USAEE 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.
Fueling the Future:
Prices, Productivity, Policies, and Prophecies
September 18-21, 2005  Omni Interlocken Resort  Denver, Colorado - USA
25th USAEE/IAEE North American Conference
United States Association for Energy Economics  International Association for Energy Economics
Denver Chapter, USAEE
General Conference Chair:  Marianne Kah
Program Co-Chairs:  Dorothea El Mallakh & Carol Dahl
Concurrent Session Chair:  Wumi Iledare

Conference Objective
Energy is forefront in the news again! Will coming years take us to clean, cheap, stable, and secure energy supplies with ever-increasing prosperity? Concentrated plenary sessions combined with diverse concurrent sessions and ample networking opportunities will provide the backdrop for exploring a wide-range of issues within energy markets while enjoying a view of the Rocky Mountains in a congenial atmosphere.

Plenary Session Themes
- Fossil Fuels Reliance & Reserves
- Environmental Issues: Past Approaches - Future Concerns
- Electricity Reliability: Boom to Bust & Back Again
- Non-Conventional Energies: Probable to Proven
- Oil & Natural Gas Market Volatility
- Renewable Energy: Back to the Future?
- Energy: International Commodities
- Electricity Reliability: Boom to Bust & Back Again

Possible Concurrent Session Topics
Concurrent sessions will be developed from the papers selected for the program. Among the possible topics are: Electricity markets; geopolitics of energy; international energy markets; global LNG; Kyoto Protocol revisited & emissions trading policies; transport sector challenges; forecasting, modelling & scenario developments; energy efficiency & renewables; avoiding bottlenecks & blackouts; nuclear power revisited; sustainable development; private vs. public ownership & use; energy supply & demand; energy policy discontinuities and the climate change debate.

All topic ideas are 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

**** CALL FOR PAPERS ****

Abstract Submission Deadline: April 29, 2005
(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 May 20, 2005, of their paper status. Authors whose abstracts are accepted will have until June 29, 2005, 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: Please submit your paper for consideration of the USAEE Best Student Paper Award ($1,000 cash prize plus waiver of conference registration fees). If you are interested, please contact USAEE Headquarters for detailed applications / guidelines. Students may also inquire about our scholarships for conference attendance. Visit www.iaee.org/en/conferences for full details.

Travel Documents: All international delegates to the 25th 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 United States. If you need a letter of invitation to attend the conference, contact USAEE with a fax request to 216-464-2768 or email to usaee@usaee.org. The Conference strongly suggests that you allow plenty of time for processing these documents.

Interested in touring Boulder? Visit http://www.bouldercoloradousa.com
Serving as president of the USAEE this past year has been an honor and a privilege for me. After nearly 20 years in the IAEE/USAEE fold attending meetings and serving on committees and Council, it almost feels like family. The IAEE/USAEE has provided me with a great network of colleagues upon whom I can rely for challenging questions, enlightening discussions and thoughtful advice. This year especially, having worked closely with so many people, I have come to appreciate everyone’s diverse capabilities more than ever. I’m grateful to the members of the USAEE Council for all their efforts and support this year. I’d also like to thank the president’s advisory board, whose members helped me think through some tough issues. And I don’t think I could have survived without Dave Williams Jr. and Sr.

2004 has been a tumultuous year for energy markets. With oil prices rising above $50 per barrel, natural gas above $7 per Mmbtu and a forecast for a colder-than-normal winter, all eyes are on energy. Recall that research shows 9 of the 10 post World War II recessions were preceded by oil price shocks. Not all oil price shocks gave rise to recessions, of course, and the economy is far more resilient and energy efficient than it was 20 or 30 years ago. So I don’t believe current prices will trigger a recession. But I do think they will slow the economy. That makes a comprehensive energy policy more important than ever.

So, what is an energy economist to do? I think we need to cut through the rhetoric, distinguish the policy prescriptions that make sense economically and educate the public about them. For example, the notion of energy independence is not a viable option. Sure, we can become independent from sources in politically unstable parts of the world. But at what price? Do we really need to subsidize domestic oil and gas production? What is the cost of giving domestic oil and gas producers tax incentives to develop expensive oil and gas reserves? Drilling in ANWR is still a hot issue. To put it in perspective, we should remember that implementing the current passenger car CAFE standards for light trucks and SUV’s could give us the same result as drilling in ANWR. ANWR is a patch, not a remedy.

As economists, we know there is no free lunch. But the public needs to be educated about the trade-offs between energy policy choices. If we want cleaner air, it is not a free good. If we want low and stable electricity prices, we won’t be able to buy all we want. If we desire cheaper gas, as domestic natural gas prices rise, NIMBY decisions about the sitting of LNG terminals are not going to get us there.

Clearly, many regulatory changes are needed in power markets. At the USAEE meeting in Washington this past July, Tom Casten gave a very thoughtful and provocative speech on power generation. Challenging the notion that central generation of power is optimal, he made a strong case for decentralized generation and pressed for fundamental policy and regulatory reform to remove the barriers to efficiency stemming from the monopoly production of power. Deregulation and freer markets will bring us closer to an efficient allocation of energy resources, but we need to remember that the consumer is all for free market solutions until prices start rising. Education of the consumer is an important aspect of the move to deregulation and free markets.

Gasoline prices, petroleum leases and electricity markets are among the topics on tap for the IAEE session at the ASSA meetings in Philadelphia January 7-9, 2005. I’d like to invite everyone to the session and the (soon to be traditional) IAEE/USAEE cocktail party. Carol Dahl and Fred Joutz have put together an excellent session. Looking forward to next fall, the Denver program committee has
In this fall edition of the USAEE Dialogue, Ian Parry, senior fellow at Resources for the Future, provides a discussion of the economic efficiency, or social welfare effects, of higher gasoline taxes and passenger vehicle fuel economy standards. Parry suggests that there are better approaches than higher fuel taxation to address problems associated with gasoline and motor vehicle use; but using purely efficiency logic as the basis for higher fuel economy standards may be harder to justify.

This issue of the Dialogue also includes articles by Fereidoon (Perry) Sioshansi, president of Menio Energy Economics. Perry Sioshansi argues that the time for debate and equivocating has passed. Businesses engaged in exploration, development, transportation, conversion, or use of energy – and that includes nearly every one – must begin to address how their energy-related decisions and investments affect global climate change and vice versa.

Wumi Iledare, LSU Center for Energy Studies, reviews the significance and growing importance of deepwater activity and petroleum discoveries on U.S. domestic petroleum resources and supply. Iledare indicates that the significance and growing importance of the OCS deepwater to the U.S. domestic petroleum supply are evident in the proportion of the U.S. Gulf OCS resources, reserves and production that comes from deepwater (water depths greater than 200 meters).

Several energy analysts from the Baltic States of the small Baltic region in Northern Europe coauthored the article on the environmental aspects of the electric market management for three post-transition Baltic States, which they presented at the 24th Annual North American Conference of the USAEE/IAEE. They opined that the existing national and regional Baltic (Estonia, Latvia, Lithuania) electric energy market does not comply with the principles of the free market as it is implemented in the developed Western countries.

Finally, Dr. A. F. Alhajji, associate professor of economics at Ohio Northern University, presents a synopsis of the presentations by four prominent energy experts on world oil market management at the 24th Annual North American Conference of the USAEE/IAEE. Guy Caruso, Administrator of the US Energy Information Administration, presided over the plenary session entitled, “A New Era in Oil Market Management.” Other speakers include Claude Mandil, the Executive Director of the International Energy Agency, Luis Giusti, Senior Advisor, Center for Strategic and International Studies and the previous head of PDVSA, and Al Hegburg of Scowcroft Associates.

As always, members are requested to submit short articles for publication in the USAEE Dialogue. The editor welcomes policy or analytical debates on topical issues of energy concerns between two experts. We would also be delighted to publish your recent research effort on energy policy issues and problems. Send us abstracts of your most recent working papers and unpublished and published research papers. Further, we want to publish short articles on research centers (academic, government laboratories, etc) around the country working on energy economics and related fields. Thus, in this edition we have presented a short précis on the Center for Energy Studies at Louisiana State University, Baton Rouge, LA.

Please send new articles, notices, news of chapter events, and relevant energy news to the editor via e-mail (wumi@lsu.edu), by fax (225-578-4541) or by regular mail (Center for Energy Studies, 1107 Energy, Coast and Environment Building, Louisiana State University, Baton Rouge, LA 70803).

Wumi Iledare

President's Message (continued from page 3)
been doing a great job for the annual USAEE meeting that will be at the beautiful Interlocken Resort, September 18-21, 2005. I hope to see everyone there. I hope especially again to see many younger members and students. Fresh blood and fresh ideas will help keep us vibrant and relevant.

Thanks to all the support I’ve had, my term as your president has been an immensely gratifying one. I can only wish incoming president Marianne Kah as fulfilling a year as I’ve had.

Mine Yucel

USAEE News
Editor's Corner

Conference Proceedings on CD Rom
24th North American Conference
Washington, DC, USA, 8-10 July, 2004

The Proceedings of the 24th North American Conference of the USAEE/IAEE are available from USAEE Headquarters on CD Rom. Entitled Energy, Environment and Economics in a New Era, the price is $100.00 for members and $150.00 for nonmembers (includes postage). 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 @ $100.00 each (member rate) $150.00 each (nonmember rate).
Total enclosed $________ Check must be in U.S. dollars and drawn on a U.S. bank, payable to IAEE.
Dialogue Disclaimer

USAEE is a 501(c)(6) corporation and neither takes any position on any political issue nor endorses any candidates, parties, or public policy proposals. USAEE officers, staff, and members may not represent that any policy position is supported by the USAEE nor claim to represent the USAEE in advocating any political objective. However, issues involving energy policy inherently involve questions of energy economics. Economic analysis of energy topics provides critical input to energy policy decisions. USAEE encourages its members to consider and explore the policy implications of their work as a means of maximizing the value of their work. USAEE is therefore pleased to offer its members a neutral and wholly non-partisan forum in its conferences and web-sites for its members to analyze such policy implications and to engage in dialogue about them, including advocacy by members of certain policies or positions, provided that such members do so with full respect of USAEE’s need to maintain its own strict political neutrality. Any policy endorsed or advocated in any USAEE conference, document, publication, or website 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.

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 Washington Conference, twenty-seven 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.

2004’s student scholarship fund has been generously provided by the support of the following organizations/individuals:

ConocoPhillips
ExxonMobil Corporation
Robert Borgstrom
Leonard Coburn
Joseph Dukert
Michael Lynch
Margarita Pirovska
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 2005 North American meeting in Denver, CO, September 18-21. Contributions have ranged from $50 to $2500. If you would like to receive information on how your or your company can become a supporter of this program, please contact Dave Williams, USAEE Executive Director at (p) 216-464-2785, (f) 216-464-2768, or usaee@usaee.org

Conference Proceedings on CD Rom
23rd North American Conference
Mexico City, Mexico October 19-21, 2003

The Proceedings on CD Rom from the 23rd Annual North American Conference of the USAEE/IAEE held in Mexico City, Mexico are now available from USAEE Headquarters. Entitled Integrating the Energy Markets in North America: Issues & Problems, Terms & Conditions, the price is $100.00 for members and $150.00 for nonmembers (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. Please complete the form below and mail together with your check to: Order Department, USAEE Headquarters, 28790 Chagrin Blvd., Suite 350 Cleveland, OH 44122, USA.

Name ____________________________
Address ___________________________
City, State, Mail Code and Country ___________________________

Please send me _____ copies @ $100.00 each (member rate) $150.00 each (nonmember rate).
Total enclosed $__________
Check must be in U.S. dollars and drawn on a U.S. bank, payable to USAEE.
USAEE BEST STUDENT PAPER AWARD GUIDELINES

USAEE is pleased to once again offer an award for the Best Student Paper on energy economics. The award will consist of a $1000.00 cash prize plus waiver of conference registration fees at the 25th USAEE/IAEE North American Conference, September 18-21, 2005. To be considered for the USAEE Best Student Paper Award please follow the below guidelines.

- Student must be a member of USAEE or IAEE in good standing.
- Electronically Submit COMPLETE paper by June 30, 2005 to USAEE Headquarters.
- Paper MUST be original work by the student (at least 50% of work completed by the student seeking award).
- Submit a letter stating that you are a full-time student and are not employed full-time. The letter should briefly describe your energy interests and tell what you hope to accomplish by attending the conference. The letter should also provide the name and contact information of your main faculty supervisor or your department chair. Also, include a copy of your student identification card.
- Submit a brief letter from a faculty member, preferably your main faculty supervisor, indicating your research interests, the nature of your academic program, and your academic progress. The faculty member should state whether he or she recommends that you be awarded the scholarship funds.

Complete applications should be submitted to the USAEE Headquarters office no later than June 30, 2005 for consideration. Please submit all above materials electronically to usaee@usaee.org

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

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

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25th USAEE/IAEE NORTH AMERICAN CONFERENCE
STUDENT SCHOLARSHIPS AVAILABLE

USAEE is offering a limited number of student scholarships to the 25th USAEE/IAEE North American Conference. Any student applying to receive scholarship funds should:

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

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

USAEE scholarship funds will be used only to cover conference registration fees for the 25th 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 31, 2005. 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
Do Gasoline Taxes and Fuel Economy Standards Increase Economic Efficiency?

By Ian W.H. Parry*

This article provides a discussion of the economic efficiency, or social welfare effects, of higher gasoline taxes and passenger vehicle fuel economy standards. The focus is mainly on externality arguments for these policies, and mainly on the United States. The bottom line is that higher fuel taxes are readily justifiable, although, even if politically feasible, there are far better approaches to addressing problems associated with gasoline and motor vehicle use. Higher fuel economy standards appear much harder to justify on pure efficiency grounds, even if consumers undervalue future fuel savings from better fuel economy.

