million barrels a day which comprises nearly 60% of Mexican crude oil production. See Cantarell, the second largest oil field is dying. <http://home.entouch.net/dmd/cantarell.htm> Last visited at 09/01/06.

Career Opportunities for USAEE/IAEE Student Members

Looking for a job in the energy field after graduation? Or an internship before??

USAEE will continue the placement assistance program for student members that was initiated last year at the Ann Arbor conference.

At the registration desk of the Houston conference will be a binder of resumes submitted by student members who have registered, as well as a listing of students and their thesis topics, academic school, and expressed interest for work or internship. Arrangements will be made for students and prospective employers who wish to arrange on-site interviews. More details will follow.

USAEE Student Scholarship Fund: A Call for Support

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 Ann Arbor Conference, thirty-three 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.

2006's student scholarship fund has been generously provided by the support of the following organizations/individuals:

ConocoPhillips	ExxonMobil Corporation
IAEE	Leonard Coburn
Joseph Dukert	Gregory Pickett
Andre Plourde	

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 2007 North American meeting in Houston, TX, September 16-19, 2007. Contributions have ranged from \$100 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 or usaee@usaee.org

Russia, Ukraine and EU Trade Dispute: Implications on the Atlantic LNG Market

By Obindah Wagbara*

Introduction

The gas conflict between Moscow and Kiev, in January 2006, motivated an evaluation of several energy policy options by the EU (and its individual member-countries).¹ The considered options ranged from a modification of energy mix to diversification of oil and gas supply. There has also been increased pressure on Russia to ratify the 1994 Energy Charter Treaty, following doubts exist over the complete resolution and successful implementation of the January 4, 2006 Russia-Ukraine gas Agreement.

Amid the disputes, the EU seems to lack a common policy on energy, while the Russian monopoly (Gazprom) is strategically exploiting the lack of coordination and successfully picking off portions of Europe's energy infrastructure. According to Jonathan Stern: "in...future, the issue of whether Europe is prepared to accept more Russian gas for security reasons, may be overtaken by whether Gazprom will find more profitable markets for its gas..."² The reality of this prediction, about the biggest gas supplier on the planet³, seems closer than expected. Other experts are of the opinion that Russian supplies may be insufficient for Europe due to decreasing investment and production decline in existing fields⁴. Amid the uncertain European energy paradigm shift, proposals for more Liquefied Natural Gas (LNG) liquefaction terminals in many European countries have been/are being adopted.⁵

Against the above background, this paper attempts to delineate the consequences of the ongoing (and proposed) changes on the Atlantic LNG market. The paper is important because, the EU's indication to loosen long-term contracts between Gazprom and European buyers could undermine the stability of the regional gas market. Furthermore, Gazprom's intention to favour North America and China, if its downstream ambitions are blocked, bears some implications for gas trade. Meanwhile, there are concerns that Gazprom may not acquire the technological and financial clout sufficient for meeting its ever-increasing⁶ gas contract obligations. Whether real or imaginary, these uncertainties portend consequences for LNG trade globally and therefore need further consideration. This effort matters, also, because LNG is deservedly being given more attention globally: the EU (especially South-Western Europe) has the highest regional dependence on LNG, while the US, in LNG Contract volumes, is the most dependent on the Gas Exporting Countries Forum.

This paper ignores (or minimally captures) the political aspects of the theme. Only Western Europe is covered in the anal-

*Obindah Wagbara is Ph.D Candidate in Petroleum Economics at the Centre for Energy, Petroleum, Mineral Law and Policy (CEPMLP), University of Dundee, DD1 4HN, Dundee, Scotland, United Kingdom. He can be reached at: o.n.wagbara@dundee.ac.uk

ysis even though Russia supplies gas to most European countries. The reason is because eight countries⁷ (mainly in Western Europe – **EU Gas Majors**) determine the amount and nature of European gas demand (imports). This descriptive analysis reveals that despite the changing world of costs and technologies, the crisis of confidence in the Euro-Russian energy relations does portend varying consequences for LNG trade in the Atlantic. Fundamentally, a sudden shift (actual or proposed) to LNG could create a supply gap; corresponding price rise and maybe price-induced demand destruction.

Why Atlantic LNG Trade?

In 1959, *Methane Pioneer* carried the first LNG cargo of 5,000 cubic metres across the Atlantic from the US to England.⁸ Global gas production today has more than doubled the 1970 level while international LNG trade, over the same period, has increased sixty-fold. The renewed interest in Liquefied Natural Gas is having significant implications on the energy industry worldwide and especially the security of supply.⁹ Efforts to solve problems with (or diversify) traditional OECD gas supply¹⁰ have made LNG a valuable option. Consequently, LNG trade has grown from being just 6% of international gas trade¹¹ in 1970 to 22% today (2006)¹². Atlantic LNG trade, also, has grown by an annual average of over 3.97 BCM since 1996¹³.

These changes have created spot markets in the US and UK, and financial derivatives now exist for the management of risk.¹⁴ Due to the geographical mismatch between gas location and demand, inter-regional gas trade will triple before 2030 and 50% of it would be in LNG form.¹⁵

Furthermore, LNG is absorbing about half of all investments in the gas sector.¹⁶ A key significance of LNG is the prospect for more arbitrage, connectivity of diverse markets and not the volumes traded. The promise for growth and globalization of LNG trade lies in the Atlantic Basin, even though project risks could be high.¹⁷ **Figure 1.0 below shows various ongoing and proposed LNG regasification projects in Europe.** Even existing LNG importers like Spain, Italy and the UK are embarking on new projects and capacity expansion.

Figure 1.0 LNG Receiving Terminals in Europe: Existing; under Construction and Proposed



An Overview of EU-Ukraine-Russia Gas Trade History

Ukraine has been very strategic to Russia's gas supply to European Markets. Since the Soviet era, it has remained the largest recipient of subsidized Russian gas in the Former Soviet Union (FSU). Currently, Russia-Ukraine gas transactions are the second largest in the world and next to Canada-US relations¹⁸. Ninety percent of Russian gas exports¹⁹ to Europe are through pipelines that transit Ukrainian territories. Gas has been flowing smoothly from Russia to Europe for the past four decades. Soviet era trade was between the Western Europeans and member-countries of the Council for Mutual Economic Assistance (CMEA)²⁰. With the advent of the European Union (EU), a new relationship has been formed between Russia and Europe. Despite several geological constraints, Russian gas export to Europe reached a record of 154.30Bcm in 2005²¹.

