

# IA INTERNATIONAL ASSOCIATION FOR ENERGY ECONOMICS

# EE

# Newsletter

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Third Quarter 1998

## President's Message



In this message I'd like to report to you on some of the activities on which your Council is working.

Now that the Association has generated sufficient reserves, Council has decided to reinvigorate its sister organization, The Energy Economics Education Foundation, and provide it with funds to further activities within its charter of operation. Heading this effort is Mitchell Rothman, former Treasurer of the Association. Mitch and his committee are in the process of developing proposed guidelines for such matters as

projects the Foundation would be interested in considering, proposal and selection methods, distribution procedures, fund solicitation procedures and so on. Paralleling Mitch's work, our legal counsel, John Jimison, is updating the EEEF bylaws as these have become somewhat out of date during the foundation's period of inactivity. At the same time we are reviewing the IAEE bylaws and updating these to ensure that the initial funding of the EEEF by the IAEE does not adversely affect its (IAEE's) future finances.

Those of you who have any suggestions or ideas on the course a rejuvenated EEEF should take are urged to contact either me or Mitch Rothman directly.

As many of you know, we now carry abstracts of articles from *The Energy Journal* on-line. We're now looking closely at the possibilities of putting the complete article on-line as well as putting the Membership Directory on-line. These considerations involve not only technical details, which are fairly easily handled, but also security details as access would need to be restricted to members only. Though this also can be handled easily technically, it does involve an administrative cost. Whether the cost is worth the benefit has still to be worked out.

While still on the Internet subject, we are carefully looking at links that might be established with our HomePage. Headquarters has solicited suggestions from Council members and would appreciate other suggestions from the members at large. If you have any suggestions in this area, please contact Dave Williams at HQ ([iaee@iaee.org](mailto:iaee@iaee.org)).

I'm pleased to report that as the result of considerable effort on the part of past president, Dennis O'Brien, and our VP for International Affairs, Guy Caruso, we are very near to establishing an Affiliate in China. The Chinese have worked out arrangements for the funding of the group and Headquarters is now working with their representatives to obtain a membership list and the other details needed to formally set the group up as an Affiliate.

For many years the President has appointed an Advisory Board. Its size and duties have been somewhat ambiguous, due in part to the fact that there are no guidelines regarding it. In view of this, I decided not to appoint a Board this year, but rather to review the matter with a number of past presidents and others and, if warranted, attempt to develop some guidelines. Peter Davies is assisting me in this and we hope to have a report to Council at its Berlin meeting.

Annually, Council presents an Outstanding Contributions to the Profession Award and a Journalism Award. We have just updated the procedures for selecting the winners of these awards. The Association also presents a Best Paper Award for the article judged to be the best from *The Energy*

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## Editor's Note

We have a number of interesting articles this issue, several from the 21st Annual Conference in Quebec City and two drawn from the G8 Ministerial in Moscow earlier this year.

John Ferriter examines the global energy outlook, post-Kyoto. He first looks at what was agreed to at Kyoto and what the key issues are that still need to be resolved. Next he comments on the implications for the energy sector, noting that energy will have to bear the brunt of the emission reduction burden. In light of world energy prospects to 2020, as visualized by the IEA, he comments on the likely widening gap between the Kyoto treaty targets and actual emissions. Finally he looks at policies and measures to close this gap.

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

## Technology's Critical Role in Energy & Environmental Markets

19th USAEE/IAEE Annual North American Conference - October 18-21, 1998

Albuquerque, New Mexico, USA - Hyatt Regency Hotel

Sponsored by: USAEE/IAEE

If you're concerned about the future of the energy industry and profession, this is one meeting you surely don't want to miss. The 19th USAEE/IAEE Annual North American Conference will detail current developments within the energy field so that you come away with a better sense of energy supply, demand and price. Some of the major conference themes and topics are as follows:

**Critical Energy and Environmental Issues in the Next Century: Where Can Technology Make A Difference?**

**A Competitive Advantage in the New Millennium: Use of IT in the Energy Market**

**Technological Change and Government Policy: Experience in the U.S. Gulf of Mexico**

**25 Years After the First Oil Shock: Are Oil Markets Managed and Will They Need to Be?**

**Technology in Energy Modeling: Key Insights and Future Directions**

**Energy Resource Development and Public Lands Policy**

**Debate: Federal/State Jurisdictions for Electricity Restructuring**

**Innovations in Risk Management**

**The Role of Technology in Climate Change Policy**

In the opening session C. Paul Robinson, President, Sandia National Laboratories, will focus on critical energy and environmental issues in the next century. In particular, issues of where can technology make a difference will be addressed. Luncheon speaker Senator Jeff Bingaman (invited) will share with us his views on critical energy issues and congressional initiatives.

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

**Herman Franssen, Petroleum Economics Limited**  
**Jay E. Hakes, Energy Information Administration**  
**Joe Roemm, US Department of Energy**  
**Jennifer Salisbury, State of New Mexico**  
**Robert C. Marlay, U.S. Department of Energy**  
**Edward L. Morse, Energy Intelligence Group**

**Anthony J. Finizza, Atlantic Richfield Company**  
**Mark K. Jaccard, Simon Fraser University**  
**Benjamin F. Montoya, Public Service Co. of New Mexico**  
**Tom Fry (invited), Bureau of Lane Management**  
**Dennis J. O'Brien, Sarkeys Energy Center**  
**Richard Newell, Resources for the Future**

In addition, 25 concurrent sessions are planned to address timely topics that affect all of us specializing in the field of energy economics. Companies today are investing and trading in intensively competitive international energy markets. How these market conditions develop and what kinds of opportunities they create depend very much on the policies governments adopt, not only for promoting competition but also for meeting certain societal goals such as environmental protection. Since markets transcend national boundaries, policies adopted in one country or region may affect competition elsewhere as well as domestically.

The 19th USAEE/IAEE Annual North American Conference provides a unique opportunity for leading experts from business, government, universities, and research institutions to discuss and debate the future of energy markets in this era of commodization, decentralization, and internationalization.

You can be sure that prominent speakers who are on the cutting-edge of energy economic issues will once again address this annual meeting.

Albuquerque, New Mexico is a wonderful and scenic place to meet. Single nights at the Hyatt Regency Hotel are \$119.00 (contact the Hyatt Hotel at 505-842-1234, to make your reservations). Conference registration fees are \$400.00 for USAEE/IAEE members and \$475.00 for non-members. Special airfares have been arranged through Conventions in America (5-10% off the lowest applicable fares, call Conventions in America at - 619-453-3686). These prices make it affordable for you to attend a conference that will keep you abreast of the issues that are now being addressed on the energy frontier.

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

## Technology's Critical Role in Energy & Environmental Markets

19th Annual North American Conference of the USAEE/IAEE

Please send me further information on the subject checked below regarding the October 18-21, 1998 USAEE/IAEE Conference.

Registration Information  Sponsorship Information  Exhibit Information

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Company: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

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

Phone: 216-464-2785 Fax: 216-464-2768

## **22nd ANNUAL IAEE INTERNATIONAL CONFERENCE**

*Grand Hotel Parco dei Principi, Rome, Italy, 9-12 June 1999*

### **Theme**

#### ***New Equilibria in the Energy Markets: The Role of New Regions and Areas***

This three day conference aims at discussing new relations and agreements between North Africa and Middle East producing countries and industrialised regions in the framework of European co-operation. The Mediterranean basin and Black Sea as well as Middle East markets are showing an ongoing process of increasing energy production and capacity but with some security problems. The oil and gas reserves are vast, but are there outlets to consuming areas? What about the transit and security routes for new pipelines? What role should government, institutions and companies play in this context? How can the new free markets in oil, electricity and gas create new equilibria in Europe and Asia? What will be the impact of Kyoto follow-up on the various regions? Which scenarios for the world energy market can be outlined?

Rome will be the best meeting point to provide a unique forum where these and related issues will be debated by experts from around the world to examine opportunities, future trends and challenges of the new and old energy areas.

### **CALL FOR PAPERS**

*Deadline for Submission of Abstracts: 5 January 1999*

Abstracts may be submitted for plenary as well as concurrent sessions. Anyone interested in organising a session should propose topics, objectives, possible speakers to the Programme Chairman well in advance of the deadline for submission of abstracts. Abstracts should be between 300 and 500 words, giving an overview of the topic to be covered. Full details, including the title of the paper, name of the author(s), address(s), telephone, fax, and e-mail numbers, should also be sent. At least one author from an accepted paper must pay the registration fee and attend the conference to present the paper. All abstracts, session proposals and related inquiries should be directed to:

Vittorio D'Ermo, Programme Chairman  
22nd Annual International Conference of the IAEE  
Vice President AIEE  
Via Giorgio Vasari, 4  
I-00196 Rome  
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#### **DEADLINES**

Abstract Submission: 5 January 1999  
Notification of Abstract Acceptance: 4 February 1999  
Manuscript Submission: 4 March 1999

## The Global Energy Outlook in the Post-Kyoto Environment

By John P. Ferriter\*

The International Energy Agency is completing its updated World Energy Outlook for publication later this year. I will share with you today some of the highlights of this new work, and then consider the impact of its findings on policies to meet Kyoto commitments.

I would like to discuss:

- What was agreed at Kyoto?
- What are the key issues that still need to be resolved?
- What are the implications for the energy sector?
- What policies and measures are available to realize the Kyoto commitments?
- Some thoughts about the road ahead.

### What Was Agreed at Kyoto

Last December in Kyoto, Japan, negotiators from over 160 countries agreed on a Protocol to reduce greenhouse gas emissions. The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) represents a major step forward in the world's effort to respond to the climate change challenge in the decades to come.

The Protocol text, however, is complex and subject to varied interpretations. The world community is still trying to grasp its major provisions, to comprehend its implications for energy and environmental policies, and to exploit the flexible approaches that it offers to reduce greenhouse gas emissions.

Since exhausted negotiators went home from Kyoto with the completed document in hand, the International Energy Agency has studied the essence of the agreement and the role of IEA governments in the post-Kyoto follow-up. I will share with you today a few tentative conclusions. But to begin, let us review what was actually agreed in the text.

### Emissions Reductions

The central commitment in the treaty is quantified greenhouse gas emissions reductions for the world's industrialized countries, the so-called, Annex I countries. The developing countries, for now, are not bound to make commensurate reductions in their own emissions.

Overall, the Annex I countries agreed to reduce greenhouse gas emissions by about 5 percent from 1990 levels.

The specific reductions from 1990 levels vary from country to country. Most Annex I countries agreed to an 8 percent reduction. The United States agreed to 7 percent and Canada, Japan, Hungary, and Poland to 6 percent. Certain countries claimed special circumstances and pledged to stabilize or were even allowed to increase emissions. Russia, New Zealand and Ukraine will maintain their 1990 levels, while Norway will increase by 1 percent and Australia by 8 percent above 1990 levels.

The Protocol deals with six greenhouse gases. It is important to place the relative role of energy in context with

\*John P. Ferriter is Deputy Executive Director, International Energy Agency, Paris, France. This is an edited version of his remarks at the 21st Annual International Conference, May 13-16, 1998 in Quebec City, Canada.

<sup>1</sup> See footnote at end of text.

these other greenhouse gas sources and carbon sinks. Not all greenhouse gas emissions are energy-related; but the energy sector will be expected to provide the bulk of the prescribed reductions.<sup>1</sup>

### Flexibility Mechanisms

The Protocol contains several new "flexibility mechanisms" to help Annex I countries achieve their emission reductions in a flexible manner and at lower cost. First, emissions targets are to be reached over a 5 year period rather than by a single year. Allowing emissions to be averaged across five years is intended to smooth out short-term fluctuations in economic performance or weather. The first target period will be from 2008 to 2012. Second, several articles allow Parties to collaborate in the pursuit of meeting their commitments:

1. Groups of countries may "share out" their targets among themselves. In protocol lingo this has come to be called *bubbling*.
2. *Joint Implementation (JI)*: verifiable emission reductions achieved through specific, individual projects in any Annex I Party may be transferred to other Annex I countries. The Party receiving the reduction would see its allowable emissions increased, while those of the other Party would be correspondingly reduced.
3. *Emissions trading*: Parties with emission commitments may trade emissions to fulfill their respective commitments. Parties that are fortunate enough to have overfilled their reduction requirement may sell the "surplus" to any other Party.
4. *Clean Development Mechanism (CDM)*: This is designed to harness the resources of the private sector and extend investments under the Protocol to the developing countries. It will enable certified emission reductions from sustainable development projects in a developing country (non-Annex 1) to be transferred to an industrialized country (in Annex 1).

### Outstanding Issues from COP-3

The Kyoto Protocol plainly leaves a number of other questions open.

#### Entry into Force and Compliance

The first and foremost issue is entry into force. The Kyoto Protocol still has a number of hurdles to clear before it comes into force.

No less than 55 Parties must consent to be bound, including Annex I Parties which must represent at least 55 percent of Annex I greenhouse gas emissions in 1990.

The Protocol has already started along the long path to entry into force. So far, 24 countries have signed the convention. Just last month, the 15 nations of the European Union signed, along with Canada, Monaco, Brazil and Norway.

Conspicuously absent is the United States where the Protocol is under intense criticism in the Senate that could delay its ratification.

A majority of the Senate pledged before Kyoto that they would not ratify without developing country commitments. There are none in the Protocol.

The United States alone emitted about 36 percent of the Annex I total in 1990. Russia accounted for another 17 percent. Clearly, if both of these countries do not ratify, it will not come into force. However, the Protocol could

conceivably come into force without the United States.

Compliance issues have been left largely open for future negotiation. What are Parties legally bound to do? Are there any "teeth" to this treaty? For now, the Protocol lacks a procedure to impose specific consequences for noncompliance.

#### **Future Commitments by Developing Countries**

Kyoto did not set in motion an official post-Kyoto process to involve developing countries in future emissions limitations. This is the most important challenge remaining for the convention negotiators, and will be a key issue at the next meeting of the Parties (COP-4) scheduled for this November in Buenos Aires.

#### **Implications for the Energy Sector**

Even a superficial reading of the Protocol demonstrates that energy is at the heart of the Kyoto program. Since energy contributes decisively to the problem, energy will have to bear the brunt of the emission reduction burden.

Quantifying the exact level of required reductions in energy-related emissions is extremely difficult. The task is complicated by the wide range of natural and anthropogenic sources of greenhouse gases, as well as by the costs and political implications of abating emissions in various sectors.

What is incontestable is that carbon dioxide emissions from fossil fuel combustion represent about four-fifths of all man-made greenhouse gas emissions in the industrialized countries. Policymakers will have to direct their efforts toward controlling fossil fuel emissions. The question remains which basket of policies and measures should be chosen to meet the Kyoto challenge.

#### **World Energy Prospects to 2020**

The IEA World Energy Outlook studies long-term trends in energy supply and demand, with detailed estimates of variations by geographic region and by the type of energy related services demanded.

The preliminary conclusions of this study are available now – *World Energy Prospects to 2020* was presented by Robert Priddle to the G8 Energy Ministers at their Moscow meeting in April. I will use the findings of the *World Energy Prospects* to frame the extent of the challenge we face post-Kyoto – but first I want to say a word about the vagaries of forecasting the future.

As we all know, the future is uncertain. And we at the IEA have no better ways of seeing into the future than anyone else. So when we talk about the future of energy, we cannot lose sight of these uncertainties. History is replete with surprises that we see now only with the benefit of hindsight. The future will undoubtedly bring more of the same.