Optimal Gasoline Taxes

Externality Considerations. The major passenger vehicle externalities can be classified into those that vary with fuel use—carbon emissions and oil dependency—and those that vary with vehicle miles driven—traffic congestion, accidents, and local tailpipe emissions.1 It seems reasonable to assume that local pollution is proportional to mileage rather than fuel use, given that emissions standards on new passenger vehicles are defined in grams per mile and that emission deterioration rates over vehicle lifetimes are similar for vehicles with different fuel economy initially subject to the same emissions standards (Fischer et al. 2004).

The following formula can be derived for the optimal gasoline tax to address motor vehicle externalities (Parry and Small 2002):

\[
\text{Externality tax, cents/gallon} = \frac{\text{Cost of externalities proportional to fuel use, cents/gallon}}{\text{Miles per gallon}} + \frac{\text{Cost of externalities proportional to mileage, cents/mile}}{(\text{Miles per gallon})} \times \frac{\text{Fraction of the reduction in gasoline use due to reduced mileage}}{\text{Miles per gallon}}
\]

A crucial, and frequently neglected, point is that over the long run, only a portion of a tax-induced reduction in fuel use will come from reduced driving; another portion will come from improvements in average fleet fuel economy as people shift to smaller vehicles or manufacturers incorporate fuel saving technologies. The smaller the portion that comes from reduced driving, the smaller the portion that comes from improvements in average fleet fuel economy as people shift to smaller vehicles or manufactures incorporate fuel saving technologies. The smaller the portion that comes from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving; another portion will come from reduced driving.

For the marginal external cost of oil dependency we will also follow NRC (2002) and use a value of $5 per barrel of oil or 12 cents per gallon of gasoline. Their assessment was mainly based on an extensive analysis by Leiby et al. (1997) which quantified expected external disruption costs from the risk of oil price shocks as well as the “optimum tariff” due to US monopoly power in the world oil market. The estimate may have gone up significantly over the last two years, given political developments in the Middle East and heightened risks of terrorist attacks on oil supply infrastructure, although there have been no recent studies on which to base an assessment.

For marginal congestion costs we will adopt a value of 6 cents per mile, based on Fischer et al. (2004) who average across times of day, and across all cities in the United States, using extrapolations from a model of the metropolitan Washington DC road network.4 For accidents, we will assume a value of 4 cents per mile based on Miller et al. (1998), a study that attempts to separate internal accident costs (e.g., own driver injury risk) from external costs (e.g., pedestrian injuries, a portion of property damages, emergency services, etc.). An unsettled issue in the accident literature is whether the presence of one driver on the road raises the severity-adjusted accident risk for other drivers: additional driving by one motorist raises the likelihood that other drivers will crash, however if people drive slower or more carefully in heavier traffic a given accident will be less deadly. This affects the extent to which injuries to other drivers should be counted as an external cost. For local pollution we will adopt a value of 2 cents per mile based on the review in Parry and Small (2002); this mainly reflects mortality effects.

On-road fuel economy is currently around 20 miles per gallon.5 And based on long run estimates of the elasticity of mileage and fuel economy with respect to fuel prices, we follow Parry and Small (2002) and assume that 40% of the long run tax-induced reduction in fuel use will come from reduced driving (and 60% from improved fuel economy).

Plugging all these values into the above formula yields an externality tax of $1.20 per gallon. This is three times the cur-

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*Ian Parry is a Senior Fellow at Resources for the Future. His research focuses on environmental, transportation and tax policies. He can be reached at parry@rff.org. Parry is grateful to Joel Darmstadter for helpful comments on this article.

See footnotes at end of text.
rent federal and (average) state tax of about 40 cents per gallon. This optimal tax computation is obviously sensitive to different parameter assumptions, and estimates of parameter values change over time. Nonetheless, based on a "best assessment" of current evidence, there appears to be a solid case for substantially higher fuel taxes on economic efficiency grounds.

Note that the combined fuel-related externalities amount to "only" 24 cents per gallon, well below the current fuel tax. Were it not for the mileage-related external costs, and leaving aside controversies over external cost measurement, it seems that fuel taxes would actually be too high on economic efficiency grounds! Mileage-related externalities amount to 12 cents per mile or $2.40 per gallon (before scaling them back by 60% in the optimal tax formula); in terms of magnitude they are ten times the fuel-related external costs.

Revenue Considerations. A recent literature in environmental economics has emphasized the importance of considering the linkages between externality-correcting taxes and the broader fiscal system (e.g., Goulder 1999). On the one hand, externality taxes raise revenue for the government, which can result in large efficiency gains if revenues are used to reduce other taxes, such as income taxes that distort labor markets. On the other hand, by raising product prices, taxes effectively depress (very slightly) real returns to work effort and labor force participation, which compounds efficiency costs from labor tax distortions. For most product taxes, the latter welfare loss exceeds the welfare gain from revenue recycling; this means that it is usually less costly in terms of economic efficiency for the government to finance its budget through broad income taxes, rather than narrowly based taxes on specific products.

However gasoline seems to be a special case given that, in the jargon of optimal tax theory, it is a relatively weak substitute for leisure. Recent analyses that consider both externalities, and the appropriate balance between excise taxes and income taxes in financing the government’s budget, put the optimal gasoline tax at around 15 to 25 cents per gallon higher than the pure externality-correcting tax (West and Williams 2003, Parry and Small 2002).  

Are European Fuel Taxes too High? Gasoline taxes in many European countries are several times those in the United States, equivalent to between $2 and $3 per gallon. But these rates exceed our optimal tax assessment for the United States. Does this mean that Europeans overtax fuel?

In principle there are some reasons why tax rates should be higher. European countries have higher population densities so marginal congestion costs could be greater and they have stronger preferences for public spending, implying higher revenue requirements a share of GDP. A more subtle point is that vehicles have greater miles per gallon, which magnifies the contribution of mile-related external costs in the above optimal tax formula.

Nonetheless, despite these factors, Parry and Small (2002) find that gasoline is still overtaxed in the case of the United Kingdom (which has the highest tax in Europe); they compute the optimal gasoline tax for the United Kingdom at about half the existing tax. Perhaps paradoxically, the overall burden of taxation on UK motorists is not excessive in their analysis; if taxes were levied on mileage rather than fuel, which would target mileage-related externalities more directly, they estimate the optimal mileage tax would be approximately equivalent to the current fuel tax. In fact, they find more could be gained in social welfare from swapping gasoline taxes for mileage taxes, even with no change in the overall burden of taxation on driving, than from reducing the UK gasoline tax to its optimal level.

Fuel Economy Standards

In a highly aggregated framework, Fischer et al. (2004) show that the welfare effects of tightening fuel economy standards on new passenger vehicles can be decomposed into three main components. First is the welfare change in the gasoline market, given by:

\{The aggregate reduction in gasoline demand, in gallons\} ×

\{The cost per gallon of externalities proportional to fuel use – The gasoline tax\}

If external costs per gallon exceed the gasoline tax, the inward shift of the gasoline demand curve improves economic efficiency, because drivers are currently undercharged for fuel use. But if external costs per gallon are less than the gasoline tax, the reduction in gasoline demand is actually welfare reducing, because drivers are already overcharged for fuel use. The latter is applicable, given fuel taxes of 40 cents per gallon, and if we follow the National Academy of Sciences panel and assume combined external carbon and oil dependency costs of 24 cents per gallon. In that case, the welfare loss amounts to 16 cents per gallon of fuel reduction.

If gasoline tax revenues are earmarked for highways rather than general revenue, the gasoline tax in the above formula becomes multiplied by the social benefit per dollar of extra highway spending. If the social benefit per dollar exceeds a dollar, the potential welfare loss from the reduction in gasoline demand is magnified, because the resulting reduction in gasoline tax revenue crowds out public spending with a high social value. Only if the social benefit per dollar is less than 60 cents, would there be a welfare gain from the reduction in fuel demand, given our externality assumptions. The latter seems unlikely. According to Shirley and Winston (2004), the average rate of return on highway projects is around 5% which is approximately, or a little below, the rate of return on capital. This suggests that the social benefit per dollar of highway spending is approximately, or only slightly below, a dollar.

The second welfare component is another welfare loss, due to the exacerbation of mileage-related externalities. It is simply:

{The increase in mileage as people drive their vehicles more when fuel costs per mile fall} ×

{External costs per mile from mileage-related externalities}

According to recent studies (e.g., Greene et al. 1999), the
increase in mileage, or rebound effect, is modest; however, the resulting welfare loss is still significant, because mileage-related externalities are so much larger than fuel-related externalities. If the proportionate increase in vehicle miles equals 15% of the proportionate reduction in gasoline use, and mileage-related external costs are equivalent to $2.40 per gallon, then the welfare loss will amount to 36 cents per gallon of reduced gasoline.

The third welfare effect is from the increase in fuel economy itself and is given by:

\[ \text{(Discounted fuel savings over vehicle lifetimes)} \]

\[ \text{(Cost of incorporating fuel saving technologies in new vehicles)} \]

A number of engineering studies, and the widely cited estimates in NRC (2002), suggest that there is a plethora of new and emerging technologies for which the discounted fuel saving benefits would substantially exceed the added vehicle costs. That is, the marginal benefit, shown by MB\(^a\) in Figure 1, would exceed the marginal cost, shown by MC\(^a\), over a substantial range of improved fuel economy above the current level. At first glance, this might suggest a welfare gain from (an optimally set) fuel economy standard of triangle abc in Figure 1, the gap between MB\(^a\) and MC\(^a\) integrated over the increase in fuel economy.\(^a\) However, this overstates the actual welfare gain in practice for two reasons.

\[ \text{Figure 1} \]

First, the market may adopt some of the fuel saving technologies in the absence of regulation. If vehicle buyers correctly perceive fuel saving benefits, they should be willing to pay for all fuel saving technologies for which the lifetime fuel savings exceed the added vehicle costs. In this case the market equilibrium without regulation would be at point b in Figure 1; any mandated increase in fuel economy above this point would be welfare-reducing.

However there are several reasons why consumers may undervalue fuel saving benefits: they may have excessive discount rates; they may only reckon fuel saving benefits over, say, the first 3 years of the (average) 14 year vehicle life span; or they may care far more about other vehicle attributes and are not fully informed about the benefits of better fuel economy. Suppose that the marginal benefit curve perceived by consumers is MB\(^b\) in Figure 1, well below the actual or true marginal benefit curve MB\(^a\). In this case market equilibrium without regulation would be at point d, leaving a potential welfare gain from mandating higher fuel economy of triangle ebd. But note that the potential welfare gain from policy intervention declines disproportionately with any market-driven increase in fuel economy. Suppose that MB\(^b\) is 40% of MB\(^a\)—a reasonable assumption if consumers count the first 3 years of fuel savings and we apply a 12% discount rate—then (using similar triangles) the area of ebd is 36% of the area of abc. That is, the potential welfare gain from higher fuel economy standards is 64% smaller than triangle abc.

The second reason for overstatement is that engineering studies may have underestimated the true economic costs of fuel saving technologies by ignoring their opportunity costs, that is, their possible value in enhancing other vehicle attributes, such as safety, power, payload and comfort.\(^b\) If consumers would value some technologies more if they were applied to other vehicle attributes rather than fuel economy, then the true marginal cost curve in Figure 1 is higher than MC\(^a\). Suppose that there would be no market driven increase in fuel economy in the absence of policy change. For this to be the case, and when consumers correctly perceive fuel saving benefits, the marginal cost curve must be MC\(^b\) in Figure 1. In this case any mandated increase in fuel economy would be welfare reducing, because MC\(^b\) lies above MB\(^a\). On the other hand, if consumers perceive the marginal benefit curve to be MB\(^b\), the marginal cost curve must be MC\(^b\) for there to be no market-driven increase in fuel economy, and equilibrium without policy intervention would be at point f. In this case there is a potential welfare gain of triangle aef from mandating the (optimal) fuel economy standard, though again this welfare gain may be much smaller than triangle abc.

We are left with three broad scenarios that span the possible welfare effects of tightening fuel economy, depending on how consumers value the benefits, and opportunity costs, of fuel saving technologies, both of which are highly contentious issues among analysts.\(^c\) First is that consumers correctly value fuel saving benefits and new technologies have no opportunity costs. In this case the market should adopt fuel saving technologies that pay for themselves as they emerge, undermining the effectiveness, and need, for fuel economy regulation. Second is that consumers correctly value fuel savings, but that they value new technologies more highly when used to enhance other vehicle attributes. In this case, mandates that induce manufactures to instead use new technologies for fuel economy improvements will reduce welfare, and by a potentially substantial amount when welfare losses from the increase in mileage and reduction in gasoline demand are also included. Third is that consumers substantially undervalue fuel saving benefits; even if new technologies have opportunity costs, there is a potential welfare gain from the increase in fuel economy above any market-driven increase (Figure 1). However, a sizeable portion of this welfare gain may be offset by welfare losses from the increase in mileage and reduction in gasoline, leaving perhaps
only a modest overall gain (Fischer et al. 2004).

We have left aside some potentially significant issues, such as potential welfare gains from the impact of fuel economy mandates on encouraging more innovation, and estimates of parameter values, particularly marginal costs of oil dependency and carbon emissions, may certainly increase over time. Moreover, policymakers may have other priorities than maximizing economic efficiency— their primary concern might be to pass on an economy less dependent on oil and carbon emissions to future generations, or to try and weaken the market power of OPEC. These are laudable goals, as it is highly troubling that higher fuel economy standards may not have a solid footing on economic efficiency grounds. Logically, this leads to a consideration of other options; although higher fuel taxes are currently off the political agenda, there are actually much better measures to address the problems of fuel and motor vehicle use.