The Trade Dispute and New Issues

Gas trade between Russia and Ukraine actually began in the 1990s. The Soviet collapse brought an end to the highly subsidized Russian gas supply to Ukraine. This gradually led to Ukraine's indebtedness amid a consistent need for gas. At that time, the already developed infrastructure meant that Russia was the only source. Following Ukraine's indebtedness and Russia's reliance on it, for the transit of its exports to Europe, a price dispute ensued. The dispute finally culminated in the cessation of gas supply to Ukraine and consequently disruption of exports to Europe from the 1st to 4th January, 2006. A deal to resolve the gas row was finally signed by Russia and Ukraine on January 4, 2006.²²

Arguably, a major consequence of the crisis was a reappraisal, by the EU, of its dependence on Russian gas and energy security issues. Although projections indicate increased dependence on Russia, European countries have renewed interest in other forms energy. This is aimed at diversification of energy sources, as well as, gradually reducing dependence on Russian supplies²³. Furthermore, by putting pressure on Russia to ratify the 1994 Energy Charter Treaty and the Transit Protocol, the EU wants open access to Russia's upstream gas sector. Requesting for "reciprocal steps"²⁴ Russia is aggressively seeking access to Europe's retail gas markets. Invariably, the situation today implies a dispute between an energy-consumer (Europe) seeking to secure its interest against a supplier (Russia) which perceives its interest as being endangered. Given the above scenario, the next relevant question, therefore, is to determine what options are available for Russia and EU. These alternatives are briefly highlighted in the next section.

Options Proposed/Adopted by Russia and the EU

The implications and consequences of a European Shift to LNG remains the focus of this paper, however, this section outlines other alternatives being proposed or adopted by Russia and its European Customers.

Russia

North-East Gas Pipeline:

This is an ongoing project to build a pipeline directly from

Russia to Germany. It is hoped that the Pipeline would deliver Russian gas direct to Europe without transiting any FSU state.

Asian and American markets

Russia is also considering the option of sending its gas to the rapidly growing economies of China and India.²⁵ Large reserves are being committed to LNG projects for sale to the North American market. In partnership with Petro-Canada and expected to deliver in 2009, the first of such projects is the Baltic 7mt/y liquefaction plant.²⁶ Until the Siberian LNG export begins, Gazprom has signed an LNG swap agreement with Sonatrach of Algeria under which it would deliver Algerian cargoes of LNG to US ports.²⁷

Europe

Alternative Pipeline imports from Central Asia

One of the alternatives being considered is the importation of natural gas from Central Asia into Europe through the following routes:

- NABUCCO Pipeline: An OMV-operated €4.4billion pipeline from the Turkey through Erzurum and Budapest to Vienna. With a proposed capacity of about 25billion cubic meters, the pipeline is expected to carry gas from the Caspian region to Europe by the end of 2009.²⁸
- Trans-Caspian Gas Pipeline System: The \$2.4 billion project is expected to carry gas across the Caspian through Baku in Azerbaijan to Turkey.
- North African Pipeline: The plan is to increase pipeline gas trade with Algeria and Egypt. Considering its strategic position near Southern Europe, there are plans to build a pipeline from Algeria to Spain directly.

It should be stated, however, that there are several economic, political and geological issues relating to these Pipeline projects.

Nuclear, Coal and Renewable Energy

There seems to be a clamour for a return to coal-fired power generation in Europe (especially in the UK). The revival of coal-fired power in Europe, however, should not be confused with the revival of European coal industry. The former involves using coal (from anywhere) to generate power in Europe, while the latter involves mining domestic coal for various uses (especially in power generation). Nuclear options are also being considered but it has remained controversial and there are strong oppositions in many European countries (Germany, Sweden, and the Netherlands).

Considering the anticipated contribution of LNG to meeting future gas demand in European, as well as, the above alternatives, the next section analyzes its implications for LNG trade in the Atlantic.

Implications for Atlantic LNG Trade

There are several supply-side and demand-side implications for LNG trade in the Atlantic. Through the price mechanism, the supply-side issues generate corresponding demand-side effects. Furthermore, as the feedback effects continue, market players react and interact to generate other consequences. The discussion below starts with supply-side implications;

highlights price issues and speculatively concludes on the demand-side consequences:

Legal and Regulatory Issues

The interest of LNG terminal investors to enter the UK has been increased by the application of third party access (TPA) exemptions²⁹. Consequently, the UK's regulatory framework for LNG appears similar to that of the US, Italy, Belgium and Spain. Negotiated TPA are now used or considered in some other European countries. It could increase the demand for LNG in the Atlantic, as well as, make the UK market netback more vulnerable to LNG delivered on spot price basis.

Infrastructure and Cost Issues

LNG receiving terminals are the lowest cost segment of the LNG chain and due to the heightened interest in LNG they³⁰ now exceed liquefaction plants by over 30%. Table 1 below shows this more vividly.

Table 1³¹

LNG liquefaction and regasification terminals in the Atlantic

LNG Liquefaction Capacity (Mt/Year)	Existing Capacity	Under Construction & Approved	Planned	Total (existing & potential)
North America	33.8	+172	+280	485.8
Europe	46.4	+42	+90	178.4
Total Liquefaction	80.2	+214	+370	664.2

Liquefaction (Mt/Year)

Existing 5 Countries: Algeria; Nigeria; Egypt;

E. Guinea and Trinidad and Tobago	62
Proposed	88
Total	150

Furthermore, long-term contracts have made it possible for LNG liquefaction volumes to be sold up to 2010³². Shipyard capacity, which has constrained increase in transport vessels, could be worsened by requests from the newcomers. The surge in proposed and ongoing projects has stretched contractor/construction capacity. The cost implications of this capacity stretch also compounds the hike in the price of raw materials used along the LNG supply chain. For instance, the rising cost of steel has consequently increased both construction and transportation costs.

Such developments represent actual and potential constraints on new infrastructural investments and capacity expansion. This, invariably, prompts the vital question of 'who bears the burden of such hikes in cost'. Although they signed SPAs, for relatively cheap LNG, now China and India are in a fix because global LNG prices could not be transferred to or borne by domestic consumers. Unless the European newcomers are careful a similar problem may arise.