Looking back over the last thirty years, we can list several of these watershed changes; few of them were foreseen by the forecasters of yesterday.

- the oil crises of 1974 and 1979;
- the rapid growth in non-OPEC oil supply since then; and
- low oil price levels of today;
- the present concerns over nuclear power, or;
- the rapid economic growth in Asian countries.

Yet they have all affected the way we look at the energy world.

#### **The Business-As-Usual Projection**

Of course, there are some trends in energy demand that

have been remarkably stable through the last three decades. The IEA has sought to capture these trends in its *World Energy Outlook*, and use them as the basis for the "Business-As-Usual" case.

Business-As-Usual essentially continues these past trends in energy supply and demand through the year 2020. The continuation of past trends is not a simple one. The IEA publishes energy demand and supply statistics for virtually all countries of the world. These data include details for individual fuels and for the different economic sectors.

We have made a detailed energy demand analysis of these data for each of eleven world regions. We have divided the OECD region into Europe, North America and the Pacific. Russia is separate from the other Transition Economies. China, too, is considered separately. The other regions are East Asia, South Asia, Latin America, Africa and the Middle East.

For each region we have analyzed the effects of changing economic activity levels on the demand of each of the main fuels. Where data on fuel prices are available we have taken them into account.

Our analysis is not only organized along regional differences, but also by the type of service for which energy is used. Today, we'll look at three: electricity consumption; fuels used for transportation – called mobility; and fossil fuels used for stationary energy (mainly for heat in buildings and processes).

The IEA has observed the following past and future demand trends in these services:

- Electricity consumption has grown in step with GDP since 1960. Its growth apparently is not affected by the oil shocks.
- Mobility demand has also grown in step with GDP since 1960 with the exception of the downward shift in North America at the time of the second oil shock (1979-82).
- Fossil fuels used in stationary energy include heating in buildings and industrial processes. Fossil fuel demand for stationary heat purposes has been strongly influenced by the two oil shocks. Heat-related fossil fuel demand in OECD countries as a whole has stabilized. Since the late seventies, most of the increase in the stationary use of fossil fuels for heat services has taken place outside the OECD, where it is expected to continue to rise with income in developing countries.

Fuel used for these three services has moved closely with economic activity – Gross Domestic Product – over the period since about 1971. Our Business-As-Usual Case finds that these trends are likely to continue into the future provided that energy policies, economic activity and energy prices continue into the future much as they have in the past. I would like to return to these important qualifiers a bit later. But for now, let's delve a little more into the Business-As-Usual case and what it means for the regions and services.

The result of our analysis indicates the Business-As-Usual world will continue to be a world powered by fossil fuels. Fossil fuels are expected to provide 95 percent of additional global energy demands to 2020. Oil continues to dominate world energy consumption, with transport use increasing its share of oil demand. Gas consumption rises to equal that of coal consumption by the end of the period. Nuclear power and the use of hydro power stabilize while

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## **The Global Energy Outlook....** (continued from page 5)

other new renewables increase steadily, but from a very low base. Relative to fossil fuels, they remain at low levels.

We believe that over the period to 2020, decisions on new nuclear power plants will be made on mainly political, rather than on economic grounds. The same holds true for renewables, as site specific and political issues tend to dominate economic considerations.

The geographical pattern of energy demand is projected to shift from the OECD region to developing countries. China and the other developing countries are expected to account for 68 percent of the increase in energy demand between 1995 and 2020.

The distribution of world energy use will, of course, depend on assumptions of economic growth for the world regions. The Business-As-Usual projection has assumed average rates of growth roughly equal to those we have seen in the last 25 years – about 3.1 percent per annum in real GDP using 1990 prices and purchasing power parities.

We assume that the developing countries will continue to grow faster than the developed world. But we see all regions having lower economic growth rates in the future than they have had in the past. This is due to falling birth rates and aging populations in the OECD. In developing countries, we expect declines as countries achieve higher living standards.

Because the faster growing countries are gaining larger shares of world GDP, the world economic growth rate remains unchanged with Business-As-Usual.

While the world economy is expected to continue to grow, energy intensity is expected to fall for the world as a whole, continuing the downward path observed over the past 15 years.

CO<sub>2</sub> emissions rise with primary energy demand; and slightly faster than in the past, meaning that carbon intensity does not fall with energy intensity. Contributing factors are the halt to new nuclear power generation and the continued rapid growth in solid fuel use in China and other Asian countries.

Since there are so many of us here who study the oil market, let me digress for a moment and show you our latest thinking on long-term prospects for oil.

We expect that demand for oil to continue to rise at about 1.8 percent per annum to 2030 under Business-As-Usual.

The supply trend of oil is based on estimates of the ultimate recoverable reserves of conventional crude oil – an uncertain number that has been under brisk debate recently. The U.S. Geological Survey in 1993 reported a range of 2.1 to 2.8 trillion barrels. Experts differ on these figures. Some take a longer view, emphasizing geological and statistical issues. Some take a higher view, arguing that advancing technology will help discover more reserves and make a wider range of already known deposits economic to produce.

Experience in mature oil regions indicates that oil production builds to a peak then falls away. This peak occurs when approximately half of the ultimately recoverable reserves has been produced. This has been the experience in the United States.

In our analysis, this approach has been applied on a regional basis. It indicates that a peaking of conventional oil could occur between years 2010 and 2020. The timing depends mainly on assumptions for the level of oil reserves.

Our assumption is 2.3 trillion barrels of ultimate recoverable reserves of conventional oil – the most probable value

given in the United States Geological Survey study.

Oil supply from producers outside the Middle East OPEC countries is expected to decline after the year 2000. Oil supply from Middle East OPEC producers is expected to peak around 2015. Liquid fuels from non-conventional sources (natural gas liquids, deep off-shore oil, heavy oils and tar sands) could begin to play an increasingly important role as 2020 approaches, and the price of conventional oil rises.

The key message from this analysis is that the world will be increasingly dependent on OPEC Middle East oil reserves into the next millennium. We may differ on the numbers and the timing might vary – but we all should consider how to prepare for the day when the falling curve of non-OPEC supply crosses the still rising curve of Middle East conventional supply.

Emissions growth has up to now gone hand in hand with economic growth, particularly in the developing world. The growth in emissions will continue despite continuing reductions in energy intensity.

Under these assumptions, the IEA model predicts world energy demand growth of 65 percent between 1995 and 2020. In the absence of new policies to curb energy use and greenhouse gas emissions, CO<sub>2</sub> emissions will grow by 70 percent in the same period.

Developing countries will contribute a large share of the emissions growth. The increases in CO<sub>2</sub> emissions projected for China and the rest of the developing world between 1995 and 2010 are large – almost three quarters of the total projected increase.

The situation is not much different in Annex I countries; CO<sub>2</sub> emissions in the OECD are expected to rise continuously during the outlook period in the Business-As-Usual case.

So, how does the OECD break the link between economic growth, increasing energy demand and greenhouse gas emissions? Before we can begin to answer, we have to have an idea of how energy is used in the economy and where our options lie.

### **The Kyoto Gap**

Without significant new policies, the OECD countries will experience a widening gap between their Treaty targets and actual emissions. Preliminary IEA analysis points to an increase of approximately 2.4 billion tonnes in energy-related CO<sub>2</sub> emissions in Annex I countries between 1990 and 2010. OECD countries, as a whole, will have to reduce their energy-related emissions by approximately 3.2 billion tonnes CO<sub>2</sub> by the first “commitment period”.

This reduction is huge – it represents almost a 30 percent cut from the Business-As-Usual level in 2010. It is roughly equal to CO<sub>2</sub> emissions from fuel combustion for all of countries of the European Union in the year 1995.

### **Response to the Challenge: Two Illustrative Policy Approaches**

So far governments have not yet chosen the policies they plan to adopt to meet their Kyoto commitments. For this reason, I will hold myself to the constraints of Business-As-Usual when talking about how the Kyoto commitments will be met.

Here are two illustrative “Kyoto analyses” which describe the scale of measures that will be needed to effect changes in energy use sufficient to meet Treaty commitments. They both require a combination of energy saving and replacement of coal use in power generation by nuclear or renewable energy forms of generation.

The first analysis assumes that approximately half the reduction in CO<sub>2</sub> emissions is achieved by imposing the same additional uniform reduction in energy intensity across all of the energy related services. This is the classic "command and control" regulatory approach to promoting energy savings.

In the command and control model, energy intensity would have to be reduced approximately 1.25 percent in each energy service in all of the OECD regions. (This is in addition to the 1.25 percent decline already assumed in our Business-as-Usual case.) This would achieve half of what was promised at Kyoto.

The second analysis achieves half the reduction in energy intensity by adding a carbon value to the price of fossil fuels. This is the "uniform carbon value" approach to energy savings.

In the "uniform carbon value" approach, fossil fuel prices would have to increase by the equivalent of \$250 per ton of carbon to bring about the same demand reduction. This again would achieve only *half* of what was promised at Kyoto.

What would be the impact of an increase in the cost of fuels of \$250 per ton of carbon? Real energy prices for end users would rise to levels not seen since the 1979-80 energy crisis.

In both cases, the other half of the CO<sub>2</sub> emissions reductions is achieved in the power generation sector. Both cases assume that post-Kyoto decisionmakers will substitute non-fossil (nuclear or renewable) as much as possible for fossil power generation. This is a key condition, and is a major part of both our cases.

It is clear from this projection that early retirement of a large number of coal-fired plants would be required to replace half of the coal-fired power generation in OECD countries in 2020 by non-fossil technologies to meet Kyoto commitments.

Solid fuels use will grow to take a larger share of power generation in the world as a whole over the outlook period. Under these assumptions, most new plants built use natural gas when it is available. They use coal where gas is scarce or gas imports are expensive, as in China and India. Only countries with current nuclear programs are assumed to build nuclear plants in the future.

#### **Response to Kyoto: Policies to Close the Gap**

##### **The Scale of the Problem**

These Kyoto analyses are purely illustrative. But they do indicate that new policies adopted to meet the Kyoto commitments will involve major changes in the Business-As-Usual projection that have yet to be determined.

I imagine we would all agree that achieving 1.25 percent reduction in energy intensity across all sectors will be extremely challenging. The effort would require a comprehensive and aggressive set of policies that could meet considerable resistance in the affected sectors.

Governments will choose the set of policies and measures that fit their own domestic economic and political circumstances. There are many potential responses other than the two general approaches mentioned here.

In fact, several IEA governments have undertaken studies that conclude that Kyoto reductions can be met at reasonable net cost and possibly with positive impacts when efficiency gains from innovation are realized throughout the global economy.

The key to interpreting the many renditions of the post Kyoto energy world is the mix of measures proposed to address

the problem. The Business-As-Usual case demonstrates the scale of the problem; not the methodology for solutions.

For these reasons, it is best that you take with you today not a formula for how to respond to the Kyoto challenge, but a notion of the scale of the response necessary to achieve it and the variety of measures available to policymakers.

##### **Where Can We Find the Reductions?**

So where will the Annex I countries find the emissions reductions to which they are committed?

Electricity generation is perhaps the best vehicle for greenhouse reductions. It is the largest, fastest-growing sector and most sensitive to higher fuel costs. It is also the easiest to tackle since there is a limited number of individual actors. The biggest potential for emissions reduction in electricity generation is fuel switching, mostly from coal to gas, nuclear and renewables.

Stationary fossil fuel end use – mostly heating – represents the second most promising area. It is the second largest sector in IEA countries (the first in developing countries), and there are significant opportunities to switch to cleaner fuels.

While transport is the smallest energy service in terms of energy demand, it is growing rapidly. However, transport's sensitivity to higher fuel prices is extremely low, therefore, measures will have to aim less at influencing demand and more at improving the efficiency and carbon intensity of transport.

When looking at transport one must keep in mind:

- The level of taxes which already exists on gasoline. In most IEA countries they are already quite high;
- That most people, for their pleasure and convenience, want to benefit from individual mobility; and
- Fuel costs, including taxes, are only a small portion of the total cost of mobility. Depending on the car and the location, they account for only 20 to 30 percent of total costs.

New technology can offer the road to a sustainable transport sector; but in this case a dramatic breakthrough is needed. Recent improvements in alternative technologies lead me to optimism, but I am more guarded on whether the Annex I countries will be able to make a dent in transport emission in the Kyoto time frame.

There is, however, an opportunity to "get transport right" in developing countries. Facing enormous costs to build the transport infrastructure, produce or import cars, and import or produce fuels, the developing countries have a clear incentive to explore efficient alternatives.

##### **What Kind of Policies**

Now that we have identified the areas of opportunity, let's consider the policies that can achieve reductions in energy related CO<sub>2</sub> emissions.

These policies will fall mainly into the following categories: 1) switching to less carbon-intensive fossil fuels: from coal to oil or gas, from oil to gas; 2) switching from fossil to non-fossil fuels; 3) switching to more energy efficient equipment, and management practices to provide the same level of service; and 4) switching expenditures to less energy-intensive products and services.

In all these cases, governments, industries and other institutions must choose whether and how strenuously to act in their own or in other countries.

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## The Global Energy Outlook.... (continued from page 7)

Some actions are already taking place and will not require new policies. We have included these trends in our Business-As-Usual case projections:

1. The share of gas will rise relative to that of oil and coal;
2. New nuclear plants will be built and the use of renewables in power generation will increase; and
3. Energy use will rise more slowly than economic activity.

Generally, policy instruments that can promote emissions reductions tend to fall into two main categories: command and control (regulation), and policies that affect prices. The IEA is examining the merits of a wide range of instruments in these categories. Of course, no single measure will suffice. Actions will be required in all sectors, but they will need to be tailored to those sectors.

The Kyoto Protocol is part of a longer-term process that will extend far beyond the first "budget period" from 2008 to 2012. For longer term solutions, innovation in energy technology will be a key factor.

The Kyoto commitments call for this long-term view, but IEA countries have, nevertheless, passed through a R&D drought where budgets declined in real terms during the 1980s, as private sector R&D budgets continue to be squeezed by the effects of global competition.

I am happy to report that the drought might be over and that budgets have appeared to stabilize recently. However, the question remains if current research is enough to stimulate tomorrow's innovation. R&D resources invested today are a down payment for the technologies we will rely upon in the future.

The involvement of industry in the Kyoto response will be critical. However, for industry to work effectively, certain conditions must be in place. First, a clear goal is essential. Uncertainty and lack of clarity drain energy and effort and money away from meeting goals.

Second, industry must be given the flexibility to meet the goals as it deems best. Flexibility will ensure cost-effective and creative responses.

Third, transparent and competitive markets and other incentives are needed to increase the use of efficient and cleaner technologies. This is true for both developed and developing nations.

### Conclusions

The challenge for governments to meet their Kyoto commitments is a daunting one. The energy Ministries of IEA and other Annex I countries are actively considering the basket of policies and measures that they will need to implement the Kyoto targets.

At the end of the day, each country will have to make its own decisions on these matters. I believe, however, that IEA countries will seek to utilize market forces to reduce emissions at lower cost. They will adopt policies that are consistent with a sustainable development approach, which will maintain global economic growth and energy security on an environmentally sound basis.