Other Policy Options

With respect to global warming, motor vehicles account for “only” 20% of US carbon emissions. Upstream taxes on the carbon content of fossil fuels, or an equivalent system of tradable carbon permits, would be far more effective at reducing economy-wide emissions, than higher fuel taxes or fuel economy standards. But perhaps the best we can hope for at present is a more piecemeal approach, with specific measures targeted at downstream industries, such as legislation proposed by Senators John McCain and Joseph Lieberman to implement a cap-and-trade emissions control system on electricity generation, the dominant source of low-cost emission reductions.

However, “getting the price of emissions right” will not be enough to substantially dent future US carbon emissions, particularly given that coal, the most-carbon intensive fuel, is cheap and there is a lot of it. The challenge is to develop “clean coal” technologies that might involve, for example, separating carbon dioxide during coal combustion and storing it underground rather than releasing it into the atmosphere. Even with the right emissions tax, innovators in the private sector would not invest enough in such an R&D program, given the difficulty of appropriating all the benefits to other potential users of new technologies; hence the case for additional policy measures to encourage such R&D.

Gasoline accounts for less than half of all oil uses in the United States, so a broad tax on all oil would be far more cost effective approach to reducing oil intensity than raising only gasoline taxes. Based on the above discussion, a tax of around $5 per barrel of oil should be introduced, perhaps escalating over time. Again, the tax alone is not enough. Another strategy for reducing oil dependence over the long haul is to transition the vehicle fleet away from gasoline and towards alternative fuels, such as hydrogen. There is a case on economic efficiency grounds for subsidizing alternative fuels and vehicles (even if the ideal oil tax were implemented), given market barriers due to economies of scale in vehicle production and the highly limited distribution network for alternative fuels (Leiby and Rubin 2001). In addition, there appears to be a convincing efficiency rationale for expanding the Strategic Petroleum Reserve for use during major oil price disruptions (Leiby and Bowman 2000).

Finally, fuel taxes are a very blunt way to address external costs of traffic congestion and traffic accidents. The most effective way to reduce congestion is through electronic road pricing that varies over the time of day according the flow of traffic. Some initial steps are being taken in this direction with the opening up of existing high occupancy vehicle lanes to single occupant vehicles in exchange for a fee, and the tolling of new lane capacity. Besides raising penalties for drunk drivers, traffic accidents could be reduced by encouraging the adoption of pay-as-you-drive (PAYD) insurance. Driving costs for the average motorist would not increase under PAYD, as reduced lump-sum premiums compensate for higher per mile charges, so there should be less political opposition to the policy than to higher fuel taxes. And, paradoxically, PAYD could reduce gasoline demand by up to about 10% with a much higher gain in economic efficiency than under a gasoline tax that achieved the same fuel reduction (Parry 2004); this is because it targets mileage-related externalities more directly.

Footnotes

1 Another important externality is road damage; however vehicles cause road wear at a rate that is a sharply increasing function of the weight per axle, so that virtually all damage is attributed to heavy-duty commercial vehicles. There are many other externalities associated with automobile use, including noise, vehicle and tire disposal, policing needs, and upstream leakage from the petroleum industry. However, estimates of these external costs are small relative to those discussed above.

2 A gallon of gasoline contains 0.0024 tons of carbon.

3 It did not include US Persian Gulf military expenditure, as this is viewed more as a fixed cost that would not vary in proportion to modest reductions in US oil demand. Furthermore, although the potential market power of OPEC is substantial, this does not in itself create a “wedge” or distortion between marginal consumer benefit and marginal supply cost in the domestic US oil market, and therefore does not create a direct source of domestic efficiency gain from reducing US oil use.

4 This estimate also takes into account the weaker sensitivity of peak driving on congested roads (which is dominated by commuting) to fuel costs than off-peak driving.

5 We will leave aside the complication that miles per gallon will increase moderately over the long run in response to higher fuel taxes.

6 Another caveat is that we have ignored the potential role of higher fuel taxes in raising the costs of long commutes and reducing externalities associated with urban sprawl, such as loss of open space. However, the linkages between driving costs and sprawl are complex, and have not been factored into computations of optimal fuel taxes.

7 If additional revenues from higher fuel taxes were earmarked for highways rather than substituting for other taxes, the welfare gain from revenue use would be larger/smaller depending on whether the social benefits from using the revenue to pay for highway projects are larger/smaller than the social benefits from using them to reduce distortionary taxes. However, if gasoline taxes were ever raised to over a dollar per gallon, revenues raised would easily exceed highway spending requirements; thus the marginal revenue would go to the general government budget rather than being earmarked.

8 Additional welfare effects arise from changes in the composition of the vehicle fleet, given that external costs per mile, and the net
Benefits of improving fuel economy, differ across vehicles; however, these welfare effects are fairly minor in Fischer et al. (2004) relative to those discussed above. Their analysis abstracts from welfare effects due to changes in vehicle sales in the presence of price marginal cost mark-ups. Again, the relative magnitude of these welfare effects may be small, given that most of the improvement in fuel economy to meet higher standards comes from changes in vehicle technology rather than changes in the sales of fuel efficient versus fuel inefficient vehicles.

9 This point—that further reducing an externality is only welfare improving if prior policies fail to fully price for the externality—is a straightforward application of welfare analysis (e.g., Harberger 1974), but is frequently neglected in discussions of environmental and energy policies.

10 To simplify the discussion we will assume that existing fuel economy standards are non-binding. This may actually be a reasonable approximation, given that the car standard has remained at 27.5 mpg since 1985 and (leaving aside a recent ruling) the light-truck standard has remained at 20.7 mpg since 1995. We also simplify by approximating the marginal benefit and marginal costs by linear curves.

11 Emerging technologies identified as fuel saving technologies in an earlier National Academy of Sciences report, NRC (1992), including 4 valve per cylinder engines and 4- and 5-speed automatic transmissions, were widely introduced over the last decade yet new vehicle fleet fuel economy did not improve while average horsepower increased significantly. Engineering studies may also fail to capture many important costs of actually implementing a new technology, such as marketing, maintenance, consumer unfamiliarity, and retraining of mechanics.

12 Many economic analyses (e.g., Kleit 2004, CBO 2003) assume that (leaving aside externalities) the market would provide the efficient level of fuel economy without policy intervention. Those in the auto industry, on the other hand, often argue that consumers care very little about fuel economy. And some economic analyses allow for undervaluation of fuel economy (e.g., Greene and Hopson 2003).

13 There are many reasons, besides the potential efficiency gains from recycling emissions tax revenues, why emissions taxes would be a more preferable approach than carbon emission permits (e.g., Nordhaus 2003).

14 Even if it were allowed under World Trade Organization rules, and it did not induce any retaliation by foreign governments, a tax on Middle East oil imports into the United States would be inferior to a tax on all oil consumption. The major problem is the risk of macroeconomic disruptions due to oil price shocks; these disruptions depend more on the overall oil intensity of GDP rather than on the portion of oil that comes from foreign as opposed to domestic sources.

References


Leiby, Paul N. and David Bowman, 2000. The Value of Expanding the U. S. Strategic Petroleum Reserve. Oak Ridge National Laboratory, Oak Ridge, TN.


Do You Want to Start Your Own USAEE Chapter?

The requirements for starting a USAEE Chapter are straightforward – You must have a viable group of at least 20 individuals all of whom must join the USAEE and have organized to the point of adopting a set of bylaws and a group of elected officers. Sample bylaws can be requested and obtained by calling USAEE Headquarters at 216-464-2785. USAEE dues are $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 work or interest is in the field of energy economics. If you have any further questions regarding the establishment of a USAEE Chapter, please do not hesitate to contact David Williams at USAEE Headquarters, phone: 216-464-2785; email: usaee@usaee.org A complete Chapter start-up kit can be mailed to you.
Global Climate Change: Like It or Not, It is Here and It Won’t Go Away

By Fereidoon (Perry) Sioshansi*

Global climate change has been around for some time. First, as an issue to be considered, then as a scientific issue to be studied, then as an environmental policy issue to be endlessly debated. But in the past few months, it has metamorphosed into a significant risk factor to be addressed by the business community, especially for those in the energy sector. This article argues that the time for debate and equivocating has passed. Businesses engaged in exploration, development, transportation, conversion, or use of energy – and that includes nearly every one – must begin to address how their energy-related decisions and investments affect global climate change and vice versa. Those who do not, can no longer claim that they were not warned.

Day After Tomorrow

In the movie Day After Tomorrow, director Roland Emmerich portrays a scary picture of what might happen if we do not pay attention to potential consequences of climate change. But the movie’s gloomy picture fades in comparison to the future envisioned by the usually sober and business-focused John Coomber, head of Swiss Re, the world’s second largest re-insurance company.

Mr. Coomber’s portrayal of the future is far more sobering. He says there has already been “a detectable increase in the frequency and severity of weather-related events.” Since his company covers the losses suffered by other insurance companies, he is in a position to know. In an interview with The Financial Times (27 April 04), Mr. Coomber says, “I don’t feel any inclination to lecture or blame. But I’d like to encourage companies, he is in a position to know. In an interview with The Financial Times (27 April 04), Mr. Coomber says, “I don’t feel any inclination to lecture or blame. But I’d like to encourage greater awareness of what is happening.”

Dirty dozen

Greenhouse gas emissions of selected countries, million tons of CO₂ equivalent

2001 data for U.S., Russia, Japan, Canada & Australia
2002 data for EU 15, Germany, U.K., Italy, France, Spain, France, Italy, Spain & Ireland
Source: United Nations Framework Convention on Climate Change (UNFCCC)

Is this a self-promotion through scare tactics? Perhaps, but the likes of Mr. Coomber are not to be dismissed. Swiss Re, along with 20 large multinational corporations including BP, Lafarge, and DuPont have formed a partnership called The Climate Group, with partial funding from The Rockefeller Brothers Fund. At their opening meeting, which was attended by British Prime Minister Tony Blair in London in April 2004, the group announced its goal, “to build a world-leading coalition of reducers – companies, agencies, cities, states, provinces and countries – whose mitigation efforts demonstrate clear progress in cutting emissions.”

Frustrated by foot dragging on Kyoto Protocols and governmental inaction, notably by the US administration, members of the Climate Group have reached the conclusion that “practical action on addressing greenhouse gas emissions cannot wait for an international agreement.” Executive Director, Mr. Steve Howard is optimistic that the group’s message is gradually “beginning to reach a wider audience.”

How so? Swiss Re, which provides climate change liability policies for directors and officers of major corporations, says that 4/5 of the world’s 500 largest companies now believe that they will be affected by the impact of climate change. Surprisingly, however, only half have any plans to deal with the issues. Until recently, most companies did not expect climate change to have a significant impact on their business until after 2050 – beyond the horizon of any long-term plan. Now, perhaps due to the increased publicity and awareness of the issue exemplified by the movie Day After Tomorrow, “people realize it has immediate impacts,” according to Mr. Howard.

Big US Polluters

Top 10 coal burning utilities in the US, ranked by million tons of coal burned, 2002 data

<table>
<thead>
<tr>
<th>Company</th>
<th>Tons of Coal Burned</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Electric Power</td>
<td>55.3</td>
</tr>
<tr>
<td>Southern</td>
<td>42.7</td>
</tr>
<tr>
<td>Tennessee Valley Authority</td>
<td>41.8</td>
</tr>
<tr>
<td>Xcel Energy</td>
<td>32.3</td>
</tr>
<tr>
<td>TXU</td>
<td>29.4</td>
</tr>
<tr>
<td>Ameren</td>
<td>27</td>
</tr>
<tr>
<td>Edison Int'l</td>
<td>25.9</td>
</tr>
<tr>
<td>Cinergy</td>
<td>23.7</td>
</tr>
<tr>
<td>PacifiCorp</td>
<td>19.9</td>
</tr>
<tr>
<td>FirstEnergy</td>
<td></td>
</tr>
</tbody>
</table>

Source: US Environmental Protection Agency.

The motivations of companies like BP and DuPont to join The Climate Group and take other precautionary steps, however, are not entirely altruistic. They realize that sitting idle would limit their strategic options and may expose them to potentially larger risks – including the risks of getting sued by shareholders for failure to act in light of growing scientific evidence about climate change.

BP, which under the leadership of its chairman, Lord Browne, has adopted a stunning new green logo, claims that it has managed

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to hold its energy use constant between 1990 and 2000 while increasing output by 35%. Net cost? A reported saving of $2 billion. One can only wonder why more companies are not taking similar steps.

Fossil fuel exposure
Primary fuels for electricity generation in the U.S., percent*, 2002 data

- Coal: 52%
- Gas: 16%
- Nuclear: 21%
- Oil: 2%
- Other: 7%
- Hydro: 2%

* The numbers do not add to 100% due to rounding
Source: Energy Information Administration.

The problem may be that there aren’t enough forward-looking companies like BP and DuPont. Many companies take a short-term view of the future, or all chronically entangled in fighting yesterdays’ battles. World Economic Forum, in a report released in April 2004 cheered the voluntary efforts of “forward-looking multinationals” but concluded “current voluntary actions are inadequate to stem the tide of global warming.”

The Climate Group, however, maintains an optimistic outlook. Its members are convinced that the costs of action are greatly out weighed by the potential benefits. Moreover, they believe that the proliferation of unilateral and voluntary efforts to reduce emissions may “create an irresistible momentum for change.”