Exporters' response to increased market share

LNG is increasingly gaining market share especially in Western Europe. The question then arises about the response of exporting countries to the resultant market leverage³³ and their willingness to allow investors access to more gas deposits. The EU-Russia energy trade row is enhancing cooperation³⁴ between Russia and LNG exporters in the Atlantic – Algeria and Qatar.³⁵ The influence of LNG exporters, given Russia's indirect involvement in transatlantic trade, could be great.

Dynamics in the North American Market

These supply-side implications become more complex as the North American gas market transmit shocks on the Atlantic LNG market. Despite the mild weather and reduced gas demand in the industrial sector, drilling activities have increased in the region. Therefore, buyers' expectations about future gas supply are being affected by the increase in both gas storage and unconventional gas reserves. With increased European LNG transactions, these issues could exert further pressure on spot LNG prices in the Atlantic through the Henry Hub gas prices.

Competition among Buyers and Price issues

Trans-Atlantic and inter-regional transactions are bound to increase as more players (prepare to) enter the market. As price mechanism induces the flow of LNG to the highest-priced market, more arbitrage and diversion of cargoes would persist. Although domestic price hikes may occur gradually in the European markets, in the short term, Henry Hub spot price would remain the basis for the indexation of spot LNG transaction in the region. The increased interaction among players in the various domestic natural gas markets could ensure the disappearance of the North America – Western Europe split in LNG prices.

In terms of price, therefore, LNG would sometimes strengthen and support Natural Gas prices in North America and Europe. The extent of influence, however, would be a function of natural gas prices in each market, across the Atlantic, as well as, the demand, supply and spot price of LNG. The basis for LNG Contract Price indexation, in the long run, may still remain unresolved globally. Figure 2 below captures both the competition for LNG³⁶ and the interaction of prices in the region.

Demand Issues resulting from Price effects

In the short term, given the existing appliance stock; expected Combined Cycle Gas Turbine (CCGT) and Integrated Coal-Gas Plants, demand for LNG shall persist. The fairly liquid Atlantic LNG market may not offer Europe succour unless it offers higher prices. Due to the long lead time of the anticipated (liquefaction and regasification) projects prices could continue to rise into the Medium term.

Medium Term: Anticipation of demand destruction (from price hikes) and future supply glut explains the imposition of a moratorium, by Qatar's government, on gas projects till 2012³⁷. Despite the anticipated entry of Norway and Equatorial Guinea next year, the Atlantic LNG market could remain tight in the me-

dium term if demand is sustained. Sustained demand, however, is partly a function of the actions or reaction of LNG exporters. The actions of Gas Producing Countries could determine the actual building of some proposed regasification plants.

Fig 2

Price rise and arbitrage enhanced by competition for LNG globally



Long Term: Vivienne Cox attempted to predict a long-term destruction of demand by high gas prices in the competitive North American markets.³⁸ While agreeing with Vivienne’s speculation on the likely demand destruction, the analysis here indicates that European LNG (and Pipeline gas) importers would contribute significantly to the upward push in gas prices. This argument follows from Europe’s huge interest in LNG. The occurrence of long run price-activated demand destruction, however, would depend not only on an actual European shift to LNG but also on:

- the market situation in North America;
- the US Weather situation;
- the level of US Industrial sector’s demand for gas;
- capacity utilization/underutilization of LNG Infrastructure in the US

Conclusion

Depending on how you define security, diversifying gas supply through geographical origin and transit routes may enhance security of gas supply. The above discourse was neither about European energy policy nor its security of supply options but Europe can not economically replace Russian gas supplies in the short term.

Different strands of positive and negative effects on LNG have been discussed but a high degree of uncertainty remains. On both sides of the Atlantic, LNG exporters would gain more market share with various regasification terminals being built or planned in the US, UK, Germany, Belgium, and The Netherlands. These developments would principally determine the future of LNG trade in the Atlantic. Although the size and nature of the North American gas market is vital to Atlantic LNG trade, it may be concluded that:

- Developments in Europe could greatly determine the fu-

ture trend in LNG trade dynamics - Price, Demand, Contracts and Infrastructural Capacity - as the Atlantic market evolves;

- Implications of the row are complex; interwoven and a function of market interaction within and across the Atlantic.

The European anticipation for more LNG may increase investments in receiving infrastructure, but the consequences for Atlantic LNG trade raise other pertinently researchable long run questions: How would these developments make the US gas market less attractive to LNG Producers? Would rising natural gas prices destroy LNG demand in the Atlantic when most LNG volumes have been ‘contracted out’ to 2010? Is an LNG supply glut likely, in the light of collusion by LNG exporting countries?

Endnotes

- ¹ Bocharov, D., *Alternative Gas Supplies to Europe: Pro and Contra of the diversification towards central Asia*, p.1, para.2, Vol.1, Issue 1, OGEL, May 2006.
- ² Stern, J. *The Russian-Ukrainian gas crisis of January 2006*, p.17, para.3 at http://www.oxfordenergy.org/pdfs/comment_0106.pdf January 16 2006
- ³ Gorst, I., *The empire strikes back*. p.8, para.4, Petroleum Economist, May 2006
- ⁴ The Clingael Institute, *Summary CIEP Gas Market Seminar LNG impacts on North West Europe*, at http://www.clingael.nl/ciep/events/20060203/20060203_CIEP_%20LNG_Summary.pdf February 3, 2006, The Hague.
- ⁵ See Bochkarev *supra* note 1.
- ⁶ In 2005, Gazprom exported \$30Billion-worth of gas.
- ⁷ The Eight Countries are Belgium, France, Germany, Italy, Netherlands, Spain, Turkey and the United Kingdom.
- ⁸ Sullivan J. A. and Shook, B., *Ships, Crews stumbling Blocks in developing LNG Supply Chains*, p.3, Natural Gas Week, February 6, 2006.
- ⁹ IEA, *Security of Gas Supply in Open Markets: LNG & Power at a turning point*, (Paris: OECD/IEA, 2004).
- ¹⁰ Jensen, J.T., *The development of a global LNG market*, (Oxford: Oxford institute for Energy Studies, 2004).
- ¹¹ Belorgeot, C., *The International market is becoming global*, p.126, Energy & Mines, November 2004
- ¹² Chabreliet, M., *LNG: A Commodity in the Making*, PANORAMA 2006 at http://www.ifp.fr/IFP/en/events/panorama/IFP-Panorama06_10_GNL-VA.pdf
- ¹³ Jensen, J.T., *The development of a global LNG market*, (Oxford: Oxford institute for Energy Studies, 2004).
- ¹⁴ See Jensen *supra* note 13.
- ¹⁵ IEA, *World Energy Outlook 2002*, (Paris: OECD/IEA, 2002).
- ¹⁶ IEA, *Natural Gas Market Review 2006: Towards a Global Gas Market*, (Paris: OECD/IEA, 2006).
- ¹⁷ Ross, C.E.H., *Atlantic Basin LNG: Who Gets the Rent?*, World Energy Vol.7, No.1, 2004.
- ¹⁸ Buckley, N., *Moscow has more than just the price of gas on its mind*, F.T, Tuesday January 3, 2006.
- ¹⁹ This is about a quarter of EU gas supply.
- ²⁰ Stern, J., *Soviet and Russian Gas: The origins and evolution of Gazprom’s export strategy*, (Oxford: Oxford Institute for Energy Studies, 1999).
- ²¹ See Gorst *supra* note 3 at page 9.
- ²² See Stern 2006 *supra* note 2, for a detailed analysis of the