Progress towards achieving the Kyoto objectives will require:

- Close cooperation among governments and between governments and industry;
- Recognition by individual consumers of the need to act;
- Development of "flexible measures", particularly emis-

sions trading;

- Stronger efforts to promote energy efficiency;
- Enhanced collaboration in research and development of renewable and energy efficiency technologies;
- A public airing of the nuclear option; and
- Participation of developing countries, since there can be no solution to the global climate change problem without them.

The world has taken an historic step by agreeing to the Kyoto Protocol. Judging from our analysis, an historic response will be necessary to achieve our goals.

I am still confident that we can meet the challenge. The Kyoto Protocol demonstrates that our countries possess the indisposible ingredient in making social change – political will. If we have the will, we can find the way, and the next 25 years will move far away from "Business-As-Usual".

### Footnote

<sup>1</sup> The six greenhouse gases covered by this agreement are: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF<sub>6</sub>).

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

*Journal* in the past year. Hossein Razavi and Headquarters are now updating the guidelines for the selection of these winners.

Finally, Council is anxious to expand the number of Affiliates and toward this end has asked Headquarters to provide all necessary assistance to individuals willing to spearhead such an effort in their country or area. Elsewhere in this issue you'll find an ad to this effect. I encourage anyone interested in this to contact IAEE Headquarters directly.

As you can see, the summer months are not idle ones for your Council. It is busy at work. I hope the summer is going well with all of you and will look forward to seeing many of you at the Berlin Regional Conference on *Energy Markets: What's New?* on 9 and 10 September.

Charles Spierer

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# DISTRIBUTED RESOURCES: TOWARD A NEW PARADIGM OF THE ELECTRICITY BUSINESS

*Edited by Adonis Yatchew and Yves Smeers*

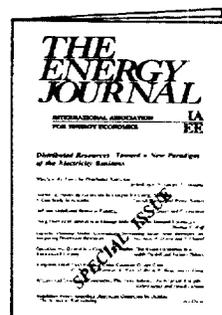
As electricity industries worldwide move toward restructuring, rationalization and increased competition, a variety of factors are combining to increase the prominence of distributed resource alternatives. These factors include: increased cost-effectiveness of small-scale generation; reduced confidence in long lead-time large-scale projects; increased pressure to find cost savings; changing regulatory relationships; new developments in technology; growing emphasis on environmental factors; and greater uncertainty about long-term load growth. This new special issue examines the emerging distributed resources paradigm. The DR paradigm promises to increase efficient use of resources by tailoring resource acquisition and rate design to local conditions. Several distinguished authors present their views in this concise, balanced and readable primer to the DR paradigm.

## CONTENTS

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- Distributed Electricity Generation in Competitive Energy Markets: A Case Study in Australia
- Defining Distributed Resource Planning
- Using Distributed Resources to Manage Risks Caused by Demand Uncertainty
- Capacity Planning Under Uncertainty: Developing Local Area Strategies for Integrating Distributed Resources
- Control and Operation of Distributed Generation in a Competitive Electricity Market
- Integrating Local T&D Planning Using Customer Outage Costs
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- Regulatory Policy Regarding Distributed Generation by Utilities: The Impact of Restructuring

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**ABOUT THE EDITORS:** Dr. Adonis Yatchew is professor of economics at the University of Toronto, and joint editor of *The Energy Journal*. Professor Yves Smeers of the Catholic University of Louvain has been lecturing for 25 years, chiefly in Industrial Engineering, and has written over 50 major articles in this field. He has served as a consultant for international organizations and various energy companies in Belgium, Canada, France, Germany, Norway and the UK.



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## Energy Investment and the Moscow G8 Energy Ministerial

by Lise Weis and Isabel Murray\*

The first 100 days of Prime Minister Kiriyenko's term in office have not been easy ones and it doesn't look like it will get any easier soon – from increasingly difficult financial problems, pressure on the ruble due to investor cooling in the wake of Asian financial turmoil worsened by the continuing non-payment problems, international debt servicing pressures and the impact of low oil prices on a country given that oil and gas still account for almost half of Russia's hard-currency export revenue, to the crack down on tax collection and tax evaders, the formulation of a package of crisis measures and pressure on the Duma to adopt them and the recent passage in third reading by the Duma of PSA related legislation. This ongoing flurry of news and events began during the week leading up to the G8 Energy Ministerial in Moscow. At the end of March, President Yeltsin surprised the world with the decree dissolving his cabinet and if the other G8 government representatives needed a reminder of the lack of a stable investment climate in Russia, they got it in the form of the term "acting" before the titles of each of their Russian counterparts. The new government has provided solid leadership since it was given its mandate with the energy sector and investment a key focus. This was made clear by then "acting" Prime Minister Kiriyenko in his opening address to the G8 Energy Ministers. Having stepped into these shoes from his portfolio as Minister of Energy, Kiriyenko understands all too well how vital this sector is to Russia, especially now.

The International Energy Agency (IEA) jointly with the Energy Charter Secretariat (ECS) prepared a background paper for Energy Ministers on Energy Investment for the G8 Energy Ministerial in Moscow April 1, 1998. In it the IEA and the ECS assessed future energy investment needs and the benefits which national economies could gain from private sector energy investments. The paper identified the policies needed to attract private sector investment, whether domestic or foreign. G8 Energy Ministers were invited to widen awareness of the importance of energy investments for world economic growth and trade by bringing the conclusions, and recommendations based on this paper to the attention of other governments.

In general, the paper covered:

- **Growing need for energy investment:** All countries will need to assure a supportive climate for investment to meet their energy needs, enhance efficiency and improve environmental quality. Energy investment requirements will amount to 3 or 4 percent of world GDP over the next two decades. As a percent of GDP, the needs will be higher still in the transition economies, because of the need to replace or

\*Lise Weis works at the Energy Charter Secretariat in Brussels on investment matters in the Negotiations Directorate. Isabel Murray works at the International Energy Agency in Paris on Russian Co-operation in the Office of Non-Member Countries. This paper is based on the Energy Investment paper jointly written by the Energy Charter Secretariat and the International Energy Agency which was presented to the G8 Energy Ministerial in Moscow, 1 April 1998.

modernise obsolete and inefficient plants and infrastructure.

- **Investment competition:** There is no shortage of capital for global energy investment – the problem lies in how to mobilise it. Energy projects will be in competition with other investment opportunities in both domestic and international markets.
- **Socio-economic benefits:** Investments in the energy sector provide a range of socio-economic benefits in the regions and countries where they are made. These include job creation, increased tax revenues and competitiveness, as well as infrastructure, transfer of modern technology and managerial techniques, improved efficiency and the ability to reallocate government spending.
- **Meeting energy investment needs depends on competitiveness:** Countries' ability to mobilise enough capital for their energy investment needs will depend on the quality of their investment, fiscal and regulatory policies. This in turn will crucially affect the rate of economic growth and living standards in those countries.
- **Thorough assessment of market, financial and legal risks:** One of the most important considerations for potential investors will be a country's political and economic stability. Companies will also evaluate other market, financial and legal risks. The main areas will be market access, including market structure, discrimination and bureaucracy and market operation, including the legal framework, the financial environment and market conditions.
- **Excessive bureaucracy or discrimination hinder market access:** Companies will want to know that they can obtain any consent needed for new investments through procedures based on clear and consistent criteria and avoid bureaucratic complexities and delays. Foreign investors will be particularly deterred if there is discrimination on nationality grounds.
- **Attractive market structure:** Traditionally, in many countries, the scope for private sector activity in the energy field has been limited by the involvement of government and State enterprises. There is now widespread recognition that liberalisation, including privatisations and reduction of monopolies yields major benefits for the efficient operation of energy markets. Governments need to ensure fair competition, including control of monopoly behaviour, and avoid distortions in energy prices.
- **A stable and effective legal environment:** Companies will always look closely at the overall legal and administrative framework in a particular country. They want to be sure that they can, if necessary, protect their investments by recourse to law. This matters most in cases where agreements they have entered into are not being complied with by other parties, or where customers have defaulted on payments. Dispute resolution is an important aspect of this issue, including, whenever necessary, access to international arbitration. In a wider sense companies will want to feel protected against crime and corruption.
- **Pattern of legal and fiscal stability is needed:** In countries where appropriate legal and/or fiscal regimes are still being developed or have not long been in place, governments will need to take positive action to create investor confidence through strong and stable legal guarantees. International treaties can provide a broadly-based, secure

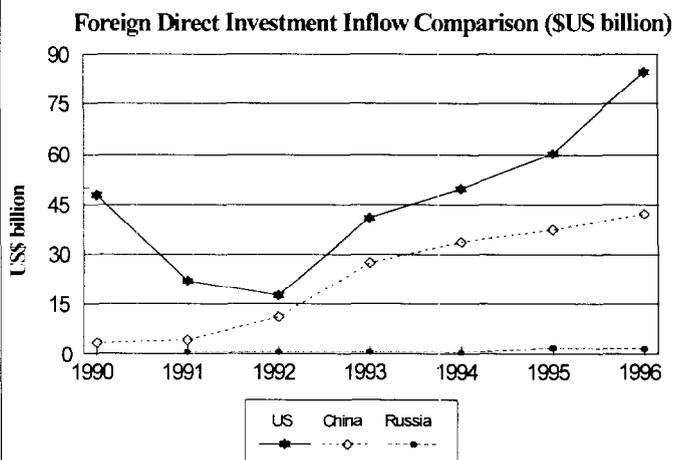
and stable foundation for large-scale investments with long pay-back periods. Examples are the Energy Charter Treaty (ECT) and its future extensions, a Multilateral Agreement on Investment being negotiated under the OECD, bilateral investment treaties and production sharing agreements in upstream oil and gas investments.

- **Proper taxation rules:** The viability of an energy investment will depend crucially on the relevant tax regime. Experience has shown that an unstable or unbalanced tax system can be the single most important factor in deterring investors. This has been particularly true where taxation is based on gross revenues rather than on profits, with allowance for incurred costs. A system which favours short-term government revenues can jeopardise long-term investment benefits.
- **Access to energy transport systems and trade:** Companies will want to know whether they can move their future production to domestic or international markets. They will ask for secure access on fair terms to local and national energy transport systems, such as pipeline networks or electricity grids. They will also be sensitive to any likely restrictions on their ability to export or import energy, or on their purchases of energy equipment or services from abroad. A regime which follows World Trade Organization Rules will provide companies with considerable assurance in this regard.
- **Energy efficiency and the environment:** Governments should ensure that attention is also given to investments in energy efficiency and in energy-related environmental projects, along with investments in energy supply.

Energy is vital to prosperity in developed countries, countries with economies in transition and developing countries. But the sector faces a fundamental challenge: to attract investment in today's fiercely competitive financial markets, now that the system of state management has disappeared. Energy investment projects compete with other investment opportunities across the domestic economy and internationally as well. In the area of new power generation capacity alone, the World Bank estimates that Asia would require about \$30 billion/year and Latin America about \$15 billion/year and estimates the gap between savings and investment needs by 2005 at about \$50 billion/year in both Asia and Latin America. In Russia and Eastern Europe the World Bank estimates this gap at about \$10-15 billion/year. The crux of the issue is whether these countries will be able to attract enough private domestic and/or foreign investment to meet their energy needs.

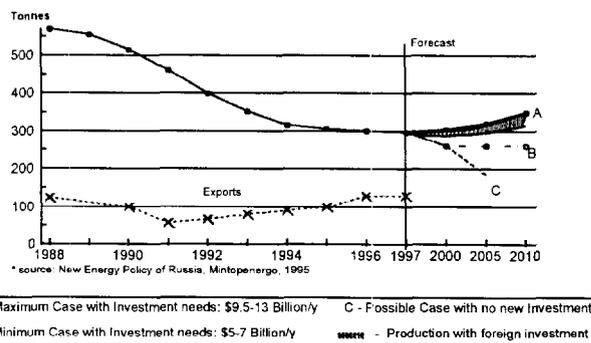
Foreign direct investment acts as a supplement to domestic savings. The following chart compares the different levels of foreign direct investment inflows over the last 15 years in the United States, China and Russia. The United States attracts more foreign investment than any other country; U.S. companies are also actively investing abroad and giving the United States its position as the largest source of foreign direct investment. Since 1990, China has created an investment environment which is increasingly attracting foreign direct investment to promote and help sustain its high GDP growth rates. The comparison between Russia and China is striking, with China attracting over \$42 billion in 1996 compared to less than \$2 billion in Russia. (In 1997, preliminary estimates

show foreign direct investment to China and Russia at \$32 billion and \$3 billion, respectively).



In Russia, oil production has at last stabilised and recently started to grow slightly. But, according to a statement by the Russian Ministry of Fuel and Energy in 1996, there could be a further decline to levels below 200 MT/y by 2005, unless significant investments are made to increase recovery in existing fields and, more importantly, to develop new fields. As shown in the graph below, Russia's annual investment needs are estimated at a minimum of \$5 to \$7 billion and a maximum of \$9 to \$13 billion.

**Russian Oil Production and Exports  
History and Forecast Dependent on Investment**



Three conditions are crucial to meeting that challenge. And they are particularly relevant for Russia and other economies in transition in continuing the work of establishing a favourable investment climate. They are:

- the establishment of an efficient market,
- the sanctity of contracts under the rule of law,
- the application of non-discriminatory, profit-based taxation.

None of these conditions is sufficient in itself to attract investment; all three need to be fulfilled.

Current energy policy in most of the economies in transition remains characterised by non-payment, discretionary and often discriminatory decisions on allocation of export permits, cross-subsidization and a substantial differential between domestic and export price. The ability to access the

(continued on page 12)

## Energy Investment *(continued from page 11)*

most lucrative markets determines the profitability of the investment. Price differential combined with limited and selective access to the most lucrative markets almost "invite" crime and corruption. This situation is significantly worsened by the non-payment problem. This fundamental market failure undermines competition. It undermines the security necessary to promote any private investment. A fundamental attribute of a functioning market is that it is underpinned by a culture and a legal system which makes selling and buying a real process, a process followed by a transaction. Without a functioning market, reasonable and even investor-friendly legislative reforms alone are not sufficient to stimulate investments in a sector.

The best way to encourage competition is to work towards elimination of discretionary measures. This will give private investors, domestic as well as foreign, the necessary signal that a frame of economically viable terms for investments is seriously contemplated. Where the price of the products is not determined by the market – driven by supply and demand – there is an overwhelming danger that the most efficient allocation of resources is not achieved.

Future investment demands the security of international market practice and the allocation of resources to profitable and cost-efficient projects. Non-discriminatory access and the eventual elimination of price differentials are primary objectives in this process. They are supported by the binding provisions of the Energy Charter Treaty. For formerly centrally planned economies, the transition to competitive markets will take time. Recent and current experience of deregulation in Western Europe provides many lessons in this respect, and it is one of the central working objectives following the Treaty's entry into force.

The rule of law and sanctity of contracts within a free-market are basic needs for investors. One of the worst fears for investors is the possibility of fundamental changes to the legal regime governing an investment which would undermine the fiscal or contractual undertakings that formed the basis of original investment decision. Delay in developing an adequate legal regime or reliance on piece-meal regulation also heighten investor uncertainty. This is a significant issue for transition economies where there is no "track record" regarding sanctity of contracts. It will take time to develop one. These economies need to move more quickly to put in place comprehensive systems of legal regulation which will provide strong assurances to investors making large-scale long-term energy investments.