Another California First

If voluntary action is not sufficient, there aren’t enough forward-looking companies, and nations do not have the backbone to take the bold initiatives necessary to address global climate change, then how can we move forward? One example of decisions that will, in due course, make a big impact follows.

In late June 2004, the California Public Utilities Commission (CPUC), the state agency that regulates the investor-owned utilities (IOUs) in California, issued a little noticed directive that, for the first time – so far we know – requires utilities to consider climate change in their long-term plan filings.

The order instating rulemaking or OIR requires the IOUs in California to “address the following questions pertaining to climate change in their long-term plan filings”

- Describe the utility’s position regarding the extent of the threat posed by climate change, and the contribution of electricity generation to that threat.
- Describe any internal planning or measurement activities currently being undertaken to evaluate and address the threat of climate change, both generally and as a result of utility operations, including URG (utility retained generation) and power purchased under contract.
- Describe, to the fullest extent possible, the utility’s emissions profile with respect to the six criteria greenhouse gases: carbon dioxide (CO2); methane (CH2); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulfur hexafluoride (SF6). Include both URG and power purchased under contract.
- Describe any steps the utility has taken to minimize the release of these gases as a result of utility operations, and how the Procurement Plan advances this effort.
- Describe the utility’s position regarding the optimal policy response to the threat of climate change, and how your Procurement Plan is aligned with this policy response.

These are relatively few words for what, we believe, will be a significant milestone in electric utility resource planning. Climate change – up to now a topic of academic debate – will henceforth be something to reckon with, and California, has once again taken the lead.

If you fail at once, try again, and again, until you succeed. Frustrated by lack of policy direction, let alone concrete initiatives, from the Federal government, eight states filed a lawsuit in July 2004 to force a reduction of CO2 emissions from U.S. power plants. Using an obscure provision in federal common law of public nuisance, which allows plaintiffs a course of action to cut air or water pollution, the states filed a suit in the federal district court in New York City.

In another precedent-setting move, the states of California, Connecticut, Iowa, Rhode Island, New Jersey, New York, Vermont and Wisconsin have sued five major US electric compa-
nies to force a reduction in CO₂ emissions, widely believed to contribute to global climate change. Interestingly, the states of are not seeking monetary damages but are asking the court to force the companies to reduce their CO₂ emissions.

The five companies being sued are among the top coal burning U.S. power companies including American Electric Power Company (AEP), the Southern Company, Tennessee Valley Authority (TVA), Xcel Energy and Cinergy Corporation. Together, they own or operate 174 fossil fuel-burning power plants in 20 states spewing over 650 million tons of CO₂ into the atmosphere annually. Why go after these five? Because together, they account for roughly 25% of the US power sector’s CO₂ emissions and 10% of total US CO₂ emissions. As the saying goes, if you are after money, you should rob the bank. In this case, if you wish to reduce CO₂ emissions, you go after the big emitters.

In a letter to the Editor of the Wall Street Journal (18 Aug 04), the group explained the reasons behind their decision to file suit: “In spite of clear scientific agreement that global warming is real and its consequences dire, the federal government has refused to act – ignoring the science and catering instead to special interests that want the problem ignored.” Ouch! The letter goes on to say, “We seek not a cent in damages. We want significant reductions in the CO₂ emissions that threaten to sicken our citizens, damage our economies and devastate our environment.” This is plain and simple.

Speaking on behalf of the group of eight, New York’s Attorney General, Mr. Eliot Spitzer, said the emissions were “a serious contributor to global warming which threatens people’s health, the economy, natural resources and the future of children.” That pretty well sums it up, does it not?

Environmental groups were elated. Frank O’Donnell, Executive Director of Clean Air Trust, an environmental advocacy group, praised the lawsuit saying “It is a bold attempt by these states to take some sort of positive action because the Bush administration has done nothing but stonewall on these issues.” It is a view shared by many in the environmental community who are not happy with the current administration’s less-than-aggressive stand on curbing CO₂ emissions.

Global Warning

Average Northern Hemisphere Surface Temperature, Selected Years, degrees F

![Graph showing average Northern Hemisphere Surface Temperature](source: The National Geographic, Sept 04)

Will the lawsuit make a difference? As described below, the case against CO₂ – if we may be excused for making an im-

perfect analogy – this is not dissimilar to those who went after the big tobacco companies several years ago, knowing that the odds were against them. In the end, they prevailed, and new restrictions were placed on marketing and sale of cigarettes. The challenge facing those who wish to curb CO₂ emissions are even more daunting, and it is not clear what is the best way to bring about a change. But those who are determined will try, and try again, until they succeed.

Such moves resonate well with an increasing number of voters in many developed countries, and a growing number of people in developing countries, who are simply fed-up with their political leaders’ inaction and/or indifference. The litigants said, “The state and local governments are acting to protect their citizens’ health, public and private property, and environment from global warming in the wake of the refusal of the President and the Congress to address one of the most serious problems facing our nation.”

AEP Bets on Clean Coal, and So Does GE

 Barely a month after the lawsuit was announced, the biggest US CO₂ emitter, American Electric Power Company (AEP), announced its intention to clean up its act while betting its future on continued reliance on coal.

This is certainly not to suggest that the lawsuit caused AEP to buckle under pressure, but there is no denying that AEP has been under increased pressure for some time as the biggest emitter of CO₂ in the country – not a distinction any companies would cherish to have.

Where do we start to cut the CO₂?

Total annual CO₂ emissions by the US, the US power industry, and AEP, the single largest US emitter, in millions of metric tons

![Graph showing total annual CO₂ emissions](source: Energy Information Administration & AEP)

Not surprising, in early September 2004, AEP announced that it was “considering” building the largest clean coal technology power plant over the “next 5-6 years.” The plant would convert coal into synthetic gas before burning it in what is essentially a combined cycle plant. The gasified coal is not as high grade as natural gas, but it burns cleanly. The new technology, integrated gasification combined cycle or IGCC, would have much reduced emissions of CO₂ per unit of output as well as significantly lower mercury and soot emissions. What’s the catch? It will cost significantly more than a conventional coal-burning plant. AEP estimates that the proposed 1,000 MW plant would have a sticker price of $1.6 billion, at least 20% more than conventional technology.

Has AEP turned green under pressure from the environmentalists? That is certainly a factor, but the real pressure,
one can surmise, is economic. With 26,000 MW of coal-fired capacity on its hands, and plans to build more, AEP is simply too exposed. Should there be a change in US policy in putting a cap on CO$_2$ emissions, for example, AEP would find itself in a bind. That is not all. A group of its own shareholders have been putting increased pressure on the management to pay more attention to environmental issues, notably global climate change. AEP management must realize that the day of reckoning is coming, and when it does, the company will be in an unenviable position with most of its eggs in the coal basket.

In announcing the company’s plans, AEP’s CEO, Mr. Michael Morris, explained the cold logic of the decision, “Over the life of the plant, with environmental regulations probably getting stiffer over the years, you’ll be very pleased that you spent the up-front money. You end up with a tremendous amount of coal-buying flexibility.”

AEP’s announcement was music to the ears of the coal lobby as well as the Bush Administration, who has long sought a clean-coal technology breakthrough. America is blessed with vast reserves of coal – if it could only find an environmentally benign way to use it. If AEP succeeds to make a go of its IGCC plant, others are likely to follow.

If it were only cleaner

![Graph: Coal consumption in US electric power sector, 1970-2025, million short tons](source: Energy Information Administration, Annual Energy Outlook 2004)

Relying on the IGCC technology, however, is a risky bet. The technology has never been tried on such a scale before. Previous attempts at coal gasification have been on experimental basis with heavy government subsidies and on a much smaller scale. The basic technology is known to work, but the costs have been relatively high – at least on small-scale applications. The costs of AEP’s proposed plant remain speculative at best.

But as the AEP’s decision demonstrates, the options are limited and the stakes are high. Perhaps more significantly, procrastination is no longer an option.

Barley a month after AEP’s announcement, General Electric Company (GE) joined the clean coal technology bandwagon. In early October 2004, GE announced the formation of a partnership with the world’s largest engineering and construction firm, Bechtel Corp., to design and build standardized coal gasification technology plants. The two firms believe that the new technology could be made cost competitive with conventional pulvzerized coal by the end of the decade. Incidentally, AEP and Cinergy Corp. two of the five firms named in the lawsuit, are among the first two utilities who have expressed interest to work with GE.

Why would GE jump into the clean coal technology fire? It is economics. Coal generation business is worth at least $25 billion per year, according to GE, and coal gasification technology could grow to $1 billion per year business by 2010 – and likely to grow once it becomes cost competitive with conventional coal plants. The world’s premier manufacturer of turbines for power plants simply cannot afford to let this lucrative emerging business to go unattended.

Conference Board Puts the Nail on the Coffin

When an issue is finally recognized and acknowledged, it is amazing how quickly it becomes mainstream. Within a few short years, smoking on planes went from being free, to being restricted, to being entirely banned. Now, nobody even thinks of smoking on a plane – period. Global warming, it is argued, is on the verge of going through a similar rapid evolution and adaptation. If British Petroleum (BP) can refer to its famous initials as beyond petroleum, and if AEP is planning to convert to clean coal technology, there is hope on the horizon.

Perhaps an indicator of the changes yet to come was the adoption of an unusually unambiguous stand on global climate change by the New York-based Conference Board. The non-profit organization of some 2,000 of the world’s largest corporations is not the sort of place that looks for controversy or would take an anti-business stand on, say, environmental issues. Yet in September 2004, it released a report which, in no uncertain terms, concluded that there is “increasing scientific consensus” that human activity is “contributing to warming of the planet” and predicted “increased pressure” on corporations and their boards to “address” the global climate change issue.

While none of this is new, and while the Conference Board had issued a less alarming warning on the same topic two years ago, the language of the new report is unequivocal. In no uncertain terms, the new report warns that, among other things, “businesses that ignore the debate over climate change do so at their peril.” (emphasis added) What are the implications of this announcement? No responsible board member of a major multi-national corporation is safe from potential malpractice lawsuits or charges of fiduciary negligence if the corporation does not take the necessary steps to “address” global climate change. The implications are especially ominous for energy companies, notably those who emit large quantities of CO$_2$ into the atmosphere, in one form or another.

Ironically, the Conference Board’s report was released shortly after the Bush Administration acknowledged essentially the very same thing, namely, that human activities are contributing to global warming. But despite concluding that warmer temperatures in North America over the past half century “were unlikely to be due to natural climate variations”, (emphasis added) the Administration is unwilling to take any concrete measures to “address” the problem as the Conference Board, and much of the scientific community have suggested.

Many view the Administration’s own conclusions and its policy position on global climate change as self-contradictory, but not Mr. John Marburger, the Director of the White House Office of Science and Technology Policy. In talking to reporters
in September, he tried his best to suggest that there has been no change in the Administration’s position – although the language of the latest report is in fact significantly different than previous ones on the subject. He said, “The link between human activity and climate change is generally acknowledged by this Administration,” but went on to say, “It depends on how explicit you want to be. But it doesn’t make sense for the President to be asking for billions of dollars to be spent on mitigating CO$_2$ if we didn’t think there was some link.”

**States take initiative while the federal government procrastinates**

Selected state level initiatives proposed or pending

<table>
<thead>
<tr>
<th>State</th>
<th>Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oregon</td>
<td>Limits CO$_2$ emissions for new or expanded power plants to a level that is 17% below the most efficient natural-gas fired plant in the U.S.</td>
</tr>
<tr>
<td>California</td>
<td>Bellwether law caps emissions from new cars and trucks starting in 2009; the auto industry plans to sue to block it.</td>
</tr>
<tr>
<td>New Hampshire, Massachusetts</td>
<td>Cap CO$_2$ emissions from certain power plants that run on fossil fuels.</td>
</tr>
<tr>
<td>Maine, New Jersey</td>
<td>Set specific goals to reduce greenhouse-gas emissions statewide. New Jersey’s goal: 3.5% below 1990 levels by 2005. Maine’s goal: 1990 levels by 2010, and 10% below 1990 levels by 2020.</td>
</tr>
</tbody>
</table>

Source: The Wall Street Journal, 11 Dec 03.

With the Bush Administration procrastinating, a number of states have decided to take initiatives of their own. A coherent national policy, however, would make more sense and be more effective.

Those who continue to argue for solid scientific proof are not likely to get it any time soon. And those who acknowledge that there is a link between CO$_2$ emissions and global climate change, must begin to address the consequences. As the Conference Board has concluded, the time to sit on the fence and vacillate has come to a close.

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#### 22nd North American Conference

Vancouver, BC, Canada, October 6-8, 2002

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By Omowumi O. Iledare*

Introduction:

In the early 1990s, the Gulf of Mexico (GOM) was considered a dead petroleum basin nearing the end of its productive life. Industry analysts thought the region could only attract small investors; the chance of any big discoveries was unlikely. However, the GOM OCS has re-emerged as a global petroleum frontier and is now the focal point of oil and gas activity in the U.S. The GOM region currently accounts 28% of the U.S. total domestic oil and 23% of natural gas production. The region also accounts for most new additions to petroleum reserves in the U.S. It is reported that 97% and 82%, respectively, of all new field discoveries of crude oil and dry natural gas in 2002 were discovered in the GOM OCS Federal Offshore.¹

The reasons for this turn around in the status of the GOM OCS are attributed to technical advancements in offshore drilling and production technology. Areas in the Gulf of Mexico, once thought beyond reach in terms of water depth, are now explored and developed successfully, even at lower than expected costs. In addition, leasing activity in the deepwater has increased significantly as a result of economic incentives, specifically the Deepwater Royalty Relief Act of 1995 (DWRRA). It is estimated that without the increase in deepwater GOM production, the overall decline in U.S. oil production over the past five years would have been more than double. New incentives to encourage natural gas development in hard to reach areas of the Gulf of Mexico are an integral part of the U.S. Administration’s National Energy Plan of 2003.