dispute and settlement terms.

²³ Catan, T., *Dispute likely to boost arguments for nuclear power*, F.T, Tuesday January 3, 2006.

²⁴ Russian President Vladimir Putin quoted in *Russia, Europe draw battle lines their dispute over energy*, Volume 3, Issue 103, Eurasia Daily Monitor, Friday, May 26, 2006.

²⁵ Buckley, N., *Putin attempts to ease EU concerns over energy*, F.T News alerts, 25 May, 2006.

²⁶ See The Clingendael Institute *supra* note 4

²⁷ Mortished, C., *Algerians and Russians in gas talks*, Times Online, April 24, 2006 at <http://www.timesonline.co.uk/printFriendly/0,,1-9077-2149232-5,00.html>

²⁸ See Bocharov *supra* note 1.

²⁹ Moen, K., *The Gas Directive and Third Party Transportation Rights – What Pipeline Volumes are available?* p.50, Vol.21 No.1 Journal of Energy and Natural Resources Law, 2003

³⁰ This includes terminals that are under construction and those in operation.

³¹ Source: FERC and Cedigaz

³² See Gorst *supra* note 3 at page 9.

³³ For instance, developers of the 7th NLNG Train refused negotiations with any buyer without firmed up regasification capacity for the projected start of delivery.

³⁴ For more on cooperation among gas Producers, see Wagbara, O., *How would the Gas Exporting Countries Forum influence gas trade?* at http://www.sciencedirect.com/science?_ob=MIimg&imagekey=B6V2W-4JTRTG1-1-1&_cdi=5713&_user=1669875&_orig=browse&_coverDate=04%2F27%2F2006&_sk=999999999&view=c&wchp=dGLbVtb-zSkWW&md5=b20c1b5f870211515f909bd384d7a034&ie=/sdarticle.pdf

³⁵ Due to its political nature this issue is mentioned briefly.

³⁶ Hirschhausen, C., *Changing LNG Markets – A European Perspective*, p.19 at http://www.tu-dresden.de/www/leeg/publications/hirschhausen_mit_atlantic_lng_markets_2003.pdf (2003)

³⁷ Gavin, J., *Doha takes a breather*, .18, para.2, Petroleum Economist, November 2005.

³⁸ Quinlan, M., *Warnings of limit to growth*, p.8, para.3, Petroleum Economist, November, 2005

Strategic Plan and Organizational Changes at the USAEE

The Strategic Planning process this year, led by Marianne Kah, Past President, and Peter Nance, President-elect, resulted in recommendations for significant new efforts to expand communication and interaction within the membership. Possibilities include expanded use of the web-based services to members summarized here:

- Enhanced blog, facilitated by obtaining a blog editor
- “Ask an Expert” forum
- Energy Puzzler
- CNN-style questions
- Energy Policy Conference
- Member forecast surveys

For students, the Strategic Plan proposed a student-only survey and expanded services including:

- Internship & employment matching
- On-line resume book
- Inviting key faculty to attend student breakfast at Conference
- Energy policy competition
- Expanded best paper competition (started in 2006)
- Mentoring program

At its meeting in Ann Arbor, the USAEE Council endorsed these concepts with a plan to solicit member input and participation. From an organizational standpoint, the USAEE Council is being expanded to include a Vice President for Communication, a Vice President for Academic Affairs and a new Student Council position. A special election was just held and those positions have been filled for 2007.

Mary Barcella, as Vice President-Communications, will coordinate outreach efforts with members through the Dialogue, an expanded “blog” on the web-site, a possible electronic policy journal or paper series, as well as outreach to the media. If you are interested in becoming more involved in the USAEE, including serving on a Communications Committee and/or have ideas for the USAEE, contact Mary directly at mlbarcella@msn.com.

Jim Smith, as Vice President – Academic Affairs, will be responsible for outreach and interaction with the academic community and will manage and advise the Council on student programs including the Student Paper Awards.

Jennie Rosthal, the first Student Council Representative, will be the member of the Council who voices the views and interests of the student members of the USAEE. She is already on the planning committee for the North American conference in Houston next year. Students interested in specific programs in the USAEE or at the Houston conference may contact Jennie directly at rosthal@rice.edu.

Integrating the Regulation of Natural Gas Utilities

By Jon Ludwigson, Frank Rusco and W. David Walls*

Introduction

Demand for natural gas has grown rapidly in much of the past two decades, while domestic supply has not kept pace. Increasing imports of natural gas from Canada and other sources has made up some of the difference, but infrastructure limitations have led to a tighter overall demand supply balance. Pipeline capacity is more intensively used in this environment leaving smaller margins for addressing random supply or demand disturbances. In this context, there have been a number of large price spikes, the two most recent episodes lasting a number of months as depicted in Figure 1, showing the history of natural gas spot prices over the past twenty years.