There are immediate and relatively low-cost measures that governments can take to promote investor confidence, such as becoming party to international treaties, bilateral and multilateral, which provide for basic guarantees required by investors: enforceable contracts backed by sound and stable domestic legislation and legally enforceable international agreements, including access to international arbitration. Obvious examples are the Washington Convention on the Settlement of Investment Disputes, the Energy Charter Treaty and a future OECD Multilateral Agreement on Investment (MAI) which is currently under discussion in the OECD.

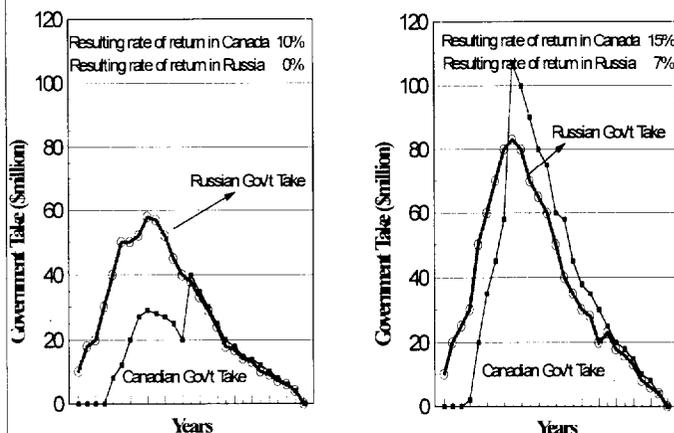
Experience in many countries has shown that investors regard Production Sharing Agreements (PSAs) as an alterna-

tive mechanism on which to base major investments especially while an overall tax regime is being drafted and put into place. The recent boom in investment in Azerbaijan shows how legal and fiscal arrangement for PSAs can attract investment, especially when it is underpinned by strong treaty obligations. Azerbaijan was among the first countries to ratify the ECT. It has signed PSAs involving total investment of over \$30 billion since September 1994. In Russia, the Sakhalin I and Sakhalin II PSA projects are already underway. They are expected to bring the Sakhalin region more than \$40 billion in investment over the next 10 to 15 years. Although Russia enacted a PSA Law in 1996, many domestic and foreign investors continue to wait while the Russian State Duma considers amendments to it and passage of related legislation for the PSA Law to become fully effective. Resolution of the PSA issue would provide a boost to investor and lender confidence in Russia generally.

Finally, risk of fiscal change is a major concern to investors making large upfront investments, especially in regions with little or no history of fiscal stability. Frequent tax changes are due in part to the nature of gross-revenue based regimes where governments need to make adjustments to benefit from changes in prices or costs. Profit-based systems are more self-adjusting and give a better basis for investors to assess the fiscal impact over the life of their investment project. Such systems do not impose a heavy tax burden in the early years of production which would negatively affect projected rate of return. This can be seen in the following chart, which compares the impact on project rate of return and the tax revenues over the life of the same oil project under the Canadian tax system (a representative of profit-sensitive tax regimes) and under the current Russian tax system, which is essentially based on gross revenues. Taxation which aims to maximise short-term government revenue may jeopardise the long-term economic goals of attracting investments, providing long-term employment, income and a widening of the tax base. Finding the right tax structure is of particular importance to Russia given the state's heavy reliance on oil-related revenues. In 1997 about two-thirds of the income from oil sales went to fund federal and regional budgets in the form of royalty, taxes and other contributions to various funds. The impact of low prices in 1998 is putting an obvious squeeze on budgets and at the same time making it clear that the taxation of the oil industry must shift away from its predominantly gross-revenue base to a profit based regime.

Passage of the presently proposed Russian Tax Code would introduce provisions for hydrocarbon taxation which are more profit-sensitive. This important step towards conformity with OECD countries in the area of taxation will need to be combined with a sound and professionally run public and private audit system. That system should be based on generally accepted accounting principles, for purposes of checking and monitoring tax compliance under a much more complex tax system. This should in turn reduce the perceived need to set norms to control maximum allowable business costs, thereby reducing still further the differences between Russian and OECD systems of taxation. This could lessen or remove altogether investor concerns about double taxation or problems with tax credit in home countries. Implementation of an effective Tax Code will be a key component to build and strengthen the ongoing process of reform to a market economy.

**Comparison of Government Take and  
Impact of Fiscal Systems on Project Rate of Return  
Low Oil Price Case  
(\$102/Tonne)                      Average Oil Price  
(\$131/Tonne)**



Much of the above are extracts from the IEA/ECS G8 Energy Investment paper. Also, in this paper, the IEA and the ECS presented several basic recommendations which were noted at the April 1st G8 Energy Ministerial meeting. Given the situation in Russia since then, the recommendations to Ministers listed below have only gained in importance and urgency in the Russian context.

**Recommendations to Governments on Energy Investment**

1. Governments should address the need for attracting higher levels of private sector investment by liberalising energy markets and ensuring fair competition, including control of monopoly behaviour.
2. Procedures for granting investment rights should be reasonable, practical, transparent and based on published criteria.
3. Where investment opportunities are generally available, the scope for private sector investment should be maximised by giving companies equal access to those opportunities without discrimination by nationality or on other subjective grounds. The national economic benefits arising from a particular investment will not be determined by the nationality of the investing company.
4. Privatisation opportunities should, except in very limited cases of clearly defined national interest, be open to companies without discrimination on grounds of nationality. There should be no constraints on subsequent resale and purchase of shareholdings or other assets after privatisation.
5. Investment prospects should be enhanced by a stable and comprehensive framework of national law, properly implemented at all levels of administration, including enforceability of contracts, debt recovery mechanisms and recourse to effective national and international dispute settlement procedures. The respective responsibilities of national, regional and local authorities should be clearly defined. Investors should receive effective protection from crime and corruption.
6. In countries where the legal framework for upstream oil and gas investments and the relevant taxation rules do not yet provide sufficient confidence to investors, governments should include effective alternative options such as

Production Sharing Agreements into their policies.

7. Taxation systems should be clear, stable, non-discriminatory and based mainly on profits rather than on gross revenues or production.
8. No constraints should be placed on international financial transfers relating to energy activities, or on access to capital funding.
9. To enable resources to be allocated efficiently, Governments should allow energy prices to reflect market conditions.
10. In accordance with international standards, there should be no discrimination in the operation of national energy markets.
11. Governments should have legal regimes ensuring access to energy transport systems on fair terms, under rules applied by operationally independent regulatory authorities.
12. Companies should be free to sell their production in foreign markets through the full application by governments of World Trade Organization (WTO) Rules. Consistent with WTO Rules, there should be no barriers to purchases of energy equipment, services or technology from the most economic source, whether that source is within the country concerned or abroad. Government policies in this area should acknowledge the benefits of transfers of modern technologies.
13. As well as energy supply projects, investments in energy efficiency and environmental quality should be given high attention in energy investment policies.
14. The governments concerned should continue to pursue, as a matter of priority, ratification of the 1994 Energy Charter Treaty. The Treaty remains open for accession by other countries.

The recommendations of the G8 Energy Ministers were endorsed at the G8 Summit in Birmingham. Below is the relevant extract from its Communiqué.

“A crucial factor in ensuring sustainable development and global growth is an efficient energy market. We therefore endorse the results of our Energy Ministers’ Meeting in Moscow in April. We shall continue co-operation on energy matters in the G8 framework. We recognise the importance of soundly based political and economic stability in the regions of energy production and transit. With the objective of ensuring reliable, economic, safe and environmentally sound energy supplies to meet the projected increase in demand, we commit ourselves to encourage the development of energy markets. Liberalisation and restructuring to encourage efficiency and a competitive environment should be supported by transparent and non-discriminatory national legislative and regulatory frameworks with a view to establishing equitable treatment for both government and private sectors as well as domestic and foreign entities. These are essential to attract the new investment which our energy sectors need. We also recognise the importance of international co-operation to develop economically viable international energy transmission networks. We shall pursue this co-operation bilaterally and multilaterally, including within the framework and principles of the Energy Charter Treaty.”

The Energy Charter Treaty offers a sound and effective  
*(continued on page 15)*

## Effective Use of Energy is Coming to the Czech Republic

By Ivan Benes\*

For the future development of the country, the most important task of the Czech government is to improve the energy efficiency of the national economy. This objective is an essential part of the national energy policy. Responsibility for achieving this goal lies primarily on the good cooperation of the Ministry of Industry and Trade with the Ministry of Environment supported by the Ministry of Finance, but it will need also cooperation with other government bodies (the Ministry of Regional Development, the Ministry of Agriculture, the Ministry of Social Issues, the Czech Energy Agency, and the State Environmental Fund).

CityPlan is currently working on a National Effective Use of Energy Action Plan, which should be discussed on the government level in the beginning of July 1998.

### Purpose

The energy infrastructure is the blood of economy. The Czech national economy would have serious problems if the energy system did not operate efficiently. If we are speaking about an energy system, we see this system as a whole, i.e., with three energy subsystems:

- Energy Sources System which represents all raw energy forms, both fossil fuels and renewable energy sources;
- Energy Conversion and Transportation Systems which represent energy conversion processes (refineries, power and heat generation, pipes, lines etc.); and
- End User System which represents final energy demand.

It is necessary to evaluate the energy system as a whole chain of energy processes from extraction of energy through energy conversion and transportation to end use. One of the important purposes of the study is also to change the approach to energy planning from separated tasks (for example a single big power plant project development) to Integrated Resource Planning and Least Cost Planning methodology. It is important, because based on experiences from the former political regime, there are doubts about the purpose and necessity of energy planning on the national and regional levels.

### Background

Since the changes in 1989, the Czech economy has moved steadily toward a liberalized free market. Of course, there still remain several sectors with the legacy of the former regime. The energy sector is the most important part of the infrastructure, but with still deformed economy.

Responsibility for energy policy is split between several governmental bodies. Their responsibilities are:

- Ministry of Trade and Industry – responsible for energy legislation, authorization and regulation,
- Ministry of Finance – responsible for price control,
- Ministry of Environment – responsible for environmental

\*Ivan Benes is general manager and partner of CityPlan Ltd., president of CZAEE (Czech Association of Energy Economics) and Ministry of Environment secretary advisor. His professional career covers energy economics, energy policy, energy planning, project development, regulation, forecasting, power and heat generation and distribution.

legislation and EIA processing,

- Czech Energy Agency – responsible for energy efficiency and conservation programs, and
- State Energy Inspection – responsible for supervising energy utilization.

The current problems of the Czech energy sector are:

- high energy consumption in relation to the level of economic activity,
- distortion of energy prices – especially cross subsidies,
- insufficient and incomplete legislation,
- unfinished restructuring,
- unfinished privatization, and
- insufficient oil stock (only 50 instead 90 days).

Energy costs of the Czech economy are five to six times higher than the EU average and the intensity of energy consumption is approximately three times higher than the EU average. One of the most important targets of national energy policy is to decrease primary energy consumption. It can be achieved mainly by:

- energy conservation,
- increasing the efficiency of primary energy conversions (cogeneration, etc.) and
- renewables.

Unfortunately, all three measures to improve the national energy efficiency are not attractive from a free-market economic standpoint: to save energy is more expensive than to buy energy.

One of the most serious problems is to remedy the distorted energy price system. The price of electricity and natural gas is strongly cross-subsidized for the residential sector. To protect district heating systems against bankruptcy and to keep them economically competitive, central heating was also subsidized, but directly from the state budget. The government plans to raise energy prices to their free-market level in three years.

As was said, final energy intensity, i.e., the ratio of primary or final annual energy consumption to the gross domestic product (GNP), is almost three times higher than that of western European countries.

The high level of energy consumption is due to:

- Historical economic development in which priority had been given to heavy industries (iron and steel, petrochemicals) which are highly energy intensive.
- Low efficiency in the production, conversion, transport and distribution of energy products, in particular for electricity production and the transport of heat.
- Obsolete and poorly maintained industrial installations and, in general, inefficient consumption or end use systems (badly insulated buildings, poor regulation, etc.).
- Low cost of energy.

This high intensity of energy consumption and correspondingly high energy production is the source of enormous economic waste (e.g., in investment and hard currencies) and of environmental pollution and hazards.

Energy intensive branches of the economy (coal industry, energy industry, metallurgy, heavy machinery) have declined in the past five years. From experiences with

privatization it seems that a relatively long period will be necessary for structural change.

Very high energy consumption compared to gross national product uncovers the possibility of energy savings and the rational use of energy. To reduce consumption while raising service quality, the effective use of energy must become the highest priority of Czech energy policy. This objective is absolutely necessary if the country wants to encourage new economic growth and to significantly improve its environmental conditions. The structure of final energy consumption would be heavily modified – the share of industry would decrease to 30 percent and thus the share of the residential and commercial sectors would increase.

The main target of Czech energy policy today, and for the next two decades, is to improve the efficiency of energy use.

The energy efficiency policy should be developed through:

- Creation of institutional programs for improving energy efficiency in different sectors of activity and to help the appropriate partners and economic agents to implement them.
- A system of regulations to promote the rational use of energy (new standards and legislation).
- An appropriate system of incentives to stimulate and promote energy efficiency improvements, initiatives and projects and corresponding mechanisms to facilitate financing of investments and programs.
- Training programs about energy efficiency for technicians and engineers, managers, architects, local and municipal officials, etc.

We believe that it is possible to insure steady improvements in energy efficiency and long-term energy intensity levels nearer to that presently achieved in western Europe. Then the increased requirement for energy stemming from economic growth may be substantially offset resulting in little or no overall growth in final energy consumption. Achieving these levels of energy efficiency and intensity is an attractive economic policy objective.

#### Target

The analysis and evaluation of the effective use of energy in the whole national energy system should result in a National Effective Use of Energy Action Plan. This program is supposed to cover:

1. Energy demand balance model of the Czech republic broken-down by end-use sectors: industry, agriculture, transportation, tertiary and residential,
2. Overview of energy savings and energy efficiency improvement measures in each sector,
3. Overview of alternative fuel/energy sources,
4. Overview of energy conversion and energy transport processes,
5. Investment strategies,
6. Institutional measures, and
7. Noninstitutional measures.

The key goal of the National Effective Use of Energy Action Plan should be to ensure the economy grows without increasing the demand for primary energy. The GNP can be doubled (at least) without increased energy consumption. It means that all future energy demand should be covered by energy savings for a long time. The power sector should focus

on the higher utilization of natural gas, distributed cogeneration and efficient clean coal technologies. The Action Plan also has to consider higher utilization of renewables.

Success in reaching the target can be measured by means of three parameters:

1. The primary or final intensity of energy use, i.e., the ratio of primary or final annual energy consumption to the GNP of the same year.
2. The internal cost of energy, i.e., the ratio of the internal cost of annual energy consumption to the GNP of the same year.
3. The social cost of energy, i.e., the ratio internal plus the external cost of annual energy consumption to the GNP of the same year.

The final energy intensity as well as the social cost of energy should decrease through the years.

#### Energy Investment *(continued from page 13)*

basis not simply for international cooperation in the energy sector but for establishing the rule of law and guaranteeing the free market. While recent developments in Russia have brought about some changes in priorities, Mr. Kiriyyenko considers it likely that the Energy Charter Treaty will be ratified by Russia before the end of 1998. The Treaty has, as of the end of June, been ratified by 38 out of 50 countries and has entered into force for 30 countries accounting for most of the European countries and economies in transition and Russia at present applies the Treaty provisionally.