The significance and growing importance of the OCS deepwater to U.S. domestic petroleum supply is evident in the proportion of GOM reserves and production that comes from deepwater (water depths greater than 200 meters). Deepwater now produces more than 60 percent of total GOM oil production and about 30 percent of gas production. The annual trends in deepwater share of GOM oil and gas proved reserves and production are described in Figures 1a and 1b, respectively. In 1992, crude oil production and reserves from OCS deepwater accounted for 17.2 and 30.4 percent of the total OCS crude oil production and reserves, respectively. These ratios, however, increased to 63.9 and 75.9 percent, respectively by 2002. Similarly, the proportion of OCS gas production and reserves accounted for, by production and reserves from OCS deepwater reservoirs, increased from 3.6 percent in 1992 to 30.0 percent in 2002 and 12.1 percent in 1992 to 41.6 percent in 2002, respectively.

This article reviews the significance and growing importance of deepwater activity and petroleum discoveries on U.S.

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See footnotes at end of text.
deepwater oil and gas resources are still available for discovery in the deepwater. In comparison, the estimated ultimate recoverable oil and gas resources in the shallow Gulf (water depth < 200 meters) are 18.939 Bbbls and 258.305 Tcf. About 26 percent of both resources can be classified as undiscovered but conventionally recoverable oil and gas resources. Figures 2a and 2b depict the distribution of the ultimate recoverable reserves for OCS deepwater and the shallow shelf. There are now high expectations for big discoveries and higher success rates in the deepwater than in the shallow waters. This tendency is evident in lease sales statistics presented in Figure 3.

**OCS Petroleum Production Potential**

The potential for growth in oil and gas production in the OCS is also supported by total reserves reported in Table 1 and discoverable reserves displayed in Figure 2b. Figures 4a and 4b provide the projections published by MMS for shallow and deepwater oil and gas production in the Gulf under two scenarios and several inbuilt assumptions. The primary assumption upon which the high case scenarios are based is that shallow water depletion effects will be offset by new drilling and production technology. The low case scenarios, on the other hand, assume shallow water depletion rates that are comparable to the previous sustained period of depletion for oil and gas in the OCS.

**Figure 3**

**Gulf of Mexico Lease Sales Statistics—Bids Received, 1999-2002**

**Figure 4a**

**Daily Projected Shallow and Deepwater Oil Production in GOM**

It is useful to note the important elements of both stability and changes with respect to the exploration and production (E&P) industry in the GOM even as the development of the deepwater Gulf resources approaches its full potential. Figures 5a and 5b show the annual and cumulative production of the top-30 operators, in each category, since offshore development began in the late 1940s. The figures also indicate that Chevron, Shell, and ExxonMobil, who are currently the leading oil and gas producers in the Gulf of Mexico, and are responsible for a corresponding substantial share of cumulative production, provide some stability. The companies have been consistently involved with OCS oil and gas development for years.

However, comparing annual and cumulative production also reveals significant changes in the offshore industry. According to Pulshipher et al., BP is a top-five producer nowadays, but as a relative newcomer to the Gulf of Mexico, the
Table 1
Estimated and Calculated Ultimate GOM Petroleum Resources

<table>
<thead>
<tr>
<th>OCS Resources / Components</th>
<th>1/1/2000</th>
<th>1/1/2003</th>
<th>Change, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow-water Gas (SW Gas), Tcf</td>
<td>56.724</td>
<td>69.605</td>
<td>22.7</td>
</tr>
<tr>
<td>Recoverable Undiscovered Resources (RUC)</td>
<td>1.014</td>
<td>0.639</td>
<td>(37.0)</td>
</tr>
<tr>
<td>Total Recoverable Reserves</td>
<td>22.888</td>
<td>14.423</td>
<td>(37.0)</td>
</tr>
<tr>
<td>Unproved Recoverable (U)</td>
<td>48.942</td>
<td>30.841</td>
<td>(37.0)</td>
</tr>
<tr>
<td>Proved Recoverable (P)</td>
<td>128.736</td>
<td>142.797</td>
<td>10.9</td>
</tr>
<tr>
<td>Appreciation P&amp;U</td>
<td>151.624</td>
<td>157.220</td>
<td>3.7</td>
</tr>
<tr>
<td>Cumulative Production</td>
<td>258.304</td>
<td>258.305</td>
<td>0.0</td>
</tr>
<tr>
<td>Proved Ultimate Recovery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Ultimate Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deepwater Gas (DW Gas)</td>
<td>134.903</td>
<td>124.898</td>
<td>(7.4)</td>
</tr>
<tr>
<td>Recoverable Undiscovered Resources (RUC)</td>
<td>4.088</td>
<td>2.846</td>
<td>(30.4)</td>
</tr>
<tr>
<td>Total Recoverable Reserves</td>
<td>7.146</td>
<td>10.266</td>
<td>43.7</td>
</tr>
<tr>
<td>Unproved Recoverable (U)</td>
<td>19.154</td>
<td>22.355</td>
<td>16.7</td>
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<tr>
<td>Proved Recoverable (P)</td>
<td>3.941</td>
<td>8.867</td>
<td>125.0</td>
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<tr>
<td>Appreciation P&amp;U</td>
<td>11.087</td>
<td>19.133</td>
<td>72.6</td>
</tr>
<tr>
<td>Cumulative Production</td>
<td>169.232</td>
<td>169.232</td>
<td>0.0</td>
</tr>
<tr>
<td>Proved Ultimate Reserves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Ultimate Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shallow-water Oil (SW Oil)</td>
<td>4.912</td>
<td>4.980</td>
<td>1.4</td>
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<tr>
<td>Recoverable Undiscovered Resources (RUC)</td>
<td>0.031</td>
<td>0.040</td>
<td>28.8</td>
</tr>
<tr>
<td>Total Recoverable Reserves</td>
<td>1.381</td>
<td>1.072</td>
<td>(22.4)</td>
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<tr>
<td>Unproved Recoverable (U)</td>
<td>2.610</td>
<td>2.055</td>
<td>(21.3)</td>
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<td>Proved Recoverable (P)</td>
<td>10.006</td>
<td>10.792</td>
<td>7.9</td>
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<tr>
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<td>11.387</td>
<td>11.864</td>
<td>4.2</td>
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<tr>
<td>Cumulative Production</td>
<td>18.939</td>
<td>18.939</td>
<td>0.0</td>
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<tr>
<td>Proved Ultimate Reserves</td>
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<td></td>
</tr>
<tr>
<td>Estimated Ultimate Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deepwater Oil (DW Oil)</td>
<td>32.214</td>
<td>28.447</td>
<td>(11.7)</td>
</tr>
<tr>
<td>Recoverable Undiscovered Resources (RUC)</td>
<td>0.964</td>
<td>0.565</td>
<td>(41.4)</td>
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<tr>
<td>Total Recoverable Reserves</td>
<td>1.977</td>
<td>3.372</td>
<td>70.6</td>
</tr>
<tr>
<td>Unproved Recoverable (U)</td>
<td>5.126</td>
<td>6.862</td>
<td>33.9</td>
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<tr>
<td>Proved Recoverable (P)</td>
<td>0.902</td>
<td>1.938</td>
<td>114.9</td>
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<tr>
<td>Appreciation P&amp;U</td>
<td>2.879</td>
<td>5.310</td>
<td>84.4</td>
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<tr>
<td>Cumulative Production</td>
<td>41.184</td>
<td>41.184</td>
<td>0.0</td>
</tr>
<tr>
<td>Proved Ultimate Reserves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Ultimate Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The author calculated the 1/1/2003 estimates from the 1/1/1999 estimates by MMS in 2001.

Company still ranks only 23rd in cumulative production. Conoco, an offshore pioneer, ranks 26th in annual production but it remains among the top-five in cumulative production. Seven of the today's top-30 annual producers have not produced enough to be ranked amongst the top-30 cumulative producers. In 1980 the combined production by all non-top-30 producers ranked 16th in terms of annual production. Currently, the combined group ranks second. Certainly, there are quite a lot of “new kids on the block” as far as GOM operations are concerned. In fact, Baud, et al. reported that non-majors currently own about 25 percent of deepwater GOM oil production and 30 percent of natural gas.
production. In addition they now produce more oil than the majors in shallow-water GOM and an increasingly larger share of total shallow-water gas production. The logical implication of all these changes is that the major companies are providing the driving forces underlying the evolving success of deepwater resource developments, as they tend to concentrate more in the development of deepwater Gulf resources for their production.

Summary and Concluding Remarks

According to public data published annually by US DOE/EIA and MMS, the estimated proved and dry gas reserves in the Gulf of Mexico OCS region as of January 1, 2003 were approximately 19.1 billion barrels and 150.7 trillion cubic feet, respectively. The OCS region currently accounts for a considerable proportion of the U.S. total domestic oil (28%) and natural gas (23%) production as well as most new additions to petroleum reserves in the U.S. Furthermore, 97% and 82%, respectively, of all new field discoveries of crude oil and dry natural gas in 2002 were discovered in the GOM OCS federal offshore. The growth pattern for proved reserves for most of the years between 1983 and 2002 was positive. The few exceptions were probably induced by the collapse of crude oil prices in 1986 and 1998. On the other hand, the growth pattern for proved gas reserves is less definitive. There were as many negative growths as there were positive growths during the period.

The significance and growing importance of the OCS deepwater to the US domestic petroleum supply are also evident in the proportion of GOM, resources, reserves and production that comes from deepwater (water depths greater than 200 meters). Deepwater now produces more than 60 percent of total GOM oil production and about 30 percent of gas production. In addition proved oil and gas reserves from OCS deepwater now accounts for 75.9 and 41.6 percent, respectively. As to the distribution of recoverable resources, nearly 70% of the ultimate oil recoverable resources and about 40 percent of the ultimate gas recoverable resources are in the deepwater Gulf of Mexico. In addition, it is estimated that nearly 70 percent of recoverable deepwater oil and gas resources are still available for discovery in the deepwater. The level of proved reserves and discoverable reserves also supports the potential for growth in deepwater production as evident in MMS projections for shallow and deepwater oil and gas in the Gulf under two scenarios and several inbuilt assumptions.

Finally, there are enough elements of both stability and changes with respect to the E&P industry in the GOM even as the development of the deepwater Gulf resources approaches its full potential. Some of these changes indicate the presence of some “new kids on the block” as far as GOM operations are concerned. However, as far as the stability of deepwater Gulf operations are concerned, the major oil and gas companies, judging from the history of the offshore industry in the GOM, would have to continue to provide the major driving forces as the OCS deepwater resource development stories continue to evolve.

Footnotes

1 Energy Information Administration, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids, Reserves 2002 annual Report,

Continued on page 29
**A New Era in the Electric Market Management for the Central & East European Post-Transition Countries: Some Environmental Aspects**

**By K. Mikelsons, M. Paegle, V. Kreslinsh, K. Brinkis, V. Zebergs, and N. Zeltins***

**Introduction**

During the last 10 years, practically all the Central and East European (CEE) countries have shifted from planned economic system to a market economy and are making great progress (the growth of the GDP reaching 5%, and more). An economic, energetic and ecological leap is expected for these post-transition countries in the next 10 years due to their integration into the European energy market. Besides, it will not be possible to just simply apply the market management methods of the Western countries, since the situation of the energy sector and the priorities for its development in each post-transition country are different.

**Potential of National and Baltic regional electricity market**

There are different energy supply conditions in the three post-transition Baltic States of the small Baltic region in Northern Europe. Latvia, Lithuania and Estonia, which will become the EU member states in 2004, have fundamentally different “start positions” in the liberalized Baltic and European electricity market. First, Estonia and Lithuania have a possibility to diversify the primary energy resources for the production of electricity; second, in contrast to Latvia, they have great reserves of generating capacities (see Table 1). In Estonia, though, with its own local fuel – oil shale – the problem of primary energy supply is not so acute.

The nuclear power plant (NPP) in Lithuania can also be supplied with nuclear fuel at a higher safety degree in contrast to gas or HFO, which is to be supplied continually. Table 2 gives the most significant data on the major hydro power plants of the Baltic States. These are situated mostly in Latvia, on river Daugava. Unfortunately, the output of the Daugava HPP cascade depends on the volume of water in the river, which fluctuates significantly from year to year (see Table 3).

The pumped storage power plant in Kruonio, Lithuania was designed to regulate the operation regimes of the Ignalina NPP. All the mentioned power plants in Baltic countries have been under operation for a long time and are now outdated. That is why they’re retrofitting and updating them as needed. In each Central and Eastern European countries the regional energy market has developed with its own distinctive features. The energy companies, or Baltic countries, guarantee the Baltic electricity market, because Lithuania and Estonia produce more electricity than consume, whereas Latvia imports up to 50%.

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*K. Mikelsons, and M. Paegle are with the Latvian State Power Company, V. Kreslinsh and K. Brinkis are with the Baltic Power Systems Control Center Ltd. and V. Zebergs and N. Zeltins and with the Institute of Physical Energy of Latvian Academy of Science. This paper is an edited version of the paper the authors presented at the 24th USAEE/IAEE North American Meeting held at the Washington Hilton Hotel, Washington, DC, on July 6-10, 2004.