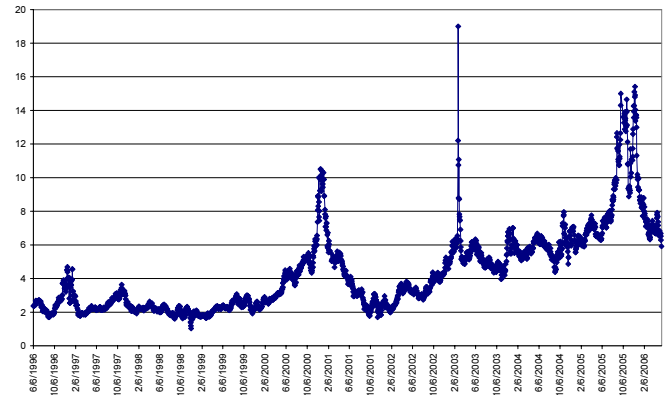
A large body of research in the 1990s showed that natural gas commodity prices tend to follow the law of one price after transportation is unbundled from the commodity and that prices in a gas pipeline network appear to behave in a way consistent with no-arbitrage pricing bounds (see for example, De Vany and Walls, 1993 and 1995 and Walls, 1993 and 1994a,b, and 1995). However, some recent events, such as the price manipulation that the Federal Energy Regulatory Commission found to have occurred during the winter of 2001 in California, as well as the tighter demand and supply balance of recent years may indicate some changes in the market since this earlier work was performed.

Residential natural gas consumers are generally unable to respond to changes in natural gas prices, either because they do not see prices in a timely fashion or because they have little ability to switch suppliers or fuels. A large part of the natural gas sold to these consumers is done so under terms in which the commodity cost of the gas is simply passed through by the gas utilities, albeit often with a lag of varying amounts. As a result, most residential consumers must rely on the decisions of the utility with respect to hedging their natural gas purchases. As will be shown in this paper, many residential gas consumers were left quite exposed to the two most recent large price spikes. A strategy of hedging against price volatility does not, in general, lead to the lowest average prices over long periods. However, casual observation of consumer and political furor every time natural gas prices rise significantly indicates that consumers have a strong aversion to the upward part of price volatility and perhaps, although this is less obvious, a preference for price stability even at the cost of higher average prices.

Natural gas utilities have a number of available tools for hedging their gas purchases against future price increases, including storage, taking physical positions in commodity markets, or using an array of gas and weather derivatives such as futures contracts, options, or swaps. Table 1 below provides a brief description of each of the tools utilities can use to hedge against price volatility.

*Jon Ludwigson and Frank Rusco are with the U.S. Government Accountability Office and David Walls is with the Department of Economics, University of Calgary, Canada. Frank Rusco may be reached at ruscof@gao.gov

Figure 1
Henry Hub Natural Gas Spot



Source: Global Insight Data

Table 1
Hedging Tools Available to Gas Utilities

Storage	Utility buys and stores gas, providing a physical hedge against price volatility.
Forward Contracts	Utility agrees to take delivery of an amount of gas at a pre-agreed price, thereby providing a physical hedge.
Futures Contracts	Traded on organized exchanges, a utility locks in prices for up to 72 months. Because delivery rarely takes place, futures contracts are considered a financial instrument.
Options	Traded on organized exchanges or over-the-counter, options give buyers option, but not obligation, to buy or sell gas at a pre-agreed price at some future date.
Swaps	Similar to futures contracts, but can be individually negotiated to provide more flexibility and often traded in over-the-counter-markets.
Weather Derivatives	A range of financial contracts the net-payment terms of which depend on weather outcomes. For example, utilities can purchase a contract that will pay them if future weather is colder than expected.

Survey Evidence of Utilities Hedging Practices and the Regulatory Environment

Three recent surveys of utilities and state regulators show a wide disparity in gas purchasing practices by utilities and also differences in regulator's views on and acceptance of various gas purchasing practices. In 2002, the GAO surveyed 475 of 1,039 gas utilities then operating in the United States. These 475 utilities included 133 large—mostly investor owned and large municipal—companies that, combined, deliver more than 90 percent of the total gas sold in the country. The remaining 342 utilities surveyed were randomly chosen from the population of smaller municipally owned utilities. This survey was designed to determine utilities' gas purchasing practices over a number of years, including the utilities' use of hedging tools. Also in 2002, the GAO surveyed staff from state regulatory agencies that oversee gas utilities in the 48 contiguous states and the District of Columbia.¹ This survey asked regulators about their regulatory goals and, more specifically, how they regulate and oversee gas utilities' purchases of gas. Finally, in 2006, GAO surveyed state regulators again with a much more limited set of questions to determine, for the utilities they regulate, what proportion of the gas purchased in the winter of 2005-

2006 was hedged.² For full details of the 2002 surveys, please see (GAO 2002) and for details of the 2006 survey, please see (GAO 2006).

The 2002 survey of utilities presents a picture of varying gas purchasing practices by utilities within and across states and by utility size. Specifically, the survey of small and large utilities done in 2002 shows that many were largely exposed to spot prices during the winter of 2000-2001. Table 2 summarizes some of the results of this survey and shows that 18 percent of large and 30 percent of small gas utilities had not hedged any of their gas purchases during the winter of 2000-2001. The survey results also show that, among utilities that did use hedges during this period, there was a wide disparity in the proportion of utilities' expected gas purchases that were hedged. This survey also asked respondents how their practices had changed in light of the 2000-2001 price increases and, while many fewer reported that they would use no hedges in the next year, there was still a wide disparity in how much of their expected gas purchases they intended to hedge.

The more recent survey asked state regulators to assess the extent to which the utilities they regulated had hedged their gas purchases for the winter of 2005-2006. This survey did not distinguish between large and small utilities, but it did indicate that there is still a great deal of variation across utilities within and across states with respect to their gas purchasing practices. Specifically, as shown in table 3, the extent to which utilities hedged their gas purchases during this period varied from zero to 100 percent both across and states within some states. In addition, the survey shows that the average commodity prices paid for natural gas varied a great deal both within and across states. These prices varied from as low as \$5 to over \$14 per MMBtu and, even within some states, average prices varied by as much as several dollars per MMBtu.