The IEA and Russia continue to cooperate on the important issue of energy investment within the framework of their co-operative work which dates back to 1994. Since then the IEA and Russia have mutually benefited from a useful policy dialogue on a range of energy issues. Examples are the 1995 IEA Survey of Russian Energy Policies, conferences, workshops, publication of specific energy sector books, exchange of information and data and, in general, a close and open relationship.

An example of a relevant energy investment related co-operative effort is the Round Table on PSA legislation which the IEA and the Ministry of Fuel and Energy of the Russian Federation are planning for the late Fall 1998. The Round Table plans to draw on international experience from IEA member countries as well as the experience of other countries that have used PSAs to form the basis for investment in their upstream oil sectors or other such arrangements similar to PSAs in that they are distinct from the generic fiscal and legal system or raised issues similar to those faced by Russian decision makers today.

It is the hope that through more active policy dialogue and exchange on the issues raised in the G8 Energy Investment paper and the recommendations made by G8 Energy Ministers that progress in this important area can be achieved. The G8 Energy Ministerial was useful in communicating the concerns of investors and in getting high-level Russian commitment to G8 goals in the energy sector.

## Energy Transit: The Multilateral Challenge

By Paul Vlaanderen\*

The importance of transit in the development of economically viable international energy transmission networks has become evident with the growing dependence on imported energy by major consuming areas and the emergence of new energy producers in new, often remote and land-locked nation states. As larger volumes of energy will have to cross more borders from production areas to consumer markets, the political and commercial risks and uncertainties of such grid-bound transit must be minimised to ensure the long-term economic viability of multiple routes and diverse production areas and to attract investments.

Energy transit and conventions dealing with it are not new phenomena: in the 1920s the first international conventions on the freedom of transit were signed. Most transit connections were negotiated and regulated on a case by case basis. In more recent years land-bound transit of energy has become an economic policy issue. Its growing importance lies in its strategic significance, in particular on the Eurasian continent.

The emergence of new independent states in Central and Eastern European countries, creating new borders between new, remote and often land-locked energy producing countries and their markets, as well as the required increases in energy investment needed to trigger and sustain economic growth, make international energy transmission networks a decisive policy issue. Such networks will provide for secure access to consumer markets; diversity of transit operations will support the competitiveness of energy markets on the vast Eurasian continent and increase supply security in importing countries.

### Market Trends

Due to the ascendancy of *market competition over economic plan*, the role of governments as owners, managers and capital providers in the energy sector is diminishing in most countries. However, their role as policymakers, setting the conditions that enable market forces to play in line with regulatory, social and environmental policies, remains paramount. Thus, governments will have to decide on the pace and extent of competition and liberalisation of their various energy sectors. Transit, both nationally and internationally, is, therefore, more than a transport requirement between energy markets, it is a critical factor for ensuring cost effective and rational energy market performance as well.

Energy markets and their transit requirements vary according to factors including geographical distribution of reserves, physical properties of the energy forms, their transportation cost, the degree of self-sufficiency, and the need for diversification of supply sources. These factors largely determine the range of transit options, which in turn requires the cooperation of governments before market operators are prepared to commit their investments for the realisation and operation of selected routes.

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### Risks

The policy and commercial risks that may deter the huge investments needed for energy markets to develop efficiently into the next millennium, are high and often directly related to the issue of transit:

1. technical risk: supply disruption due to technical reasons, such as pipeline failure or compressor failure;
2. deliverability risk: securing long term supplies from existing or new fields;
3. commercial risk: commercial disputes and contractual breakdowns;
4. political risk: disruption of existing or potential supply for political reasons; and
5. regulatory risk: administrative intervention that may have adverse effects on transportation.

These risks apply specifically to oil and gas, as countries are generally able to influence and control their self-sufficiency in electricity. Furthermore, in most countries the supply possibilities are more numerous for oil than for gas: the fact that maritime shipping is the dominant mode of oil transportation explains why gas transit is more widespread than oil transit. In addition global ecological considerations support the use and consequently increasing transit of gas in energy markets.

### Multilateral Cooperation

Any transit system, by its very nature, requires multilateral agreement to ensure that the sum of national transit rules and regulations result in a multilateral framework for unhindered transit investment and commercial operation. Therefore, governments have a major role to play in reducing companies' transit risks to manageable levels, including preempting and settling disputes. Governments are, therefore, proactively seeking agreement on international rules and principles safeguarding transport and transit of energy that will ensure an investment climate which allows for transit projects and operations to develop.

Competition and/or regulatory authorities will have to help safeguard the operation and expansion of transit capacity by ensuring undisturbed transit, objective terms and conditions of capacity utilisation, fair and equitable capacity allocation, and just, non-discriminatory and reasonable transit tariffs. Few international treaties and agreements contain rules for transit. The most recent and relevant in this context are the transit and competition provisions in the European Energy Charter and the Energy Charter Treaty (ECT); they deal specifically with grid-bound energy transit and cover all new Eurasian energy provinces.

Companies will increasingly play a key role in the development of energy transit systems as investors and capital providers. Governments involved with the Energy Charter process and the G8, while respecting the role of commercial contracts and competition rules, may again consider taking a proactive role by initiating further multilateral consultations with the objective of developing an international regime for grid-bound energy transit. Such a regime – including a dispute settlement mechanism – should be based on the European Energy Charter and the provisions of the Energy Charter Treaty in which its main elements can be found already.

## Commercial Issues

The organisation of gas and electricity transit is usually entrusted to the transmission company in the country concerned. The company is typically state owned, and holds a regional or national monopoly. Some transit facilities are owned by the buyer or the seller. Oil transit pipelines are typically owned by the private or state owned companies buying the crude oil transported.

The majority of onshore gas transmission pipelines in Europe are owned or controlled by state enterprises that have de jure or de facto transportation monopolies. The pipelines are operated as an integral part of the activities of the gas company in the country in question. Examples are the transmission pipelines in France, Denmark, Poland, Slovakia and Russia. In North America another model prevails: all interstate or inter-provincial pipelines are owned by private gas companies and utilities and are operated as separate businesses through individual companies or joint ventures. More importantly, North American pipelines are increasingly run independently from both sellers and buyers, even when they are owned by sellers or buyers. They are no longer allowed by regulators to combine the transportation function directly with the buying and selling (merchant or supply) function. Between these two organisational forms lie several variants.

Under the terms of the proposed EU gas directive, for which a common position was adopted by EU Ministers in February 1998, all transmission companies in the EU will be obliged to offer either negotiated or regulated access to eligible consumers. The draft directive also contains a clause providing for separate internal accounts for transmission, distribution and storage. On adoption, the EU draft directive will become part of the "Acquis Communautaire" and will impact new and future EU entrants, such as some Central and Eastern European countries.

The gas delivery point is crucial for the way transit pipelines are organised and owned. Some examples:

- From the Netherlands, gas is delivered at the Dutch border. The buyer has to arrange for transportation from that point. In the case of Italian imports from the Netherlands, a separate transit pipeline (TENP) has been built from the Dutch border through Germany and Switzerland into Italy. In Germany the pipeline is owned by a joint venture between Ruhrgas and SNAM. In Switzerland the pipeline is owned by a joint venture between Swissgas, Ruhrgas and SNAM;
- Algeria also delivers its gas at its border. In the case of Italian imports from Algeria, SNAM has created a wholly owned subsidiary to take the gas through Tunisia, and a joint venture with Sonatrach, the state-owned Algerian gas company for the crossing of the Strait of Sicily;
- Norway prefers to deliver its export gas at the border of the importing country and, therefore, undertakes to arrange for transportation to that point. This means that transit is arranged through German and Belgian pipelines for volumes to France and transit through French pipelines for volumes to Spain. The seller in this case has no ownership in the transit pipelines, he purchases capacity;
- Traditionally, Russian gas has been delivered to Western European customers at a Western European border. In the case of exports to Germany, transportation to the German

border is arranged by the seller (with the notable exception of the German gas company VNG which buys its contracted Yamburg volumes at the Ukrainian-Slovak border). Today, exports to Germany have to transit Ukraine, Slovakia and the Czech Republic. Before the break-up of the Soviet Union, it only had to arrange for transit through Czechoslovakia.

Looking specifically at the organisation and ownership of transit pipelines, the following observations can be made:

- Often the transit line is owned by the dominant gas company in the country or the region. The company in question is typically a monopoly, mostly combining the functions of transit and domestic transmission;
- In a few cases transit lines are owned by the gas buyer, such as the lines for gas from Algeria through Tunisia and Morocco to Italy and Spain. The SEGEO transit pipeline through Belgium provides an example of mixed ownership, between companies of the transit country (Distrigaz) and the buyer of the gas (GDF, France);
- In Moldova, Belarus, Armenia and Bulgaria, companies of the seller country (Gazprom, Russia) hold ownership interests in the national gas pipeline system.

### Commercialisation of Transit

Many complexities are faced by the newly independent states of Central and East Europe that are in transition from a centralised economic system lacking price mechanisms towards differentiated economies governed by the rule of law, price mechanisms and competition. Dominant positions may lead to monopolistic pricing practices and inefficiencies in investment strategies. Sound market oriented, anti-monopolistic tariff and fee methodologies are essential and must take precedence over barter deals and payment in kind. Thus market forces will emerge to generate the necessary incentives for developing efficiently and timely viable energy interconnections and transmission networks in Eurasian energy markets and overtime provide sufficient cash flows and liquidity for energy companies to maintain operations viable in a market economy.

### Fees and Tariffs

Although the lack of transparency makes it difficult to get a good overview of what is paid in the Eurasian continent for the transit of energy the following systems are common.

Transportation tariffs in North America have been unbundled from commodity prices. They are calculated using methodologies approved by regulatory authorities and provide the basis for tariff negotiations. In most countries in the Eurasian continent, transportation and transmission rates remain bundled with the price of the commodity. A notable exception is the unbundling of electricity transmission and distribution tariffs in the Nordic countries (Denmark, Norway, Sweden, Finland), a result of their recent liberalisation initiative that preceded the EU electricity directive.

In principle, for oil and gas transit, when the transit country owns the transit pipeline in question (the majority of cases), transit fees are supposed to cover the transportation as such, including profits, plus a payment for the right of way. What often complicates the comparison of transit fees in different countries is that the services included in the transit

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## Energy Transit (continued from page 17)

tariff vary. In some cases transit may include storage and other load balancing services. Another complicating element is that transit is often paid for in kind.

The following example may illustrate this issue: Ukraine is the biggest gas transit country in the world and has the capacity of transiting some 130 bcm of gas from Russia towards Central and Western Europe. Formally the country has a tariff of US\$ 1.75/mcm (one thousand cubic meters) per 100 km for transit. In practice, however, transit is paid for in kind. For 1997, the transit of more than 100 billion cubic meters (bcm) of gas for Gazprom was supposed to generate a transit fee in kind of 30 bcm of gas. The real price paid for transit will thus depend on the valuation of that gas.

In 1995 the price of Russian gas delivered at the German border was around US\$ 94/mcm. If the published transit tariff is used, the transit fee through Ukraine amounts to some 18 percent of the gas price to Germany. To this has to be added the transit fee through Slovakia and the Czech Republic. It can therefore be argued that transit fees/cost amount to 25 to 35 percent of the Russian gas price into Germany. This also illustrates that transportation is a significant part of the total cost, bearing in mind that the transit distance through Ukraine, Slovakia and the Czech Republic is less than one third of the total transportation distance from Siberia.

### Legal Issues

In the past, transit has mostly taken place under contracts between market participants, with specific international transit agreements playing a modest role. Transit contracts are commercial deals between market participants, be they private or state owned. Such contracts are backed up by agreements or treaties between the states involved or by the principles of international law. Contracts and intergovernmental arrangements should be of help in case of difficulties over transit.

There are several examples where transit has met difficulties or obstacles:

- An assessment of the historical record of petroleum pipelines in the Middle East until the end of 1995 reveals that every one of the 8 international pipelines in the region was shut down at least once during the period since the first pipeline was built (1931) and 1995. In most cases, including those of transit pipelines involving three countries, transit was disturbed for political reasons.
- Another study recorded 27 natural gas "transit events" in the FSU during 1992-94. Ten of these disturbances were related to negotiations or renegotiations of transit agreements, 6 were threats to supply, 3 were irregularities in supplies and 8 were actual cuts or reductions in supply.

Examples also exist where it has been, and remains, very difficult to establish sufficient transit connections, one case in point being the transportation of oil and gas from the Caspian region. In Western Europe it has also proved difficult to agree on transit: it took several years to negotiate an agreement to allow French electricity to transit across Spain to Portugal.

The above examples indicate that neither contracts nor existing international agreements, such as the 1921 Barcelona Convention on the Freedom of Transit and Article V of GATT, could prevent these incidents, either because they did not apply or had only limited coverage. Indeed there is little

specific national legislation and regulation dealing with transit as Table 1 shows.

With increasing energy volumes and market liberalisation there will be greater need for internationally accepted transit rules. The most important development in the context of Eurasian energy markets is the European Energy Charter and the ECT.

Table 1

### Legislation Dealing with Transit

Multilateral Instrument	Main Provisions
1. Barcelona Convention on Freedom of Transit, 1921	• Non-discrimination • Reasonable Transit tariffs
2. GATT, 1947, Article V	As 1. plus: • Most favoured nation treatment • Exemption from customs duties – may only charge transport costs and administration costs
3. The European Energy Charter, 1991	Political Declaration As 2. Plus: • Facilitate transit and the building of new capacity
4. The Energy Charter Treaty, 1994	As 3. Plus: • Legally binding • Conciliation procedure in the event of a dispute • Must not interrupt or reduce flows of energy materials and products • permit interconnection and new capacity be installed provided conditions are met.

### Policy Issues

An increase in world energy demand does not automatically imply an increase in energy transit. However, given the uneven geographical distribution of reserves on the Eurasian continent, there is a strong presumption that energy trade and transit will increase. Dependence on imported oil and gas is set to rise, notably for Europe and Asia, in particular for China. Important in this respect is the need to diversify supplies and the need to develop and market reserves in new energy provinces, such as Central Asia and the Caucasus.

Long-distance oil and gas pipelines as well as high voltage electricity lines built across several territories imply inter-dependence and risk. Strong and stable relations between the parties as well as regional stability are necessary to ensure reliable and safe transportation of energy flows. Such large scale transportation infrastructure is extremely capital intensive and the search for financing of such projects is, therefore, one of the major challenges faced by their developers.

Gas will have to come to consumer markets from more remote areas than today. This implies higher cost, despite the gas industry's efforts to reduce them. At the same time, the ongoing energy sector reform process is expected to reduce consumer prices. In this sense, the profitability of the gas industry might be under double pressure. As long as gas prices remain relatively low, the expected rate of return on new gas development projects and new pipeline projects will also be low. If governments can create a good investment climate and help minimise risks, costs will be lower, rates of

return will be higher and the prospects for new gas developments will improve.

Estimates show that the possible world gas pipeline length required to meet the increase in gas demand by 2010-2015 may be as high as sixty thousand km which will imply investments of at least US\$ 70 billion. Many of these new pipelines will be transit pipelines. The building of new oil transit pipelines requires significant investments as well. Several of the pipeline options proposed to transport oil from landlocked countries in the Central Asian region will need investments of more than US\$ 1 billion each.

New transit routes to Europe will involve a chain of countries, from producing, via transit to importing countries. In most cases, investments will have to be made in all the countries concerned. To realise such projects the investment climate has to be favourable in all these countries. All countries have committed themselves to create such an investment climate; the ECT contains legally binding rules on foreign investment for its member countries which are applicable to pipeline and electricity transmission investments. Signatory governments are engaged with creating stable, favourable, non-discriminatory and transparent conditions for foreign as well as for national investment within the framework of the ECT.