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**Integration in European Electricity Market**

During the post-war years, more than half of the 20th century, the energy companies of Latvia, Lithuania and Estonia (vertically integrated monopoly companies) formed electric links in order to make an optimal use of the different primary energy resources for the production of electricity. Thus, in a natural way, a regional Baltic Integrated Power System (Baltic IPS) was developed. Baltic IPS has good electricity links with Russia and other CIS countries, but unfortunately there is no link with European systems. For connecting BIPS with European energy systems, there are several “Baltic Ring” project variants for the creating of electricity network around the Baltic Sea forming an integrated North European power supply system in the future. It concerns the connection of the BIPS by means at a sea cable with Estonia and Finland, in the north, and forming an electricity link with Lithuania and Poland in the south.

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**Table 1**

**Major thermal power plants in the Baltic countries**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Installed capacity (MW)</th>
<th>Available capacity (MW)</th>
<th>Number of units and capacity</th>
<th>Steam pressure (atm)</th>
<th>Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonian CPP</td>
<td>1610</td>
<td>1280</td>
<td>8x200</td>
<td>140</td>
<td>Oil shale</td>
</tr>
<tr>
<td>Baltic CPP</td>
<td>1090</td>
<td>880</td>
<td>4x100</td>
<td>100</td>
<td>Oil shale</td>
</tr>
<tr>
<td>CHPP Iru</td>
<td>190</td>
<td>190</td>
<td>4x180</td>
<td>1x110</td>
<td>Gas, HFO**</td>
</tr>
</tbody>
</table>

Latvia

| Riga CHPP           | 390                     | 390                     | 3x110                        | 140                   | Gas, HFO   |

Lithuania

| Ignalina nuclear power plant | 3000                   | 2600                   | 4x750                        | 70                    | Nuclear    |
| Lithuanian CPP           | 1800                   | 1800                   | 4x150                        | 140                   | Gas, HFO   |
| Vilnius CHPP-3           | 360                    | 348                    | 2x180                        | 255                   | Gas, HFO   |
| Maziekai CHPP            | 160                    | 116                    | 2x80                         | 140                   | Gas, HFO   |
| Kaunas CHPP              | 170                    | 170                    | 1x110                        | 140                   | Gas, HFO   |

---

**Table 2**

**Hydro (HPP)- and pumped storage (PSPP) power plants in the Baltic countries**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Installed capacity (MW)</th>
<th>Available capacity (MW)</th>
<th>Number of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latvija</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pļavinas HPP</td>
<td>868</td>
<td>868</td>
<td>10</td>
</tr>
<tr>
<td>Riga HPP</td>
<td>402</td>
<td>402</td>
<td>6</td>
</tr>
<tr>
<td>Kegums HPP</td>
<td>264</td>
<td>240</td>
<td>7</td>
</tr>
</tbody>
</table>

Lithuania

| Kruonio-PSPP         | 900                     | 900                     | 4              |
| Kaunas HPP          | 100.8                   | 100                     | 4              |

---

The potential of the Baltic existing electricity market is characterized by the extent of electric power production in the Baltic countries (see Table 4).

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Table 1 shows the Baltic Integrated Power System (BIPS) with major power generating plants and 330 kV transmission lines. There exists comparatively good electric links (330 kV) connecting the Baltic States – Latvia, Lithuania and Estonia, as well as Russia. Table 4 shows that Latvia is the only Baltic country importing electric energy (up to 40% of its total electric energy consumption). In contrast, Lithuania and Estonia are producing more electricity than consuming, so they are able to export their surpluses.
The basic networks forming the BIPS are voltage power lines of 330 kV. BIPS includes 3 Baltic country power systems and operates parallel (on a synchronous AC grid) with the unified power system of Russia and the power system of Belarus (see Figure 1). Actually, at the present time, BIPS is the big electricity ring: Central Russia (Moscow) – St. Petersburg – Estonia – Latvia – Lithuania – Belarus – Smolensk – Central Russia (see Figure 2). In comparison with others power plants of this ring the capacity of the power plants of BIPS are not great (see Table 5).

There is, however, an emerging issue about uniting the Russian joint energy system with the Union of the Baltic Energy Systems and the joint energy system of the European Community (UCTE) for synchronous operation, using the existing energy transmission lines: three - 750 kV voltage, for - 400 kV and two - 220 kV lines. An urgent task for the energy systems of the three Baltic States - Estonia, Latvia, and Lithuania – is to build a 2 - circuit electric transmission line with the voltage of 400 kV between Lithuania and Poland (Alitus – Elk). Connection of all the electric transmission lines mentioned above for synchronous operation would ensure the throughput in both directions over 8000 MW, which would expand considerably the potential of a free market between the Western and the Eastern countries of Europe.

On July 1-2, 2003 an agreement was reached between the representatives of the Joint energy system of Russia and the European Community on technical and organizational measures to be taken during the next 2 years in order to ensure the unification of two such energy systems for synchronous operation. In preparation for a parallel work with the UCTE in April 2001, the Union of the Baltic energy systems carried out the separation of the region of ≈ 5000 MW capacity from the Russian joint energy system for two hours in order to determine the characteristic curves of its frequency (see Figure 3). The corresponding output will be applied to create a system for automatic regulation of the sub-system of the Baltic energy systems with frequency correction and preparing the region for synchronous operation with the UCTE. Both at the electric stations of the Union of the Baltic energy systems and the Russian joint energy system, reconstruction work is being done to ensure the sensitivity of the primary regulators by frequency less than 20 mHz and alteration of the generator capacity (ΔP) in the time period (Δt) with the participation in a collegial frequency regulation, if the frequency departure is greater than 20 mHz.

<table>
<thead>
<tr>
<th>Year</th>
<th>Estonia</th>
<th>Latvia</th>
<th>Lithuania</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>7.9</td>
<td>1.1</td>
<td>13.9</td>
</tr>
<tr>
<td>1996</td>
<td>8.2</td>
<td>0.9</td>
<td>16.8</td>
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<tr>
<td>1997</td>
<td>8.2</td>
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<tr>
<td>1998</td>
<td>8.1</td>
<td>0.4</td>
<td>17.6</td>
</tr>
<tr>
<td>1999</td>
<td>7.7</td>
<td>0.5</td>
<td>13.5</td>
</tr>
<tr>
<td>2000</td>
<td>7.6</td>
<td>0.9</td>
<td>11.4</td>
</tr>
<tr>
<td>2001</td>
<td>7.8</td>
<td>0.6</td>
<td>14.7</td>
</tr>
<tr>
<td>2002</td>
<td>7.7</td>
<td>0.8</td>
<td>17.7</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Production of HPP</th>
</tr>
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<tbody>
<tr>
<td>1995</td>
<td>6.2</td>
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<tr>
<td>1996</td>
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<td>2001</td>
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</tr>
<tr>
<td>2002</td>
<td>6.3</td>
</tr>
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</table>

Table 3

<table>
<thead>
<tr>
<th>Year</th>
<th>Total electricity consumption TWh</th>
<th>Production of HPP TWh</th>
</tr>
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<tbody>
<tr>
<td>1995</td>
<td>6.2</td>
<td>54</td>
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<td>1996</td>
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<td>2002</td>
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Table 4

<table>
<thead>
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<th>Latvia</th>
<th>Lithuania</th>
</tr>
</thead>
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<tr>
<td>1995</td>
<td>8.9</td>
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<td>8.1</td>
<td>6.3</td>
</tr>
<tr>
<td>1998</td>
<td>8.5</td>
<td>8.0</td>
<td>6.3</td>
</tr>
<tr>
<td>1999</td>
<td>8.2</td>
<td>7.7</td>
<td>6.1</td>
</tr>
<tr>
<td>2000</td>
<td>8.5</td>
<td>7.6</td>
<td>5.9</td>
</tr>
<tr>
<td>2001</td>
<td>8.4</td>
<td>7.8</td>
<td>6.2</td>
</tr>
<tr>
<td>2002</td>
<td>8.4</td>
<td>7.7</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Table 5

<table>
<thead>
<tr>
<th>Country</th>
<th>Thermal and nuclear power plants</th>
<th>Hydro and hydro pumped storage power plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia</td>
<td>2,420</td>
<td>1,511</td>
</tr>
<tr>
<td>Latvia</td>
<td>519</td>
<td>1,000</td>
</tr>
<tr>
<td>Lithuania</td>
<td>5,034</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Figure 1

Basic Power Network of the Baltic IPS and its Interconnection with other IPS's
Thus, the inclusion of the Baltic power supply system into the European power supply system (the NORDEL), a Scandnavian energy association in Finland, the CENTREL association in Poland, under the conditions of the free European electricity market will bring to severe competition for the producers of electricity in the Baltic States. In this way, the formation of the Baltic electricity market (Latvia, Lithuania and Estonia) is the first step towards further integration into the free European electricity market.

**Figure 2**

Existing electricity ring: Central Russia (Moscow) – St. Petersburg – Estonia – Latvia – Lithuania – Belarus – Smolensk – Central Russia

As previously mentioned, the technical state of 330kV network in BIPS cannot assure all the requirements for the fully opened electricity market at the present time. The following indicates some points that do not meet the requirements for completely open electricity market and create additional restrictions in the transmission network:

- Reliability criteria (n-1) can only be satisfied considering emergency control;
- On power stations in IPS Baltic and UPS Russia, there is lack of primary frequency regulators with small dead zone by frequency. These primary regulators participate in regulation only outside the limit of 50±0.2 Hz. Only secondary regulators can be used to correct frequency deviations within the limit of 50±0.2 Hz and the correcting actions may lead to overloads in 330 kV network. In case of presence of primary regulation in the network these additional overloads are less probable.
- The absence of the required amount of means to compensate excessive reactive power under minimum operational conditions of the network that leads to necessity of constrained disconnection of large number of 330 kV lines. This presents additional limitations on electrical transmission over the network.

**Promotion of CEE post – transition countries’ competition possibilities into European electricity market**

According to the EU agenda the CEE countries, as the youngest EU member states, will have to start the introduction of liberalized electric energy market since the year 2004, and until 2004 they have to finish the opening of a liberalized energy market. The most important measures in this connection are the creation of an independent institution of system operation and the establishment of an independent regulator institution in each country, which have practically been set up in all the three Baltic States.

Currently, a model of the perspective free Baltic electricity market is being worked out that provides free access to the power transmission networks both for the electricity producers and its consumers (eligible consumers). Further, restructuring and privatization of monopoly energetic companies is going on in all the three Baltic States, although according to different models and rates of their realization, which complicates the solution of the problem. The most urgent task is to develop such a model of the Baltic electricity market that could be included
into the European electricity market as well. The EU’s definite deadline of opening free electricity market for commercial consumers is the year 2004 and 2007 for others.

<table>
<thead>
<tr>
<th>Table 6</th>
<th>The balance of electricity power in the Baltic States, year 2002 (TWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estonia</td>
</tr>
<tr>
<td>Production</td>
<td>8.4</td>
</tr>
<tr>
<td>Consumption</td>
<td>7.7</td>
</tr>
<tr>
<td>Export</td>
<td>0.7</td>
</tr>
</tbody>
</table>

The main problem for the development of the perspective free Baltic electricity market is connected with:

- The creation of a market model,
- The market regulation measures,
- Formation of the market tariffs,
- The operator functions of networks and the system,
- Technical problems,
- The protection of the consumers’ interests.

One of the most complicated questions will be connected with the formation of electricity tariffs. Due to the growing competition among the producers under free electricity market conditions, the electricity production costs should decrease. The consumers’ electricity tariffs will depend on extra costs on electricity transmission, distribution and other services rendered to the consumers. The activities carried out before the opening of the free market in compliance with the EU directives are presented in Table 7.

The independent regulatory institution has been sufficiently developed in each Baltic Country.

The final goal of the regulation is to promote the development of national economy and the competitive capacity, as well as to advance the development of entire society and the growth of the wealth of any individual. To achieve this aim, the basic tasks of regulation are to ensure:

- Availability of high-quality public services over all the territory of the country at economically grounded prices;
- A possibility of choice for the consumers;
- The development of the investment is support system and reasonable profit for the public service providers, which ensures the return of the invested capital.

<table>
<thead>
<tr>
<th>Table 7</th>
<th>The activities carried out before the opening of the free market</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Legal</td>
</tr>
<tr>
<td>Operator of the transmission system</td>
<td>Independence</td>
</tr>
<tr>
<td>Operator of the distribution system</td>
<td>01. 07. 2007</td>
</tr>
</tbody>
</table>

In order to achieve the above goals, the regulatory institutions have to formulate the conditions in several spheres. Usually they are wide spheres: price adjustment, the quality of services and non-discrimination. Baltic IPS universal structure of power plants is advantageous for the optimization BIPS operation by changing electricity consumption, meteorological condition, etc. Unfortunately, the generating equipment of the existing electric power stations in the Baltic countries are rather worn out and, due to insufficient investments, even the maintenance is limited. In principle, the investments made in the sector of electric energetic of all the Baltic States during the last ten years are poor, and not a single power station has been built. Now, constructing new electric power stations with the use of the latest technologies, there is a possibility for the Baltic States to increase their competitive ability in the European market of electric energy. Of course, the extent of building new stations should be enforced by the market study. The Baltic countries do not want to be the buyers on the European electricity market, nor its sellers.

Figure 4 illustrates clearly the limited and irregular investments for the production of electricity in the Baltic States during the last 10 years. It is evident from Figure 4 that investments of the Latvenergo State Stock Company in the development of the sources of electric energy during the previous 10 years have been quite small. It is typical that in the neighboring countries Lithuania and Estonia, like in Latvia, the situation is similar, and during these 10 recent years no new electric power station has been built. Taking also into account the closure of the Ignalina NPP before 2010, one can expect a crisis in the electric energy supply in the Baltic region (a sharp rise in the prices of electric energy, or else, imposing restrictions on the electricity supply), which may essentially affect the progress of Latvian national economy.