The 2002 survey of state regulators explored regulator's goals and regulatory practices. The survey results suggest that, in some cases, regulators may not always provide symmetric incentives with regard to using some hedging strategies and, in some cases, have not allowed some hedging practices. However, most state regulators allow utilities to use a full array of hedging tools and, subject to prudence audits of utilities' purchasing strategies, allow utilities to recover commodity costs. There is also some evidence that regulators' views on the use of hedging has changed since the prolonged price increases of winter 2000-2001. For example, following the prolonged increase in prices of the winter of 2000-2001, 43 of the state regulators rated a goal of "stable prices" as being at least a moderately important regulatory goal, a much higher percentage of regulators than listed this as an important goal prior to the increase in prices. However, most of these states also rated "lowest reasonable price" or "prices close to market" as also being important. These three goals may send unclear signals to utilities about what is expected of them in purchasing gas. In particular, a goal of stable prices may suggest a large reliance on physical or financial hedges, while achieving prices close to market appears to call for a heavy reliance on spot prices. The survey also indicated different approaches among state regula-

tors with respect to which hedging tools utilities are encouraged or allowed to use.

Specifically, in 15 of 48 states, regulators limit the use of utilities use of financial instruments in purchasing gas. In addition, in 42 states, regulators do prudence reviews of utilities purchasing practices and can disallow cost recovery if utilities' strategies turned out to lead to higher commodity costs. In discussions with some utility staff and industry experts, such prudence reviews were cited as an important risk for utilities in deciding whether or not to use hedges—especially financial hedges, but also long-term physical hedges. Regulators appear to generally allow full commodity cost recovery if a utility buys most of their gas in short-term contracts or in the spot market because these prices will typically be close to market, while a hedge against price volatility will be viewed differently by regulators ex post depending on whether prices rose or fell relative to the contracted price. With regard to specific hedging tools available to utilities, some state regulators did not allow a full range of these tools.

Table 2
Gas Utilities' Use of Hedging for Residential Customers
(Winters of 2000-2001 and 2001-2002)

LARGE UTILITIES		
Percentage of utilities' supply hedged	2000-2001 (N=85)	2001-2002 (N=46)
0	18	9
1 to 49	44	26
50 to 99	31	57
100	8	9
SMALL UTILITIES		
Percentage of utilities' supply hedged	2000-2001 (N=161)	2001-2002 (N=86)
0	30	12
1 to 49	16	12
50 to 99	29	38
100	25	38

Source: GAO

Conclusions

This paper represents a first step at identifying and evaluating differences in utilities' gas purchasing practices. The recent survey evidence presented in this paper shows a wide disparity in gas purchasing practices by utilities, both within and across regulatory jurisdictions, as well as variation by size of utility. In addition, utilities' average commodity prices for gas varied a great deal in the winter of 2005-2006. There is also some evidence that regulators do not have uniform goals, expectations, or practices with regard to overseeing utilities' gas purchases. In particular, many regulators stated goals of price stability and prices close to market both as being important goals despite the inherent mutual inconsistency of these goals. In addition, while it does appear that most regulators at least allow the use of a full range of these tools, some do not. Finally, there are likely varying degrees of scrutiny that regulators apply to their utilities' purchasing practices that is not captured in the survey questions asked.

Table 3
Utilities' Hedging of Gas Purchases (Winter 2005-2006)

State	Number of Utilities Canvassed	Percentage of Gas that was un-hedged	Average Commodity Price/mmBTU
AL	3	15	\$8.6
AZ	4	50	\$6.00 - \$6.85
CA	7	35 to 40	Not provided
CO	7	Not provided	\$7.13 - \$11.51
CT	3	44 to 57	\$8.30 - \$8.65
DC	1	38	\$9.02 - \$11.00
DE	2	5 to 31	\$9.47 - \$11.87
FL	7	0 to 51	\$5.23 - \$9.27
GA	2	38	Not provided
IA	4	30	\$9.16
ID	2	44 to 48	\$7.15 - \$7.36
IN	22	20 to 31	\$7.86 - \$8.82
KS	4	34	\$5.00 to \$6.00
KY	30	50	\$8.50 - \$9.50
LA	15	72	\$7.30 - \$7.89
MA	9	40 to 50	Not provided
MD	7	38 to 51	\$9.00 - \$9.84
ME	3	0 to 100	\$7.73 - \$14.06
MI	7	6	\$9.27
MN	7	60 to 70	Not provided
MO	7	45	\$11.41
MS	3	60 to 90	\$9.77 - \$11.80
MT	6	45 to 75	\$6.27 - \$7.34
NC	4	70 to 88	\$7.50 - \$7.52
ND	3	52	Not provided
NE	3	10 to 40	\$7.20 - \$9.54
NH	2	30 to 35	\$12.50 - \$13.00
NJ	4	16 to 50	\$7.07 - \$8.50
NM	3	46 to 79	\$8.07 - \$10.46
NV	2	0 to 40	\$6.62 - \$7.78
NY	11	38	\$7.37
OH	26	34 to 63	Not provided
OR	3	10 to 15	\$7.11 - \$8.16
PA	25	42	Not provided
RI	1	20	\$8.35
SC	2	0	\$12.21
SD	3	25 to 60	\$6.00 - \$9.70
TX	33	63	\$9.86
UT	1	23	\$7.82
VA	6	43 to 66	\$10.11 - \$14.24
VT	1	5	\$6.45
WA	4	10 to 30	\$6.75 - \$7.90
WI	11	58 to 80	\$7.50 - \$9.00
WV	35	45 to 48	\$7.16 - \$8.30
WY	11	20 to 100	\$3.00 - \$1.20

Source: GAO

While differences in regulatory environments may explain some of the different purchasing practices we observe, it may also be the case that utilities do not uniformly possess the skills required to manage risk, or in some cases, small utilities may not have the volume of purchases to make full use of price risk management tools.

This paper raises some questions about the extent to which utilities and regulators are acting in the interests of their residential customers but more work needs to be done to answer those questions. While the evidence presented does not

prove that any one utility or regulatory body is not behaving in a way consistent with the welfare of its residential customers, the wide range of practices and price outcomes begs the question of whether all of these observations could possibly represent an efficient use by utilities of the available tools to manage their residential customers' price risk.

Endnotes

¹ Nebraska was not surveyed because gas utilities in that state are regulated by local authorities.

² All 48 states in the continental United States and the District of Columbia were surveyed. GAO received complete responses from all but four of the states.