#### **Reform policies**

Energy sector liberalisation trends, as observed worldwide, generally include deregulation, de-monopolisation and competition. The central focus of recent reforms has been the introduction of more competition through market liberalisation. The expectation is that this will improve competitiveness, economic performance and efficiency of the energy sector.

Such reforms influence the conditions of transit in a country. The reform process in each country has started from different levels. Many countries are still in transition from centrally planned economies to market economies. Some still try to cope with fundamental problems in the organisation and regulation of their economy in general and their energy sector in particular. Although several countries in Central and Eastern Europe have made considerable progress in their reforms, some in Central Asia and the Caucasus have yet to reach that point.

In North America the energy sector reform process started during the 1980s. In the mainly private gas sector, for example, one of the first steps was to grant third party access to interstate pipeline systems. Over time, the pipeline companies were asked by regulators to separate their transportation function from their merchant (or supply) function. Pipelines and electric utilities continued to be regulated on a cost-plus basis (cost of service regulation). Access to grids and pipelines laid the ground for competition in the wholesale market. More recently, smaller end-users, traditionally served by local distribution companies, have also been allowed to choose their supplier.

In Europe, the UK was first to liberalise its electricity and gas sectors. From a situation of fully integrated state-owned gas or electricity companies having a monopoly on purchase/generation, transmission and distribution, it is in the process of introducing competition in all parts of the business. Transmission and distribution of electricity and gas are now taken care of by separate de facto monopolies regulated and obliged to grant access. Transmission compa-

nies are not allowed to participate in merchant activities.

In other Western European countries, the reform process in the electricity and gas industry has been slower. Most of the transmission companies in Europe have a de facto or de jure monopoly for electricity and/or gas transmission. Some have a monopoly on imports and exports. The general rule is that they are at least partly state owned, however, in recent years, some of them have been partly privatised. The trend is that, in spite of their state ownership, they operate independently from the government, behaving more like commercial companies.

While the details of reforms are as varied as the countries in which they are implemented, it is possible to identify four distinct, yet related, classes of reforms. These are changes to:

- the operation of the market, i.e., the introduction of more competition;
- the structure of the industry, i.e., the extent of vertical and horizontal integration;
- utility ownership and the role of the private sector; and
- the extent of regulation/deregulation.

Energy sector reform in most countries largely follows the same direction; i.e., more reliance on market forces and a changing role of government. The opportunity here is to match national circumstances and market forces with measures to facilitate transit through acceptance of international rules.

Different legal and regulatory regimes and different industry structures may hamper investments in energy transit infrastructure. An improved investment climate, as well as a more harmonised set of transit rules developed on the principles of the European Energy Charter and the ECT, focusing on specific conditions for the modernisation and use of international energy transit networks, are likely to facilitate long term investor confidence by reducing risk and uncertainty.

#### **Conclusion**

Transport and transit of energy over land is bound to become a relevant issue for policymakers in companies and governments. Large risks and investments are involved; access to markets and security of supply will depend on it. In increasingly reformed and liberalised energy markets, energy companies will be responsible for operational and commercial aspects of energy deals. Governments will have to ensure that there is an investment climate and a multilateral transport/transit regime to enable energy companies to take commercial responsibilities and risks.

Due to the universal significance and the noncontroversial principles vested in international law by the Energy Charter Treaty, in full operation since April 16, 1998, further options for enhancing Eurasian energy sector cooperation in the area of transit have matured. During the Business Consultative Meeting on the eve of the G8 Energy Ministerial Meeting of April 1, 1998, in Moscow, proposals were made to encourage countries to further cooperate on the principles and provisions of the Energy Charter process. This will contribute to the stable, yet competitive performance of rapidly globalizing energy markets fuelling socially as well as environmentally sustainable economic growth on the Eurasian continent.

*(continued on page 21)*

## A Twenty-Five Year Retrospective on the Impact of the First Oil Crisis on the United States

By John H. Lichtblau\*

I have been asked to focus my remarks on the impact of the Arab oil embargo of 1973-74 on the United States, the prime target of the embargo. But before turning to the United States, I would like to make a few general comments about the 1973 embargo.

### Global Impact

It was clearly the most dramatic and lasting turning point in the post World War II history of the world oil market. In the 25 years ending in October 1973 world oil prices remained in the \$2-3 range in nominal dollars and trended downwards in real dollars while world oil demand rose rapidly and consistently, about 7.5 percent annually. By contrast, in the 25-year period since 1973 nominal WTI prices averaged almost \$19/bbl. which in real (inflation-adjusted) dollars was double the average 1950-1973 price, while world oil demand rose at an average annual rate of just 1.2 percent.

Yet, the oil embargo lasted only 5 months (from mid-October 1973 to March 1974) after which all restrictions on export destinations were unconditionally removed and never reimposed or even threatened to be reimposed.

Thus, in retrospect, it is clear that the permanent changes in the world oil market triggered by the Arab oil embargo were based on much more fundamental factors than the short-lived embargo.

Absent the embargo, the transition to higher prices and slower growth would certainly have been more gradual and less disruptive and thus would have avoided the global trauma of 1973-74. However, the need for substantially higher prices was there, even though it was generally not recognized at the time. Most forecasts in 1970-72 projected continuing rapid growth in demand at stable real prices.

There were two reasons why the price did not retreat after the end of the embargo but continued to rise moderately in nominal dollars: World demand kept growing at an annual rate of 4.2 percent from 1975 through 1979 and supplies were effectively controlled by OPEC to protect the new price structure. Only the second oil shock (1979-82), caused by extraneous political and military events (The Iranian revolution of 1979 and the early phase of the Iran-Iraq War of 1980-88.), brought on an extended *decline* in world oil demand in the first half of the 1980s. Following the historic 55 percent price crash of 1986, world oil demand has again grown every year. Through 1997 the average annual rate was respectively 1.6 percent globally and 2.5 percent excluding the Former Soviet Union.

### Impact On The United States

Now let me turn to the U.S. reaction to the Arab oil embargo.

The initial reaction was one of shock and disbelief at every level, from street consumption to national strategic planning. Since in 1973 the U.S. per capita automobile ownership far surpassed that of any other nation, the consternation and shock at the physical shortages at the pump was

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stronger in the United States than in Europe which also had supply disruptions at the consumer level. There was resentment both against the foreign countries imposing the sanctions and the oil companies which transmitted the shortages to consumers while at the same time reporting sharply increased earnings because of the oil price increases triggered by the sanctions. At a Senate hearing in 1974 the increases were called "obscene profits."

At the national strategic planning level where the principal evaluation of any international issue was how it would affect the Cold War which was then still at full strength, the embargo was viewed with much dismay since it potentially weakened the United States which was then importing 37 percent of its oil requirements, while strengthening the Soviet Union which had become a major oil exporter. Henry Kissinger who was then Secretary of State says in his memoirs that in December 1973 he hinted publicly at the possibility of some form of U.S. armed intervention if the embargo lasted much longer.

Meanwhile President Nixon in December 1973 came out with his famous *Project Independence* which was supposed to free the United States of any oil import dependency "by the end of the decade." Later there were other proposals such as the Synfuels Corporation and in early 1977, three years after the end of the Embargo, newly elected President Carter gave a national address in which he called the need to reduce U.S. oil import dependency "the moral equivalent of war."

None of these projects ever materialized. Instead, our net oil import dependency has risen from 37 percent in 1973 to about 50 percent this year, while our net import volume has increased from 6 million b/d in 1973 to about 9 million b/d this year. Yet, neither our economy nor our national security has been adversely affected by this increase in oil imports.

However, the embargo did bring on some new policies intended to better manage our import dependency. The first was legislation to construct the Alaskan pipeline. The pipeline had been strongly opposed by environmental interests and prior to the embargo in October 1973, there was little chance of passing the required legislation. The embargo quickly gave priority to domestic oil supplies over environmental considerations. As a result, Alaskan oil started to flow in 1977 and by the time of the oil crisis in 1980, it delivered about 1.7 million b/d to the U.S. market.

Another legislation in reaction to the embargo was the establishment of a U.S. Strategic Petroleum Reserve (SPR), administered by the Department of Energy, to be used exclusively for emergency purposes as determined by the White House. The SPR was not yet operative during the 1979/80 oil crisis but it was used at the beginning of the Gulf War in February 1991 and while the volume actually purchased was quite small, the SPR's declared ready availability of some 500 million barrels was definitely a factor in the historic price crash in February 1991. Currently, the SPR contains about 560 million bbls of crude oil, equal to 30 percent of U.S. commercial crude stocks. Thus, it provides not only a significant draw-down potential in an emergency, but it is also likely to discourage future sanctions threats by any oil exporter.

Another historic response to the 1973 embargo has been the establishment of the International Energy Agency (IEA) in Paris in 1974. Its initial assignment was for the world's industrial countries to cooperate in their energy policies, both

during normal times and during crisis conditions. In part, this reflected the fact that during the 1973-74 crisis some of these countries had outbid each other rather than cooperate. Secretary Kissinger was a major advocate for the IEA.

#### **Rising Prices And Domestic Production**

Regarding U.S. domestic production, the world price increases of 1973-75 were not fully passed on to domestic producers because of price controls until 1980. However, the controls still permitted substantial price increases. Thus, the average wellhead price doubled from \$3.39 in 1972 to \$6.87 in 1974 and continued to rise every year thereafter until its peak of \$32 in 1981.

As expected, the price increases brought about a sharp rise in drilling activities and drilling costs but, unexpectedly, very little additional production in the lower-48 states. U.S. oil wells drilled rose from a postwar low (until then) of 10,250 in 1972 to a record high of 42,840 wells in 1981, with an increase every year. Yet lower-48 oil production kept declining throughout that period, from 9.2 million b/d in 1972 to 6.9 million b/d in 1981. The reasons for these seemingly opposite movements were partly price controls and partly price expectations. U.S. government controls kept oil from old wells below world market prices until 1981 but oil from new wells was uncontrolled. As an additional incentive, for each barrel of "new" oil a barrel of "old" oil was removed from price control. This, together with the expectation of steadily rising prices provided both the cash flow and the incentive for the extraordinary increase in oil drilling from the early 70s to the early 80s. However, the national interest was probably not served by this policy since the vast increases in drilling expenditures did not significantly slow down the decline in production or reserves in the lower-48 states.

The Arab oil embargo affected the U.S. economy beyond the energy sector. It contributed substantially to the recession of 1975 when the U.S. GNP declined by 1.8 percent. A much deeper recession - a 2.5 percent GNP drop - occurred in 1982, caused in large part by the second oil disruption and price explosion.

#### **Is The Past Prologue?**

Let me conclude with a question, "Is the past prologue?"

The Arab oil embargo of 1973 was not a success for the countries which imposed it. As I mentioned earlier, there has not been another oil export embargo since then. The globalization of the world oil market, the standby emergency program of the IEA, the large SPR in the United States and several other major importing countries, the ongoing diversification of oil supply sources, which is part of the U.S. energy strategy, would all make the use of oil exports as a political instrument even more difficult now than it was in 1973. Furthermore, it would now be impossible to limit the impact of an export embargo to the targeted country. The impact would instantly be global and generate global reactions.

Another major difference from 1973 is Saudi Arabia's 2 million b/d readily available spare producing capacity which has been officially designated for alleviating temporary world oil shortages. Its use in 1990/91 during Iraq's occupation of Kuwait was the single most important factor in preventing a global shortage.

Thus, while we will continue to see oil disruptions in producing countries caused by military or political events or

by natural disasters, politically motivated selective export embargoes are unlikely and would be ineffective if imposed.

#### **Sanctions By Importers**

However, we are now seeing another form of embargo, one imposed on the exporting countries by restricting their exports through sanctions from the importing country. Currently, the United States is carrying out this form of sanctions through the widely disputed Iran Lybian Sanctions Act (ILSA).

ILSA is designed to force policy changes in both these countries by severely restricting foreign investments in their oil and gas sectors. No other country is supporting the U.S. position on Iran. In Libya, the UN Security Council has already imposed limited multilateral sanctions to bring about the desired policy change.

The Act contains measures to penalize foreign companies which ignore the investment restrictions contained in ILSA. If these sanctions are effective they will reduce world oil supplies and counter the diversification of supply sources. Meanwhile, ILSA is creating hostile reactions towards the United States among actual and potential foreign investors and their governments in Europe and Asia and puts U.S. corporations at a competitive disadvantage abroad.

In the post-Cold War world, unilateral oil sanctions in peace time are obsolete and counterproductive whether they are imposed by exporters or importers and could hurt those that impose them more than their intended target.

#### **Energy Transit (continued from page 19)**

Further statements contained in the final Communiqué of the Birmingham Summit of May 17, 1998, recall that international cooperation, in particular for investment in transit ensuring the development of economically viable international energy transmission networks, will be pursued within the framework and principles of the Energy Charter Treaty. This points to the significance of the provisions agreed so far.

In order to further increase multilateral cooperation on these issues, parties to the Energy Charter consider the above listed issues, in particular issues relating to transit dispute rules, as relevant to commercial aspects in regard to interim tariffs and confidentiality. Related issues, such as on volume measurement, accounting and methods of payment, security and allocation procedures in the event of disruptions to transit capacity and supply, may have to be addressed as well. Multilateral cooperation in these areas would represent a significant step forward towards establishing a multilateral transit regime. The experience of the countries involved with the Energy Charter process may set a global standard for other regions that will have to address similar issues in light of globalization of energy markets. The framework provided by the Energy Charter, embracing key energy production, transport and consumption markets as well as their subsequent regional institutions, stretches from the Atlantic to the Mediterranean onwards via the Black Sea and Caspian basin to Asian markets on the Pacific. In this sense it may well be considered as a forum for continued dialogue and cooperation to, inter alia, facilitate efficient transit and interconnection between the energy markets of its constituency and share the results of this experience.

## European Natural Gas: Market Forces Will Bring About Competition in Any Case

By Marian Radetzki\*

A ministerial decision at the European Union level, reached at the end of 1997, was to adopt a European Gas Directive. The Directive is being hailed as an instrument of critical significance for the introduction of some competition into an industry characterized by substantial elements of monopoly, public ownership and far-reaching state intervention. Its provisions are seen as tools that will assure greater flexibility and a more efficiently functioning gas market.

The Directive has been adopted as a compromise, in the face of opposition from those who have hitherto reaped the benefits of monopoly. Its ultimate content, and implications, remain to be seen, for it has yet to pass through the European Parliament which may propose amendments, and will then only gradually be enacted into national laws.

This paper argues that market forces have undermined the staid nature of the gas market since the early 1990s, that competition is popping up in a number of unexpected places, forcing change on existing agents and institutions, and that these developments will continue and gain force, irrespective of what happens to formal deregulation, abdication of state ownership, and political action to suppress commercial or statutory monopolies. In this perspective, the efforts to deregulate can be seen as a rearguard action by politicians recognizing the inevitability of what is already taking place, and the Directive can at best be seen as a lubricant to the process.