There has been a sharp fall in the amount of investments in the production of electricity in the Russian Federation during the previous 10 years and the prospects for an increase in the next few years are poor due to the slow reforms in the field of energetics and the problems of setting the necessary tariffs. Consequently, Baltic States will have to build new electric power stations in the nearest future. To make them competitive on the European free market of electric energy, they should apply the newest technologies. The choice of technologies depends, to a significant extent, on the kind of the fuel used.

According to the global prognosis for the next 20-30 years, the use of natural gas will expand. Gas using power plants could be built in the short time and this fuel allows minimizing poisonous emission as well. In Baltic countries gas could be used practically in unlimited amount. In the Baltic States there is a rather well developed gas supply system; unfortunately, gas is supplied only from Russia. Currently, thermal power plants in the Baltic States are mainly using gas fuel more because HFO is rather expensive (see Table 1).

However it is of great importance for the great capacity power plants possibilities to use underground gas storage (UGS) facilities. The UGS already existing in Latvia is the largest in Europe. However, there are favorable geological conditions in Latvia to set up eight more similar UGS (see Table 8). In direct proximity of the UGS there are favorable conditions for the construction of peak load power plants operating a few hours a day with a variable consumption of large amounts of gas.

Any successfully developing Energy Company (gas, electricity, oil, etc.) works out its own perspective plan of development for the next 5-10 years. There are several prognoses for
the country, on the whole, till the year 2015. Only visions exist for a more distant period of 30-40 years, and such prognoses are still being developed. The further development of Latvian economics has been prognosticated (by of one version) as a 5% GDP average increase a year. Considering the structure of the branches (the low specific weight of heavy industry), the increase of electricity can be assumed as 2% a year. Table 9 presents the prognosis of corresponding electricity consumption.

The increase in the consumption of electric energy by 2% a year is the worst prognosis made in Latvia as yet, and it is used in the estimations of Table 10. At a higher increase in the consumption of electric energy, the required additionally fixed capacity of basic thermal power plants (TPP) in Latvia may reach 300–400 MW during the respective decades. It may also be useful in case Latvia wishes to become a seller of electric energy on the free market. The possibility to build new electric power stations having a modern technology to ensure the local energy market allows a hope to develop the export of electric energy as well so that Latvia could turn from the electricity buyer into its seller. It will be important to study the electricity market considering not only the Baltic States but also the perspective electricity links in the integrated European power system.

In addition to the basic thermal power plant (see Table 10), a new highly efficient peak power plant (see Table 11) will be necessary to set up a reliable electricity supply system in the country. Being the biggest in the Baltic region, a cascade of highly efficient HPP on the Daugava River could meet the peak load demand from a distant perspective. Unfortunately, the power of this HPP cascade is not always used because of the changeable flow of the river. Usually, just in the winter months, when there is the most acute need for peak electricity, the flow rate of the water in the river is the lowest. Therefore it is ensured by import that this will be impossible in the future. It is for the powerful peak load TPP with sharply changing loads and gas consumption that the use of gas is economical, particularly in the vicinity of the UGS.

Presently the production of electricity in Latvia is based on gas, and the problem is how to use this highly efficient fuel in the future. According to global forecasts, gas extraction and use in the coming 30-40 years will still grow. Starting from 2030-2040, the competitive ability of nuclear energy will increase due to the introduction of economic and reliable reactors of the new generation.

Table 8

<table>
<thead>
<tr>
<th>Country</th>
<th>Existing</th>
<th>Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latvia</td>
<td>2.72</td>
<td>5.0 (18 UGS)</td>
</tr>
<tr>
<td>Poland</td>
<td>0.56</td>
<td>5.23</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1.66</td>
<td>1.60</td>
</tr>
<tr>
<td>Hungary</td>
<td>1.93</td>
<td>2.52</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>2.01</td>
<td>2.30</td>
</tr>
<tr>
<td>Romania</td>
<td>0.57</td>
<td>1.45</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>0.60</td>
<td>0.60</td>
</tr>
</tbody>
</table>

Table 9

<table>
<thead>
<tr>
<th>Unit</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWh</td>
<td>10.2</td>
<td>5.9</td>
<td>7.2</td>
<td>8.8</td>
<td>10.7</td>
</tr>
<tr>
<td>Peak demand</td>
<td>MW</td>
<td>1685</td>
<td>1226</td>
<td>1440</td>
<td>1760</td>
</tr>
</tbody>
</table>

Table 10

<table>
<thead>
<tr>
<th>Periods</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prognosticated consumption of electric energy (TWh)</td>
<td>7.32</td>
<td>8.8</td>
<td>10.7</td>
</tr>
<tr>
<td>Prognosticated increase in the consumption of electric energy in the respective 10 year period (TWh)</td>
<td>1.48</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Prognosticated estimated additional capacities of basic TPP (MW)</td>
<td>208</td>
<td>326</td>
<td></td>
</tr>
</tbody>
</table>

Table 11

<table>
<thead>
<tr>
<th>Capacity of peak load thermal power plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Peak demand</td>
</tr>
<tr>
<td>Installed capacity TPP</td>
</tr>
<tr>
<td>Installed capacity HPP</td>
</tr>
<tr>
<td>Total installed capacity</td>
</tr>
<tr>
<td>Capacity of peak TPP for reservation HPP</td>
</tr>
</tbody>
</table>

Table 12

<table>
<thead>
<tr>
<th>Prognoses of the Possible Technologies of Base Capacity Electric Power Stations in Latvia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy production technology at primary energy sources</td>
</tr>
<tr>
<td>Natural gas</td>
</tr>
<tr>
<td>Nuclear energy</td>
</tr>
<tr>
<td>Coal</td>
</tr>
</tbody>
</table>

Evaluation of technological possibilities: ++ very high; + high; - low; -- very low
New possibilities to raise their competitive capacity in the
free European electricity market: environmental activities

By choosing a modern technology for a thermal power plant using highly efficient primary energy resources it is possible to achieve significant decrease in harmful emissions. This would allow developing the emissions quota market. A real-time experiment of an emissions quota spot market was arranged in 2003 with various energy companies taken from the Scandinavian and Baltic states. The experiment proved that in this way some countries could gain considerable extra profit in the electricity market and raise their competitive capacity. One of the most successful participants in this market was Latvia.

Latvia has assumed international obligations and joined the UNO conventions. Latvia’s third national report to the UNO General Convention on the changes of climate contains the following information about the amount of emissions in Latvia in 2000. During 1990–2000 several international programs were worked out to develop respective public opinion on the energy resources economy. Thermal insulation of buildings has started, including pilot projects with the participation and co-financing of international organisations. Diminished fuel consumption in the period from 1990 till 2000 was caused not only by the reduction of industry but also by purposeful state policy. An important factor was the arrangement of the market of energy resources and formation of the tax policy permitting also to change the structure of the fuel used. The ratio of gas increased having lesser amount of harmful emissions and the use of the HFO decreased. It was of great importance that utilisation of wood and wood waste was developed, which reduced emissions. Emissions dynamics in the energetic sector is given in Table 13.

The environmental protection activities undertaken during the period from 1990 till 2000 laid the basis for international documents on the fulfilment of the tasks: how to avert global warming, which will be particularly important after Latvia’s joining the EU. So it can be prognosticated that there will be no problems with the fulfilment of the tasks set by the Kyoto protocol of the UNO General Convention “On Climate Change”. The Kyoto protocol provides that in the period of time from 2008 till 2012, the anthropogenic gaseous emissions (CO₂, CH₄, N₂O etc.) directly causing the hothouse effect should be in Latvia by 8% below the level of emissions in 1990.

Table 13
Emissions dynamics in the energetic sector

<table>
<thead>
<tr>
<th>Emission</th>
<th>Unit</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td>Mil.t.</td>
<td>22.9</td>
<td>10.0</td>
<td>6.9</td>
</tr>
<tr>
<td>CH₄</td>
<td>th.t.</td>
<td>63.7</td>
<td>29.1</td>
<td>25.1</td>
</tr>
<tr>
<td>N₂O</td>
<td>th.t.</td>
<td>1.1</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>SO₂</td>
<td>th.t.</td>
<td>118</td>
<td>59</td>
<td>18</td>
</tr>
<tr>
<td>NOₓ</td>
<td>th.t.</td>
<td>102</td>
<td>42</td>
<td>37</td>
</tr>
<tr>
<td>CO</td>
<td>th.t.</td>
<td>499</td>
<td>436</td>
<td>251</td>
</tr>
</tbody>
</table>

The EU Directive 2001/81/EC sets the levels of the total emissions for each of the 15 EU member states in relation to SO₂, NOₓ volatile organic compounds and ammonia emissions. The maximum limits of all the sources of emissions allowed for Latvia in 2010 have been fixed by the Regulation of the Latvian Cabinet of Ministers No.33 (2002) Regulations on the total maximum allowable emissions in the air in the country:

• Sulphur dioxide 107 thousand tons
• Nitrogen dioxide 84 thousand tons
• Non-methane volatile organic substances 136 thousand tons
• Ammonia 44 thousand tons

In the period from 1998 till 2000 the level of the above-mentioned emissions was significantly lower than the level allowed by the Göteborg protocol.

The successful policy of decreasing harmful emissions in Latvia illustrates the possibilities for raising the competitive capacity in the free electricity and energy market.

Figure 5
CO₂ Emission dynamics

Figure 6
Emission dynamic prognostic

Conclusions

The existing national and regional Baltic (Estonia, Latvia, Lithuania) electric energy market does not comply with the principles of the free market as it is implemented in the developed Western countries. Introduction of such market principles in the sector of electric energy entails the formation of new market structures and subsequent development of a EU energy market. For the CEE post-transition countries, this is a new and difficult task. Passing from a monopoly system to a more market-oriented system involves a risk that some misunderstandings and uncertainties may arise as to the tasks of each subject of the operating market and their distribution. Therefore the governments of the CEE post-transition countries should set to the opening of the free electric energy market under their control. Insufficient study has been made in the possibilities for the harmful emissions quota market to raise the competitive capacity of the CEE post-tradition countries in the free European
A New Era in Oil Market Management?

By A.F. Alhajji*

The 24th Annual North American Conference of the USAEE/IAEE, which was held in Washington DC from July 8 to July 10, 2004, included a session on world oil market management entitled “A New Era in Oil Market Management?” Four prominent energy experts participated in the session: Guy Caruso, Administrator of the US Energy Information Administration; Claude Mandil, the Executive Director of the International Energy Agency; Luis Giusti, Senior Advisor, Center for Strategic and International Studies and the previous head of PDVSA; and Al Hegburg of Scowcroft Associates.

Guy Caruso, who presided over the panel, started the session by setting the stage for other speakers. He focused on three factors that have affected oil prices in the last three decades: external events, spare capacity, and inventory levels.

To demonstrate the role of external events, Caruso provided an overview of oil prices in the last three decades and pointed to major world political events that caused price spikes such as the 1973 embargo, the Iranian revolution, the Iraq-Iran war, the Iraqi invasion of Kuwait, and the recent war in Iraq. Caruso pointed out that these external events have nothing to do with market management. Even after OPEC imposed production quotas on its members in the early 1980s, OPEC struggled to manage the market. Despite its efforts, the market collapsed in the mid 1980s.

Caruso explained that oil prices and excess capacity are inversely correlated. He showed a slide of historical estimates of excess capacity. The slide showed a large decline in OPEC excess capacity in recent months, which has contributed to the recent increase in oil prices.

He also pointed out that oil prices and inventories are negatively correlated. Lower stocks are always associated with higher oil prices. Low inventories in recent months may explain some of the increase in oil prices.

Claude Mandil, the Executive Director of the International Energy Agency, focused on producer-consumer dialogue. He stressed the importance of the dialogue and outlined its current status and its successes. He also praised Saudi Arabia for its cooperation with the consuming countries to prevent oil prices from increasing any further. While the idea of IEA and OPEC officials sitting at the same table was unthinkable when the IEA was established in the early 1970s to counter OPEC actions, dialogue is very common today. He described the IEA relationship with OPEC as “positive” and emphasized that “dialogue is working.”

Mandil concluded his presentation by emphasizing that dialogue has improved over time. Producers and consumers still do not agree on certain issues, such as the role of the market, but he stressed that these differences may not be susceptible to a quick solution. Dialogue must continue to find solutions.

Luis Giusti started his presentation by talking about oil prices, low inventories play a significant role. US inventories are running out of oil. He stated that while short-lived factors such as the situation in Venezuela and Iraq have an impact on oil prices, low inventories play a significant role. US inventories declined at a time when they should have increased. Several factors contributed to low inventories, such as the unexpected delay in Iraq’s oil exports and downward in futures market.

After outlining the current status of the dialogue and the differences that still exist, Mandil stated that we can improve the dialogue by continuing it and trying to eliminate the contradiction between what every group is saying and what they are doing. He highlighted the contradictions in producer and consumer behaviors. For example, OPEC members have adopted a price band, but they do not enforce it. Oil prices have been above the upper limit of the band ($28/b) for almost a year, yet OPEC members have not enforced the band. Producers claim to dislike volatility, but pursue a “low stocks” policy that increases volatility. Producers express concerns about future investment but curtail foreign companies’ access to reserves.

While mentioning the oil companies, Mandil took this opportunity to blame them for not investing enough. “Companies are buying shares instead of investing,” he said.