References

De Vany, A. and W. D. Walls. *The Emerging New Order in Natural Gas: Markets versus Regulation*. Quorum Books, Westport, Connecticut, 1995.

De Vany, A. and W. D. Walls. "Pipeline access and market integration in the natural gas industry: Evidence from cointegration tests." *The Energy Journal*, 14(4):1-19, October 1993.

GAO, *Natural Gas: Analysis of Changes in Market Price*, GAO-03-46 (Washington, D.C.: December 18, 2002).

GAO, *Natural Gas: Factors Affecting Prices and Potential Impacts on Consumers*, GAO-06-420T (Washington, D.C.: February 13, 2006).

Walls, W. D. "Competition, prices, and efficiency in the deregulated gas pipeline network: A multivariate cointegration analysis." *Journal of Energy and Development*, 19(1):1-14, Autumn 1993.

Walls, W. D. "A cointegration rank test of market linkages with an application to the U.S. natural gas industry." *Review of Industrial Organization*, 9(2):181-191, April 1994.

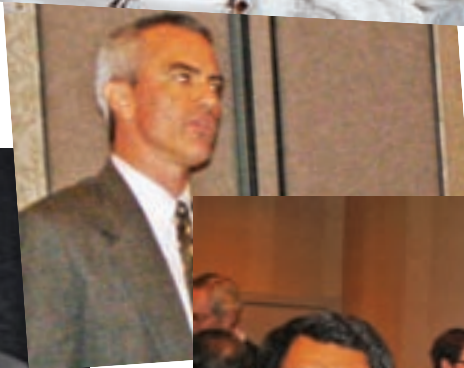
Walls, W. D. "Price convergence across natural gas fields and city markets." *The Energy Journal*, 15(4):37-48, October 1994.

Walls, W. D. "An econometric analysis of the market for natural gas futures." *The Energy Journal*, 16(1):71-83, January 1995.

Do You Want to Start a USAEE Chapter?

The requirements for starting a USAEE Chapter are straightforward – a viable group forms to create a Chapter and have organized to the point of adopting a set of bylaws as well as have elected a group of officers. A sample set of bylaws may be found by visiting <http://www.usaee.org/chapters/start.asp> or calling USAEE Headquarters at 216-464-2785. USAEE dues are \$65.00 per person, per year for a subscription to *The USAEE Dialogue*, *The Energy Journal* and *IAEE Newsletter*. Student membership is \$35.00. USAEE bills members directly for their membership in the Association. Chapter membership must be open to all individuals whose 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 USAEE Headquarters, phone: 216-464-2785; email: usaee@usaee.org. A complete Chapter start-up kit can be mailed to you

Scenes from the 26th Annual North American Conference
24–27 September, 2006 – Ann Arbor, Michigan, USA





Welcome !! The following individuals joined USAEE from 6/1/06 – 10/31/06

Tatiana Alves	Matthias Fripp UC Berkeley	Sophia Liang Nevada Power	Jennie Rosthal Rice University
A Ashfaq	Stephanie Futch Arup	Charles Linville Archer Daniels Midland	Jayagopi Sathyanarayanan
David Attaway Georgia Environmental Facilities	Debyani Ghosh Global Energy Partners	Manuel Luengo	Erich Schneider University of Texas at Austin
Robert Brecha University of Dayton	Birgit Gocht	M Sasha Mackler National Commission on Energy Policy	Diana Schwyzer UC Berkeley
Mark Bryfogle Anlage Research	Kenneth Green American Enterprise Institute	Elizabeth Mbau	Sakesh Shankar Moody's Economy.com
Terry Bussear Baker Hughes Inc	Susan Grissom	Jonathan McClelland Johns Hopkins University	Ekundayo Shittu University of Massachusetts
Robbie Cahill Stanford University	Esat Guney MA Dept of Telecom and Energy	Jorge Mercado	Deepak Sivaraman University of Michigan
Paul Centolella	Yousuf Habib	Erin Merrill	Matthew Spada
Mei-Peng Cheong	Booker Harrison	Hubert Miller III	Jeroen Struben
William Charles Conrad Barnes	Peter Hartley Rice University	Michelle Moran	Michael Sweeney Arup
Justin Dargin	Aaron Hawley	Stephen Morisseau Globelq Inc	Michael Swider NSTAR Electric and Gas
Jackie Darr Stark Investments	Jhuo Huang	William Morrow Carnegie Mellon University	Margaret Taylor UC Berkeley
Jason Davila Global Energy Management Inst	Thomas Inglesby McKinsey & Co	Adam Newcomer	Aynsley Toole Columbia University
Nicholas Dorn	Judson Jaffee Analysis Group	Hyungna Oh West Virginia University	Cyrus Wadia UC Berkeley
Patrick Doyle Booz Allen Hamilton	Shankar Karki University of North Dakota	Tadahisa Okabe JETRO Houston	Henry Olsen American Enterprise Institute
Stacy Eller Rice University	Warren Katzenstein Carnegie Mellon Univ – EPP	Henry Olsen American Enterprise Institute	Stella Papisavva General Motors R&D
Jose Fernandez	Richard Klotz Hobart and William Smith Colleges	Aube Plop-Montero IHS Energy	R Craig Williams Southern NH Univ
Victoria Fleming Goldman School of Public Policy	Steve Kyryk Hobbs and Towne Inc	Tadahisa Okabe JETRO Houston	Matt Woodson
Hilary Flynn Researcher	Ted Lawrence New York State Energy Authority	Henry Olsen American Enterprise Institute	Ning Wu MIT
Timothy Franklin Havel Massachusetts Inst of Technology	Huey-Lin Lee	Sharath Chandra Rao Univ of Delaware CEEP	Sonia Yeh University of North Carolina
	Michael Leifman US Department of Energy	Jaeson Rosenfeld McKinsey Global Institute	Brian Zimmet Van Ness Feldman PC
		John Rosenkranz	

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 impli-

cations 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.

Broaden Your Professional Horizons



Join the

International Association for Energy Economics

In today's economy you need to keep up-to-date on energy policy and developments. To be ahead of the others, you need timely, relevant material on current energy thought and comment, on data, trends and key policy issues. You need a network of professional individuals that specialize in the field of energy economics so that you may have access to their valuable ideas, opinions and services. Membership in the IAEE does just this, keeps you abreast of current energy related issues and broadens your professional outlook.