The paper proceeds as follows. The next section describes the traditional structure of the (West) European gas market, and discusses the reasons for the extended perseverance of this structure. The following section analyzes the increasing restlessness and frustrations felt by many agents whose goals and ambitions had been thwarted by the rigid market. It is argued that these frustrations are destabilizing the prevailing arrangements. A following section displays a series of commercial actions, caused by these frustrations, but also by evolving external circumstances, that are gradually undermining the prevailing gas market structure, and bringing about an increasing degree of competition. It is shown how even the most protected monopolies are jumping on the competitive bandwagon once they become aware that existing arrangements are crumbling. The final section summarizes the discussion, and briefly points to the likely implications of an increasingly competitive market. It also draws attention to some recent actions by leading gas suppliers to the European market, which, if permitted to come to fruition, might reverse the trend towards competition and help reestablish market power by the few.

### The Traditional Gas Market Arrangements in Western Europe<sup>1</sup>

The gas market in Western Europe is of relatively recent origin. It emerged on a significant scale only in the late 1960s,

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<sup>1</sup> See footnotes at end of text.

after the large Dutch Groningen field went into production. For at least 10 years, until the late 1970s, when gas from Algeria, Norway and the USSR started to flow to Western European consumers in substantial quantities, the Dutch exports constituted a major proportion of total supply.

Several factors explain the structure of the emergent West European gas market in the 1970s and 1980s. This was the OPEC heyday, a period during which the energy sector became heavily politicized, and security of supply was on top of the political agenda. Political involvement was seen to be essential for regulation of supplies believed to be scarce, and for handling the relationships with producers like Algeria and the USSR, deemed to be politically unstable. Oil prices were at historical peaks, and so were, by contagion, the prices of other energy products. The gas projects under development from which Europe was to be supplied, were huge, and each constituted a very significant addition to the small overall market. Long term contracts between sizable and well-established parties, with secure prices, were seen as essential to assure the investments in gas production and transport, and the demand for gas. The multinational oil companies took a lead in the development of gas production facilities in the Netherlands and the North Sea. These companies, along with state owned energy enterprises in Europe, were also heavily involved in the huge investments of a pipeline network to supply the European market.

With these preconditions in view, the structure of the emergent market (Radetzki, 1990) depicted in Figure 1, comes as no great surprise. At the center were the national transmission companies. Most of these, e.g., Gaz de France, Distrigas in Belgium and SNAM in Italy, were state owned, statutory monopolies insofar as imports and onward sales were concerned.<sup>2</sup> Others, like Ruhrgas in Germany, were privately owned, predominantly by energy companies like the oil multinationals, or Ruhrkohle, and held very dominant positions in their national gas markets.

Figure 1

### Main Features of the Traditional West European Gas Market

Suppliers	Transmission Companies	Consumers
Netherlands	Ruhrgas	
Norway	Gas de France	Distributors
USSR	Gasunie	Power stations
Algeria	Distrigas	Industries
Domestic	SNAM	
	etc.	

The upstream supply, too, was heavily concentrated and had a dominant government ownership. In Algeria and the USSR, of course, gas exports were an integral part of the government. In Norway, exports were tightly coordinated by a triumvirate, comprising Statoil, the state-owned petroleum company, and junior partners, Norsk Hydro and Saga, in which the government held strategic ownership positions too. And Gasunie, the supplier of gas produced in the Netherlands, half-owned by the government, held statutory monopolies in all directions: as exporter, importer and wholesale trader.

The public involvement in most national transmission companies permitted a variety of government interventions with different purposes in view. For instance, there was an implicit political understanding that dependence on imports from the USSR must be constrained. Conversely, the govern-

ments of France and Italy encouraged their transmission companies to pay excessive prices for Algerian gas as a kind of implicit foreign aid (Mossavar-Rahmani, *et al*, 1987). Large scale purchases of gas formed part of national trade policies, with regular requirements for counter-trade, as in the case of the French agreement in 1987 to import Norwegian gas from the Troll field (Estrada, *et al*, 1988).

The powerful position of the national transmission companies was widely regarded by the exporters as a guarantee that the purchase obligations under long term contracts would be fulfilled. Exporters at the time were hesitant about launching large scale production investments, until such guarantees had been obtained. The strength of the national transmission companies was also regarded as essential to ensure sufficient bargaining stamina for obtaining favorable import prices.

The ownership and sole access to pipes by the national transmission companies (and local distributors), provided these agents with considerable market power vis-a-vis their customers. Monopolistic price discrimination became the convention, with each customer category charged a price close to the price of available substitutes. In this way, each user category was charged the maximum that it was prepared to pay. In practice, consumer prices came to fluctuate in parallel with the price of petroleum products.

The import price of gas, too, was strongly related to the prices of crude oil and oil products. Since both their purchase and sales price was related to oil, the national transmission companies were shielded from the vagaries of the price fluctuations. But contrary to a widespread view at the time, the strength of the transmission companies was not a guarantee that they would strike hard price bargains with the gas exporters. Two factors reduced their incentives to bargain down the price. First, several of them were publicly owned utilities, required to provide a "normal" return on capital, not to maximize profits. For instance, Gasunie in the Netherlands was required to attain an annual net profit and dividend equal to Dfl 80 million and no more (Gasunie, 1988). Similarly, a study of the annual reports of Gaz de France from the time (Gaz de France, 1988) suggests an obligation to earn an adequate, but not necessarily a maximum return on investments. Second, the major oil companies responsible for the exploitation of gas in the Netherlands and the North Sea held very important ownership positions in several of the national transmission companies. The relative indifference of these owners between "upstream" or "downstream" profit generation must have reduced the pressure on the transmission companies to strike hard price bargains.

In any event, the very high oil prices during the "OPEC decade" of 1975-1985 made it possible to charge the gas consumers at levels far above the cost of production and transport. Most of the gas rent accrued to the producers upstream, but a share was allocated to the transmission companies, thereby assuring them of a very comfortable life. Importing country governments were complacent, for the arrangements assured secure and adequate supplies, and thus resolved the overriding concern of the time. None of the major agents wanted to rock the boat, and the structure became increasingly cemented.

#### **Emerging Frustrations**

The decision by Saudi Arabia and other Middle East oil producers in early 1986 to allow oil prices to fall by about half

led to a dramatic and uncomfortable decline in the gas rent, and, even more important, to a fundamental change in the perspective on the European energy market.

Import prices of gas to Western Europe (CIF importing country's border) declined from an average of \$ 3.7/mn/BTU in 1984-1986 to \$ 2.3 in 1987-1989, or by almost 40 percent (*BP Review of World Gas*, 1991), and have remained at the lower level for most of the time during the 1990s. The price fall sharply reduced the size of the gas rent reaped by producers, but circumstantial evidence suggests that significant rents must have remained even at the new price level (Radetzki, 1992). This conjecture is difficult to vindicate, however, for little hard data is available on the cost of gas production and delivery.

The producers' attitudes to the prevailing pricing conventions were sharply changed by the price decline. These conventions, established in the mid-1970s, involved charging final consumers the maximum they would pay, given the price of substitutes. The impact was, unsurprisingly, a restraint on the expansion of the gas market. In contrast to brisk growth until the mid-1970s when the price convention was established, that share fluctuated in a narrow range between 14.5 and 16 percent from 1980 and until the early 1990s (BP, annual). So long as prices and rents remained exceedingly high, i.e., until 1986, producers willingly accepted the stagnant market, even though they had a clear potential to expand. After the price fall, however, their attitude changed. With gas prices tied to those of oil products, the competitiveness of gas did not improve, despite the gas price decline, and the market share did not rise by much. The benefit of the monopolistic arrangement was, therefore, increasingly questioned.

Adding to the producers' restlessness was an extraordinary productivity improvement in the extraction of both oil and gas, in the North Sea and elsewhere. This was partly a pent-up reaction to the cost slack that emerged in consequence of the high prices of the preceding years, but more fundamental technical progress was also at work. Thus, even in the mid-1990s, there appears to be "a huge untapped potential for lowering production costs" (IEA, 1995). As costs were lowered, the potential for growing production and profitable sales was increased, but the realization of this potential was thwarted by the slowness of market growth. Despite increasing producer frustration, the prevailing market arrangements remained intact. Triggers were clearly needed to institute change. As will be argued in the following section, these triggers started to emerge in full force in the middle of the 1990s decade.

The oil price fall also contributed to a changed government attitude towards energy. This began in the early 1980s, in consequence of Ronald Reagan's and Margaret Thatcher's general crusades in favor of politically unhampered market solutions and competition. As the decade evolved, there was increasing disillusion with the far-reaching energy policies implemented in the preceding years. The oil price collapse was seen as a confirmation that energy supplies were ample and that public interventions to assure supply security, e.g., in the form of national monopolies, were costly and unnecessary. The public support for the rigid gas market structure was heavily diluted in consequence.

Consumers, too, came to question the monopolistic price

*(continued on page 24)*

## European Natural Gas (continued from page 23)

discrimination exercised by the national transmission companies, but few had the means to challenge the system so long as the pipelines remained the exclusive preserve of national transmission companies and local distributors. As will appear below, however, by 1990, the few started to make a dent.

In sum, then, a number of emergent circumstances in the late 1980s and early 1990s, pointed to the demise of the gas market arrangements, but the traditional structures have exhibited a considerable perseverance. In the late 1990s most of these structures are still in place, but are ripe for profound change, given the increasingly frequent attacks to which they are exposed by commercial forces. These attacks are described in the next section. Clearly, the thrust towards a competitive market for gas will be speeded up by the shift in the regulatory regime decided upon in late 1997, and especially by the provisions for some third party access to pipelines. There should be no doubt, however, that the actions of the market agents themselves are leading the process of change.

### Commercial Change in Favor of Competition

In the preceding section I discussed a number of frustrations with the status quo, increasingly voiced in the 1990s by various agents in the European gas market. I also pointed to the ensuing pressures for change. Some of these pressures have led to commercial actions that are altering the gas market structure at increasing speed. These actions, to be described below, have been greatly facilitated by two coincident developments outside the domain of the gas market regulation proper that have widened many market actors' scope for maneuver.

The first was the opening up of the huge power market for gas. In 1990, as the perception of an abundance of energy supplies in general and gas in particular had become widespread, the old EU Directive against the use of gas in power generation, was repealed. The effectiveness of the Directive, while it lasted, has been questioned. Technological breakthroughs in the use of gas for power, in particular the commercial vindication of combined cycle gas turbines with very high rates of energy efficiency about this time, were probably even more important for the promotion of gas in power production than the Directive's repeal. The second development was the liberalization of the East European gas market about 1990, thus making it accessible to agents from Western Europe. These developments in combination opened up large-scale new opportunities for the established gas market actors, as well as for new entrants, in turn providing opportunities for implementing structural change.

### The Wingas Story and its Repercussions

The Wingas actions are without comparison the most far-reaching, though clearly not the only ones, among those prompted by gas consumer dissatisfaction with the monopolistic arrangements to which they were subjected. In 1989, Wintershall, the oil subsidiary of BASF, one of Germany's chemical giants, was mobilized by its parent to build a 560 km pipeline (Midal) from Eden on the North Sea to BASF's chemical plants at Ludwigshafen in mid-Germany. The decision was prompted by failure to gain access to the existing pipeline network, and was seen as a measure to assure the chemical company's gas needs without reliance on Ruhrgas

(Estrada, *et al*, 1995).

What began as an isolated action to bypass Ruhrgas, has subsequently developed into a general challenge to the dominance and inflexibility of the leading German transmission company, with likely repercussions far beyond the German borders. The developments have shown that the natural monopoly of a dominant pipeline owner can be surmounted, provided that the challenger is determined, and has sufficiently deep pockets. They have also shown that producers with large potential capacity to supply gas in the 1990s are willing to break the established supply chains if they see an opportunity to increase sales.

A critical follow-up element in Wintershall's challenge of Ruhrgas comprised a joint venture with Gazprom, the sole Russian gas exporter, to build a new pipeline (Stegal) through Slovakia and the Czech Republic, to connect with Midal in Germany, for the purpose of selling Russian gas in eastern as well as western Germany and beyond (Estrada, *et al*, 1995). Another has involved both price and legal wars with Ruhrgas, over the gas market in eastern Germany. Wingas, 65 percent owned by Wintershall and 35 percent by Gazprom, has been in the forefront of all these actions. More recently, the fighting for markets has also spread into the western part of the country, with the challenger gaining significant footholds with some of the regional transmission companies (Bayerngas and Westfälisches Ferngas agreed to take 10-15 percent of their long term needs from Wingas according to reports in *European Gas Markets*, 23 May 1997) as well as in the industrial and the emerging power market.

Wingas' so far unsuccessful attempts to ally with Norwegian producer Saga is another demonstration of upstream frustrations caused by rigid market arrangements. In 1993, Saga agreed to deliver 2-3 BCM of gas per year, against a 14 percent stake in Wingas' pipeline assets, but the deal was rejected by Norway's Statoil-led export monopoly, GFU. In 1995, a new deal was formulated in which Saga, with a steadily increasing resource potential for which there were limited market outlets, would export some 1.5 BCM of gas annually to its own German subsidiary, thereby obviating GFU, with the gas subsequently to be sold to Wingas. This deal too, was thwarted by political and commercial pressures from the defenders of status quo (*World Gas Intelligence*, May 12 and August 25, 1995). No doubt, a third deal will soon be formulated, and in the meantime Saga's Norwegian counterparts may well have changed their mind, after realizing the Norwegian disadvantage, in terms of lost market shares, from preserving monopoly.

Wingas has been involved in an extraordinary pipeline construction program to import gas to Germany. The program is reported to have cost a total of close to \$ 3 billion (Stoppard, 1996). The results, at the end of 1996, are summarized in Table 1. The operating lines, from North and East, have a capacity of 54 BCM, but capacity utilization for 1997 was assessed at less than 20% (*European Gas Markets*, November, 1996). A rod of comparison when reviewing these figures is the total gas consumption in 1996 in the EU, of 335 BCM, and in the whole of Europe, excluding FSU, of 418 BCM.

Wingas capacity will rise to 90 BCM when the pipelines under construction and planning become operational. This is marginally more than overall German gas consumption in 1996 (84 BCM), and represents 135 percent of German

imports (67 BCM) in that year (BP, annual).

**Table 1**  
**Wingas Import Pipelines Into Germany**

Entry point	Name	Capacity BCM/y	Status
North Sea	Midal	10	Operating
Czech Republic	Stegal	12	Operating
Austria	Bavaria	6	Operating
Poland	Jagal 1	26	Operating
Belgium	Wedal	10	Building
Poland	Jagal 2	26	Planned

Source: *European Gas Markets*, November 1996

Conditions in the German gas market will be fundamentally altered in consequence of this construction. Prices will have to decline, as Wingas competes with Ruhrgas for market share, and will remain low for a long time to induce a rise in consumption sufficient to assure reasonable levels of capacity utilization. Wingas and its owners, BASF and Gazprom, must apparently believe that the pipeline investments will prove profitable in the long run, despite a lowered price level. Change in Germany is clearly driven by market dynamics, and not by shifts in the regulatory regime.

The investments by Wingas are bound to have spillover repercussions outside Germany. A gas price fall cannot be isolated to Germany in an increasingly integrated European market for energy. Spillovers will be accentuated by Wingas' own international ambitions, which are likely to undermine the market power of national transmission companies in other countries. Wingas' recent interest in the Interconnector (see below) is an indicator of these ambitions.