Mandil continued his analysis of contradictions and provided several examples of contradictions in the behavior of consuming countries. Consumers complain about high oil prices but demand remains strong. Consumers call for more surplus capacity, but it would not exist in an open market. Consumers prefer low oil prices, but low oil prices result in inadequate investment, as seen in 1998. Consumers want producers to produce more oil, but more production will make OPEC members even more dependent on oil. Consumers demand security of oil supply, but they do not want any energy projects in their backyard.

Mandil concluded his presentation by emphasizing that dialogue is working.

* A.F. Alhajji is Associate Professor, College of Business Administration, Ohio Northern University.

Initiative) data exercise, the establishment of the International Energy Forum, and OPEC input into the IEA investment study. He stressed that the dialogue resulted in better understanding of each other, continuous lines of communication, and regular technical meetings.

Despite agreement on major issues, dialogue, and successes on various fronts, major differences still exist. Mandil pointed out that they do not agree on several producers policies such as low stocks, producer quotas, access to reserves, approaches to environmental concerns, and the taxation polices of petroleum products in consuming countries.

After outlining the current status of the dialogue and the differences that still exist, Mandil stated that we can improve the dialogue by continuing it and trying to eliminate the contradiction between what every group is saying and what they are doing. He highlighted the contradictions in producer and consumer behaviors. For example, OPEC members have adopted a price band, but they do not enforce it. Oil prices have been above the upper limit of the band ($28/b) for almost a year, yet OPEC members have not enforced the band. Producers claim to dislike volatility, but pursue a “low stocks” policy that increases volatility. Producers express concerns about future investment but curtail foreign companies’ access to reserves.

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* A.F. Alhajji is Associate Professor, College of Business Administration, Ohio Northern University.
Focus on the Center for Energy Studies at Louisiana State University, Baton Rouge, LA

Introduction: The Louisiana State University Center for Energy Studies (“CES” or the “Center”) was established by the Louisiana Legislature in 1982. It was based upon the recommendations of an out-of-state review committee. The Center was located at LSU because of the University’s technical expertise and supporting infrastructure, which facilitates the implementation of the Center’s unique research and service mandates. Initially, a major part of the Center’s work was an internal grant program for LSU faculty. In the 1990s that program was scaled back and the Center’s own research staff expanded.

CES is a college-level unit within LSU with an executive director that serves in the capacity of a dean and also directs the Center’s three divisions, which are:

- The Policy Analysis Division
- The Research and Development Division (that includes the Petroleum Technology Transfer Council of the Central Gulf Region)
- The Information Services Division

Reporting through the Center’s Executive Director to the Vice Chancellor for Research and Graduate Studies are:

• The Louisiana Geological Survey
• The Minerals Processing Institute
• The Applied Oil Spill Research and Education Program
• Office of Radiation Safety

The primary mission of CES, and each of its respective units, is to serve the state of Louisiana in three broad capacities: as a research institute; as source of objective, scholarly advise on important national and state energy issues; and as an information depository, clearinghouse and technology transfer institution. The basic mission of CES is funded by a state appropriation that is augmented with grants/contracts and by private donations. The Center’s full time staff usually numbers about 20 and it currently supports seven graduate students.

Recently Completed and Active Research Projects: The Center’s research covers a wide range of topics from onshore and offshore E&P, to power generation, to market forecasting, and alternative energy and energy efficiency. Some of recent projects are:

- Modeling the Economic Impacts of Offshore Oil and Gas Activities in the Gulf of Mexico: Methods and Applications
- Inventory of Greenhouse Gases in Louisiana
- Fiscal System Analysis: Concessionary and Contractual Systems Used in Offshore Petroleum Arrangements
- Long-Term Oil and Gas Structure Installation and Removal Forecasting in the Gulf of Mexico: A Decision- and Resource-based Approach
- Changing Patterns of Ownership and Control in the Petroleum Industry: Implications for the Market for Oil and Gas Leases in the Gulf of Mexico OCS Region
- Analysis of the Economic Impact Associated with Oil and Gas Activities on State Leases
- Low-Income Home Energy Assistance Program
- Louisiana Desktop Well Reference 2001
- Effects of Changes in Oil and Gas Prices and State Offshore Petroleum Production on the Louisiana Economy, 1969-1999
- History of the Offshore Oil and Gas Industry in Southern Louisiana: Interim Report
- Moving to the Front of the Lines: The Economic Impact of Independent Power Plant Development in Louisiana
- Forecasting the Number of Offshore Platforms on the Gulf of Mexico OCS to the Year 2023
- Economic and Environmental Impact of a Public Benefits Fund in Louisiana
- Energy Conservation and Electric Restructuring in Louisiana
- Environmental and safety risks of an expanding role for independents on the Gulf of Mexico OCS

Conferences and Workshops: CES has a long history of conducting timely and conferences and workshops on important issues impacting Louisiana’s energy industries and consumers.

Our PTTC program, conducts regular workshops on technological and operational issues impacting independent oil and gas operators in the central Gulf Coast region.

The Policy Analysis Division has organized several seminars and conferences on energy policy and industry restructuring topics. For a period of about 6 years, CES conducted a series of workshops on various electric restructuring issues and how they have impacted Louisiana.

In 2003 CES’ annual energy conference focused on the impact that natural gas prices were having on the Louisiana economy. This years’ conference was titled Energy Summit 2004: Securing Louisiana’s Economic Growth in a Volatile Energy Environment, and held this past October. It addressed a broad range of issues and included a 2005 energy market outlook by Paul Ziff, CEO of Ziff Energy. Among the themes of this year’s conference was refined products and their impact on the regional economy and regional refinery operations. The power generation section of the conference focused on the future of: coal generation; nuclear generation; and the hydrogen economy.

CES will be sponsoring its first alternative energy conference on March 2-3, 2005. More information about the conference can be found on the Center’s homepage at www.energ.lsu.edu.

Publications


Dialogue

New Members of USAEE

Welcome!! The following individuals joined USAEE from 8/1/04 to 9/30/04. Welcome!!

Elias Azrak
Hydrogen Ventures LLC

Matthew F. Cinadr II
GE Power Systems

Graham A. Davis
Colorado School of Mines

R. Dean Foreman
ExxonMobil

Scott T. Jones
Lexecon, Inc.

Madeline Jowdy
PIRA Energy Group

Tulin Koray
Louisiana Public Service Comm.

Charles Lafka
Rosserock Group

Chance A. Mannina
BellSouth

Charles L. McCall, Jr.
ICF Consulting

Daniel McElhuff
New York Mercantile Exchange

Richard F. McMahon
Edison Electric Institute

Zakia Meraj
Transamerica Minerals Company

Leendert Moerman
Resources for the Future

Bernardo Pierock
Federal Energy Regulatory Comm.

J. Michael Ramirez
ChevronTexaco

Shannyn Sneed
TESLA Inc.

Dean W. Stathis
Jersey Central Power & Light

Thomas Taton
Institute for Energy Research

Zakia Meraj
Transamerica Minerals Company

Talin Saklou
ChevronTexaco

Leendert Moerman
Resources for the Future

Nisha Thirumurthy
Deloitte Consulting

Christian Turner
John Zyren

Energy Information Administration

Petroleum Resources (continued from page 20)


A New Era (continued from page 26)

electricity market.

References


Conference Proceedings on CD Rom

23rd North American Conference

Mexico City, Mexico October 19-21, 2003

The Proceedings on CD Rom from the 23rd Annual North American Conference of the USAEE/IAEE held in Mexico City, Mexico are now available from USAEE Headquarters. Entitled Integrating the Energy Markets in North America: Issues & Problems, Terms & Conditions, the price is $100.00 for members and $150.00 for nonmembers (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. Please complete the form below and mail together with your check to: Order Department, USAEE Headquarters, 28790 Chagrin Blvd., Suite 350 Cleveland, OH 44122, USA.

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28TH IAEE ANNUAL INTERNATIONAL CONFERENCE
Hosted by:
International Association for Energy Economics (IAEE)
Chinese Association for Energy Economics (CAEE)

Globalization of Energy: Markets, Technology, and Sustainability
3-6 June 2005
at the Grand Hotel, 1 Chung-Shan N. Road, Section 4, Taipei, Taiwan 104, ROC

Conference Themes and Topics

1. Prospects for Global Energy Development:
   Global and Regional Energy Demand and Supply
   New Paradigm under the World Trade
   Organization
   Restructuring and Deregulation
   Energy Security and Reliability among Regions
   Liberalization and Market Power
   Role of International Energy Suppliers

2. Prospects for Energy Technology Development:
   Green and Renewable Energy Technology
   Conservation Know-how and R&D
   Fuel Cell and Hydrogen Technology
   Distributive Energy Systems
   Diffusion and Collaboration in Energy Technology

3. Sustainability:
   Sustainable Energy Development
   Global Warming and Energy
   Energy and Pollution Control
   Nuclear Safety and Waste Disposal
   Rationality and Energy Selections
   Policy Options and Strategies

Keynote Plenary Session Theme:
The Future of Energy: Solar Energy and Photovoltaics

4. Individual Energy Sectors:
   Coal
   Oil
   Natural Gas (including LNG)
   Electricity
   Renewable Energy and New Energy

5. Energy Efficiency and Energy Modeling:
   Energy Statistics and Energy Efficiency Indicators
   Energy Modeling, Simulation, and Forecasting
   Energy Conservation Program and Demand-Side Management
   Integrated Resource Planning and Demand Response
   ESCO and New Business Models

Dual Plenary Session Themes:
The Middle East Situation and Energy Security
Regulation vs Deregulation of the Energy Market
Global Policy Options Dealing with GHGs Emission Control
Rethinking of the Nuclear Energy
Prospects for New Energy Technology
Emerging Issues

***** CALL FOR PAPERS *****

Abstract Submission Deadline: 2 December 2004

(Include a short CV when submitting your abstract)

We are pleased to announce the Call for Papers for the 28th IAEE Annual International Conference entitled ‘Globalization of Energy: Markets, Technology, and Sustainability’, scheduled for 3-6 June 2005 at the Grand Hotel in Taipei. Please mark your calendar for this important conference. There will be at least 9 plenary sessions and 36 concurrent sessions. During the conference, we will also ensure that you and your spouses can enjoy the wonderful hospitality and rich content of traditional Chinese and Taiwanese culture.

Abstracts should be double-spaced and between 300-500 words giving an overview of the topic to be covered. Abstracts must be prepared in standard Microsoft Word format or Adobe Acrobat PDF format and within one single electronic attachment file. Complete contact details should be included in the first page of the abstract, which should be submitted to the IAEE 2005 Taipei Conference Secretariat either through the e-mail system (as an electronic mail attachment) or the postal system (in a 1.44Mb diskette) to: Yunchang Jeffrey Bor, Ph.D., Conference Executive Director, Chung-Hua Institution for Economic Research (CIER), 75 Chang-Hsing Street, Taipei, Taiwan 106, ROC, Tel: 886-2-2735-6006 ext 631; 886-2-8176-8504, Fax: 886-2-2739-0615, e-mail: iaee2005@mail.cier.edu.tw

General Organizing Committee

Vincent C. Siew: General Conference Chairman; Chairman of the Board, Chung-Hua Institution for Economic Research (CIER), Taiwan, ROC. Yunn-Ming Wang: Program Committee Chairman; Chairman of the Board, Chinese Association for Energy Economics (CAEE), Taiwan, ROC. Ching-Chi Lin: Organizing Committee Chairman; Chairman of the Board, Taiwan Power Company; Taiwan, ROC. Ching-Tsai Kuo: Sponsorship Committee Chairman; Chairman of the Board, Chinese Petroleum Corporation, Taiwan, ROC.

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

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

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

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Calendar


17-17 November 2004, Deloitte’s 2004 Oil & Gas Conference at Houston, Texas. Contact: Ms. Mickey Appel. Phone: 713.982.3301. Fax: 713.427.4300 Email: dellot.com


30 November 2004 - December 2, 2004, 2004 Environmental Performance Summit at Washington, DC. Contact: Melvin Hall, Associate Director, The Performance Institute, 1515 N. Courthouse Rd., Arlington, VA, 22201, United States. Phone: 703-894-0481. Fax: 703-894-0482 Email: hall@performanceweb.org URL: http://www.performanceweb.org

25-27 January 2005, Distributech Conference & Exhibition at San Diego, CA. Contact: Jennifer Lindsey, Conference Coordinator, Pennwell, USA. Phone: 918-832-9313 Email: dtechconference@pennwell.com

22-24 February 2005, Gas Tech Cairo at Cairo, Egypt. Contact: Mohamed Hammad, Marketing Manager, World Promotion Center. Phone: 202-2738278-2738279. Fax: 202-2738303 Email: hammad@wpceg.com URL: www.wpceg.com

1-3 March 2005, Power-Gen Renewable Energy: Moving into the Mainstream at Las Vegas, NV. Contact: Conference Coordinator, Power-Gen Renewable Energy, Registration Dept, 1421 South Sheridan, Tulsa, OK, 74112, USA. Fax: 918-831-9161 Email: pgre@pennwell.com URL: www.power-gengreen.com

24-26 May 2005, 80th Annual Intl School of Hydrocarbon Measurement (ISHM) at Oklahoma City, OK. Contact: Leon Crowley, ISHM Arrangements Chair, ISHM, 1700 Aspen Avenue, Norman, OK, 73072-6400, USA. Phone: 405-325-1217. Fax: 405-325-7698 Email: lcrowley@ou.edu URL: www.ISHM.info


21-26 July 2005, 8th Joint Conference on Information Sciences at Salt Lake City Marriott City Center, Salt Lake City, Utah, USA. Contact: Prof. P.P. Wang, Prof., Duke University, USA Email: ppw@ee.duke.edu URL: http://www.jcis.org/pages/call4paper.aspx


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