The IAEE currently meets the professional needs of over 3100 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, contains articles dealing with applied energy economics throughout the world. The Newsletter also contains announcements of coming events, such as conferences and workshops; gives detail of IAEE international affiliate activities; and provides special reports and information of international interest.

• **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.

To join the IAEE and avail yourself of our outstanding publications and services please clip and complete the application below and send it with your check, payable to the IAEE, in U.S. dollars, drawn on a U.S. bank to: International Association for Energy Economics, 28790 Chagrin Blvd., Suite 350, Cleveland, OH 44122. Phone: 216-464-5365.

_____**Yes**, I wish to become a member of the International Association for Energy Economics. My check for \$65.00 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.

PLEASE TYPE or PRINT

Name: _____

Position: _____

Organization: _____

Address: _____

Address: _____

City/State/Zip/Country: _____

Email: _____

Mail to: IAEE, 28790 Chagrin Blvd., Ste. 350, Cleveland, OH 44122 USA or
Join online at <http://www.iaee.org/en/membership/>

Dia1106



Calendar

1-1 December 2006, Research Conference on Gasoline and Oil Markets at Berkeley, CA. Contact: Conference Coordinator, Center for the Study of Energy Markets (CSEM), University of California Energy Institute, 2547 Channing Way, Berkeley, CA, 94720, USA. Phone: 510-643-5009 Email: gasconf@ucei.org

5-5 December 2006, Deloitte Oil & Gas Conference at Houston, Texas. Contact: Ms. Mickey Appel, Marketing Manager, Deloitte & Touche LLP, 333 Clay Street, Suite 2300, Houston, TX, 77002, USA. Phone: 713.982.3832. Fax: 713.427.4132 Email: mappel@deloitte.com URL: TBD

11-12 December 2006, Tribal Energy in the Southwest Conference at Albuquerque, New Mexico. Contact: Erika Schaefer, Marketing, Law Seminars International, 800 Fifth Ave, Suite 101, Seattle, WA, 98104, USA. Phone: (206) 567-4490. Fax: (206) 567-5058 Email: eschaefer@lawseminars.com URL: <http://www.lsinews.com/LSI/06/06tribnm.htm>

4-6 February 2007, Innovative Energy, T&D, and Water Solutions at San Diego, CA. Contact: Conference Coordinator, DistribuTECH 2007, PO Box 973059, Dallas, TX, 75397-3059, USA. Phone: 918-831-9160. Fax: 918-831-9161 URL: www.distributech.com

23-25 February 2007, Eastern Economic Association 33rd Annual Conference at New York City, NY. Contact: Dr. Mary Lesser, Conference Secretariat, Eastern Economics Association, c/o Iona College, 715 North Avenue, New Rochelle, NY, 10801, USA. Phone: 914-633-2088. Fax: 914-633-2549 URL: www.iona.edu/eea

6-8 March 2007, Power Gen Renewable Energy and Fuels at Las Vegas, NV. Contact: Jan Simpson, Conference Manager, Power-Gen, 1421 S Sheridan Rd, Tulsa, OK, 74112, USA. Phone: 918-831-9736. Fax: 918-831-9875 Email: pgconference@pennwell.com URL: www.power-gengreen.com

13-15 March 2007, NESEA's Building Energy 07 Conference at Boston Seaport World Trade Center. Contact: Jan Nokes, Business Manager, Northeast Sustainable Energy Association, 50 Miles Street, Greenfield, MA, 01301, USA. Phone: 413-774-6051 x16. Fax: 413-774-6053 Email: jnokes@nesea.org URL: <http://www.buildingenergy.nesea.org>

15-16 May 2007, Biomass 07: Power, Fuels, and Chemicals Workshop at Grand Forks, ND. Contact: Derek Walters, Communications Manager, University of North Dakota, Energy & Environmental Research Ctr, PO Box 9018, Grand Forks, ND, 58202, USA. Phone: 701-777-5113. Fax: 701-777-5181 Email: dwalters@undeerc.org URL: www.undeerc.org

16-19 September 2007, 27th USAEE/IAEE North

American Conference at Houston, TX. Contact: David Williams, Executive Director, USAEE, 28790 Chagrin Blvd Ste 350, Cleveland, OH, 44122, USA. Phone: 216-464-2785. Fax: 216-464-2768 Email: usaee@usaee.org URL: www.usaee.org

Announcement

9th Annual USAEE/IAEE/ASSA Meeting

Chicago, Illinois., USA January 5- 7, 2007

Session Title: Current *Issues in Energy Economics and Energy Modeling*

Session Date: Saturday, January 6 – 10:15am – 12:00n
Hyatt Skyway, Rm 265

Presiding: Carol Dahl, Colorado School of Mines

Alireza Tehrani Nejad M. and Valérie Saint-Antonin, Institut Francais du Pétrole – *Allocation of CO₂ Emissions in Petroleum Refineries to Petroleum Joint Products: A Case Study*

Lester C. Hunt, University of Surrey, and **Frederick L. Joutz**, George Washington University – *Modeling Underlying Trends in OECD Energy Demand: Deterministic Vs. Stochastic?*

Benjamin F. Blair and Jon P. Rezek, Mississippi State University – *The Effects of Hurricane Katrina on Price Pass – Through in Gulf Coast Gasoline Markets*
Youngho Chang and Qiyan Ong, National University of Singapore – *Consumption Efficiency and Deregulated Electricity Market*

Discussants:

Donald A. Hanson – Argonne National Laboratory

Clifton T. Jones – Stephen F. Austin State University

Young Yoo – Federal Energy Regulatory Commission

Lynne Kiesling – Northwestern University

Abstracts are posted at <http://www.iaee.org/en/conferences/assa2007.aspx> The meeting is part of the Allied Social Science Association meetings (ASSA)

For program information and pre-registration forms on the larger meeting go to <http://www.vanderbilt.edu/AEA/anmt.htm>. Also watch for the USAEE/IAEE Cocktail Party.

USAEE Dialogue

United States Association for
Energy Economics
28790 Chagrin Boulevard, Suite 350
Cleveland, OH 44122 USA

PRSRST STD
U.S. POSTAGE
PAID
Richfield, OH
Permit No. 82