#### **Other Arrangements Undermining the Traditional Gas Market Structure**

In 1990, the Dutch Association of Electricity Producers, SEP, signed a contract with Norwegian gas suppliers, to provide gas to its power stations on the coast, so bypassing the Gasunie pipeline grid (Estrada, *et al*, 1995). Gas prices in this contract were to evolve in parallel with the price of coal, thus reducing the traditional tie to oil and oil products. Though the details of the contract have not been published, the terms must be more advantageous to the buyer than what could have been obtained from Gasunie, or else, the deal would never have been struck. Electrabel of Belgium has signed a similar contract for the import of Norwegian gas, bypassing Distrigas, the national transmission monopoly (Estrada, *et al*, 1995).

In Italy, Edison, a private electricity producer, ventured into gas in 1992, by acquiring ownership of some of the domestic gas fields (Stoppard, 1996). In 1995, it went much further, through a joint venture with Gazprom to establish the 12 BCM Volta pipeline that would transport Russian gas, mainly for combined cycle power plants to be constructed. Not only will the Volta gas bypass SNAM, the virtual monopolist for gas transmission and wholesale trade, but given the uncertainty about the volumes of gas that will be required, the Volta project even looks at SNAM as a potential customer (*European Gas Markets*, January 1996).

The Volta project is one of the early instances of a substantial gas endeavor undertaken without confirmed long term market outlets. In the maturing and soon competitive European gas market, such contracts are no longer regarded as a precondition for large-scale investments. The venture

also provides an example of an exporter (Gazprom) so eager to expand its markets that it is prepared to forgo the exclusive relationship with SNAM, until recently the sole importer.

The frustrations among Europe's main gas suppliers with sales and market shares under traditional arrangements are also expressed through an increasing frequency of spot sales. A spot sale by, say, Gazprom or the Norwegian GFU can be seen as a means to preserve the market by preempting spot sales from further away, e.g., LNG from Australia or the Middle East. But as spot sales proliferate, they undermine the long-term contract and price structure, which has hitherto been an important institutional feature of the gas market.

#### **The Interconnector**

The Yamal pipeline from western Siberia through Poland and further west is potentially providing substantial additional capacity of some 50 BCM to European gas supplies. As appears from the preceding discussions, Wingas is playing a major role in this endeavor. Only a minor share of these supplies has been sold under long term contracts, and large volumes remain to find a market. However, the expansion of Russian deliveries comes as no sudden surprise, for the development of the Russian gas bubble has been going on for some time (Dienes, Dobozi and Radetzki, 1994). Not so for the Interconnector, whose implications are causing considerable confusion to the traditional arrangements, and a great stir among the agents.

Writing in 1995, (Estrada, *et al*, 1995) recorded the plan to construct the Interconnector, a pipe from Bacton in the UK to Zeebrugge in Belgium, to permit the exports of excessive UK supplies to the Continent late in the 1990s. They also noted that the UK was likely to become a net importer just after the turn of the century, at which time the flow of gas through the Interconnector would be reversed. This, at the time, was the prevalent view in the gas industry, even though some, but not many, had much more optimistic, and, as it turned out, realistic, perceptions of the UK's production and export potential (Odell, 1996).

In the event, construction of the Interconnector, with a capacity of 20 BCM per year, was started in 1996, with anticipated completion by late 1998. The first right to use the capacity was vested with the shareholders in relation to their participation. The shareholder group comprised: British Gas, 45 percent; British Petroleum, 10 percent; Conoco, 10 percent; and Amerada Hess, Distrigas, Elf, Gazprom, National Power (UK), and Ruhrgas, with 5 percent each (*European Gas Markets*, September 1996).

Table 2 shows that by the end of 1997, a total of almost 11 BCM of this capacity had been contracted for under long term agreements to deliver UK gas. Further contracts are anticipated before operations begin, but some 5 BCM of annual capacity is expected to be left available for short-term or spot sales (*World Gas Intelligence*, November 28, 1997). At the time of writing (early 1998), before the Interconnector has started operating, plans have been advanced to make Zeebrugge into a European hub, comprising both physical and paper trade. Enron, the global and prolific gas trading company from the United States, is waiting for the right opportunity to jump into this market from its subsidiary base in the UK.

(continued on page 26)

**European Natural Gas** (continued from page 25)

**Table 2**  
**Interconnector Sales of UK Gas**  
**Status December 1998**

Parties	Volume BCM/year	Duration, Years	Delivery Point
Conoco-Wingas	1.0	10	Aachen
BG-Wingas	2.0	10	Aachen/Zeebrugge
BG-Thyssengas	0.5	7	Zeebrugge
Mobil-Hydro Agri	0.8	10	Zeebrugge
BP-Ruhr gas	1.0	15	Bacton/Zeebrugge
BG-Elsta	1.0	8	Zeebrugge
BG-Entrada	0.7	8	Zeebrugge
Conoco-Gasunie	1.0	8	Belg/Dutch border
Elf/Texaco -GDF	2.8	na	na

Source: *European Gas Markets*, Oct 1997; *World Gas Intelligence*, Nov 28, 1997.

The content of Table 2, presented chronologically, raises several observations of importance for the theme pursued in this paper.

First, it appears that very substantial exportable surpluses of UK gas will be available for the foreseeable future. Competition among producers in the UK has clearly released a profitable production potential that few observers perceived, until the Interconnector outlet became a reality. Now that the gas market in the UK is being tied to the rest of Europe, the example of what has been accomplished by competition in the UK is bound to have a stronger influence than before on continental developments. It could well be that the Norwegian capacity to supply will experience a similarly impressive upward jump, once the Norwegian producers start to compete with each other.

Second, part of the deliveries are destined for Wingas, in Germany or elsewhere, thus diversifying this company's sources, and improving the supply security image of its deliveries. This should add to Wingas' competitive edge when it seeks to take additional market shares from Ruhr gas and others.

A third observation is that several of the contracts have been signed with final users or associations of users, e.g., Hydro Agri (fertilizer), or Elsta and Entrada (electricity), all in the Netherlands. Given the onerous conditions for transmission of gas from Zeebrugge, offered by the national transmission companies, all three are constructing their own pipelines for onward transport. An excess capacity is built into these pipelines, in case the buyers' own future demand increases, or to be offered to other final gas users. The transmission companies' market control is compromised in consequence.

Fourth, the recent involvement of Ruhr gas, Gasunie and Gaz de France as buyers of Interconnector gas, can be perceived as defensive steps by the national transmission companies aimed at maintaining market control. It is by no means clear that these measures will achieve the desired ends.

The volumes to be made available through the Interconnector may be marginal, compared to overall demand (6 percent of EU's consumption). But then, it should be recalled that competition and price setting are typically determined by marginal supplies.

**A Summary of Conclusions and a Caveat**

The thesis of this paper is that competitive conditions are

gaining an important foothold in the European gas market, hitherto characterized by monopolistic conditions and pervasive state involvement, even before the impact of formal deregulation, in the form of the European Gas Directive, has taken hold. The reasons for the ongoing change comprise a lesser concern of both governments and private agents about supply security, the lesser need in an increasingly mature market to rely on stiff long-term contract arrangements, an increasing frustration among producers whose growing supply potential does not find a sales outlet under prevailing market arrangements, dissatisfied large consumers who are prepared to challenge the transmission monopolies, and the competitive injection, both on the supply and the demand side, caused by impending deliveries from the UK.

Already, some of the national transmission companies are accepting to transport gas owned by final users, at discounted rates, in an effort to thwart the thrust towards independent pipeline construction. It is only a question of time until these companies will be tempted to pinch customers, situated in the proximity of national borders, from each other. Even the most protected monopolies will jump on the bandwagon of change, and position themselves for the competitive order, once they realize that traditional arrangements are crumbling.

The implications of the ongoing process in which commercial forces lead to an increasingly competitive gas market are dealt with at length in a companion paper (Bergschneider, 1998). Briefly, the number of independently acting gas suppliers, including both producers and traders, will proliferate. Some agents currently operating in the European gas market will experience difficulties in adapting to the emerging competitive conditions, and will not survive. Average prices of gas, both at the import point and the consumer gate will decline relative to the prices of other fuels, and the growth of consumption will accelerate, as the pent-up supply potential finds competitive market outlets. The contractual arrangements will become shorter and increasingly flexible, with gas prices fluctuating, according to season, to the time of the day, and to conditions of supply. National borders in Europe will lose their significance. And governments will withdraw in some measure from their ownership positions in the gas industry, as they realize that the gas market can be privatized with impunity. Gas users will benefit, provided that they take an active attitude to the menu of flexible offers, of gas and of ancillary services, physical, financial and others, provided by the market.

Though this, in my view, is the most likely outcome of events in the European gas market in the first decade of the coming century, a caveat needs to be inserted. Russia and the other FSU republics hold an exceedingly strong gas resource position vis-a-vis Europe, comparable to that of the Middle East in world oil. Gazprom, the giant Russian gas monopoly, has made forays, both upstream and downstream, to establish itself, usually through joint ventures with local agents, throughout the European gas supply system. The Gazprom presence comprise not only the former communist countries of Bulgaria, Hungary, Poland, Romania, Slovakia and Slovenia, but also Greece and Turkey, as well as Austria, France and Finland. Gazprom's involvement with Edison in Italy and with Wingas in Germany have been discussed above. Gazprom has also made overtures about joint ventures with producers in Algeria and in the UK.

The Gazprom proliferation can, of course, be seen as an energetic effort to expand market shares, to make fuller use of the rich resource base, and to fill the two new pipes from the east, Jagal 1 and 2, reported in Table 1 above. This is the most likely interpretation, especially in the short- to medium-run. But it cannot be precluded that an implicit Gazprom goal for the longer perspective is to outmaneuver competitors, to establish itself as a dominant market player throughout the gas supply chain, and to derive benefit from advantageous prices and margins, made possible by its dominant position.

The recently announced collaboration between Gazprom and Shell is a pointer to the plausibility of such a development. Shell is another gas giant, globally and in the European market. In what "may turn out to be the most significant component of the 21<sup>st</sup> century European gas industry", the two "have agreed to form a strategic alliance to operate on a wide range of projects for the development of oil, gas and gas liquids, and other energy initiatives, both in Russia and internationally." (*European Gas Markets*, November 1997). As a first step, Shell will purchase \$ 1 billion worth of Gazprom convertible bonds. If they set their minds to it, the two together could wield a formidable influence over the European gas market.

Will they be able to manipulate the market to their own monopolistic advantage? And will they want to do so? There is no doubt about the ability of the pair first to increase their joint market position through fierce competition, and then to control supply and to maintain monopolistic prices in the short-to medium-term. In the longer run, such a policy might backfire, both by waking gas competitors to life and by prompting interfuel substitution. My hunch is that the Gazprom-Shell alliance will take a long term view, and avoid monopolistic excesses, even if its market share would permit it to do so.

#### Footnotes

<sup>1</sup>Until about 1990, East European gas supply was dominated by barter contracts with the USSR. These arrangements are of little relevance for the present account. In more recent years, the East European gas markets have become increasingly integrated with those in Western Europe to form the European gas market under investigation in this paper. With the exception of some erratic exports from Norway, the UK market remained, until the present, secluded from the rest of Europe. For this reason, the UK too, is not dealt with in the present section.

<sup>2</sup>In some cases, the statutory monopoly rights did not apply to imports for own use.

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#### Editor's Note (continued from page 1)

Lise Weis and Isabel Murray report on the Moscow G8 Energy Ministerial and discuss the background paper prepared for the Energy Ministers on energy investment. They review the paper's recommendations to governments on energy investment and look especially at the energy situation in Russia and how the recommendations relate to that country.

Ivan Benes, president of IAEE's new Czech Republic affiliate, reports on energy use in his country. He comments on the background of the country's high energy consumption and then the efforts needed to bring this in line with current Western European standards.

In a paper discussed at the G8 Ministerial Meeting in Moscow, Paul Vlaanderen examines energy transport and transit over land and notes that governments will have to ensure that there is an investment climate and a multilateral transport/transit regime that enables energy companies to make needed investments.

John Lichtblau looks briefly at the impact of the 1973-74 oil embargo on the global economy and then focuses on the impact on the United States. He concludes that the embargo was not a success for the countries imposing it, and that the events since then have made the use of oil exports as a political instrument even more difficult now than it was in 1973.

Marian Radetzki analyzes the emerging commercial forces that promote increasing competition in the European natural gas market and argues that these commercial developments are undermining existing monopolies and will bring about increasing competition even if the formal regulatory regime stays intact.

Silvan Robinson looks at the factors leading up to the 1973 oil crisis - prices, volume cutbacks and destination control, at how the situation has changed today and what the consequences of those changes are. He concludes that a 1973 could happen again and that the way to be prepared for such is to rethink the issue of Strategic Stocks; and now, a time of oversupply is just the time to do so.

As always, we encourage readers to submit articles for consideration of *Newletter* publication.

DLW

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## If 1973 was Repeated –

By Silvan Robinson\*

Let nobody be under a misapprehension. It could happen again, indeed probably will happen again. When one considers the cocktail of stresses and resentments which characterizes the Middle East it is odds on that some accident will happen. The strident Arab/Israeli tensions, the rise of Fundamentalism, the youth unemployment, the likelihood that more than one Middle East power will soon have nuclear or biological weapons, or both, lead to this inevitable conclusion, so uncomfortable to liberal economists who like to think that the mutual self-interest of trade leads to peaceful relations. We had better be prepared, or at least know what we are in for. For the most part we are not.

### The Commanding Heights

The 1973 crisis erupted on an oil world very different from the one we know today. Dan Yergin, in his recent book, has traced the evolution of the postwar industrial structure of control by governments of the “Commanding Heights” (apparently Lenin’s phrase) to one where power has shifted to the market. Oil is only exceptional because its scope was international, and control was vested in the major oil companies, not governments. The battle was about who should control the Commanding Heights, not about whether they should be there.

To be sure, there were signs of decay of the control being exercised by the Eight Sisters (including CFP) by late 1973. Demand was escalating, Libya was taking advantage of pressure on prices. Texaco had broken the line. The Teheran Agreement was under threat. But the industry was still in a position to negotiate collectively under the watchful eye of John McCloy by special dispensation from the Justice Department. The Yom Kippur War changed things fundamentally and forever. The challenge came on three fronts – on price, on volume cutbacks and on destination control.

### The Price Issue

I recall vividly stepping out of the Exxon plane one gray October day in Vienna with the industry team led by George Piercy and going straight into the meeting with the OPEC Ministers (I was allowed in as a sort of bag-carrying voyeur). The Yom Kippur War had just started. It was immediately apparent that the rules of oil engagement had also changed. OPEC was no longer talking about inching up the price gradient agreed under the Teheran formula by imperceptible stages, but about a massive hike – an extra three dollars, doubling the price. George Piercy responded that such a hike became a matter for governments not commercial companies. Amouzegar, the Iranian Oil Minister, started a long speech. Yamani in the chair yawned, having heard it all a dozen times before, got up and shuffled out of the room, Amouzegar still talking. That was the last occasion the industry confronted OPEC to negotiate prices as a body. Price management passed to the producers. As is well known, the second OPEC price hike took prices to \$12 a barrel. This was still well below the price of \$19 achieved

\*Silvan Robinson is with the Royal Institute of International Affairs, London, England. This is an edited version of his remarks at the 21st Annual International Conference, May 13-16, 1998 in Quebec City, Canada.

at the notorious Teheran auction. But the producers, no more than the companies, believed that the emerging (and small) open market should actually control prices rather than influence them. The final decay of the controlled market happened much later, in the aftermath of the second oil crisis.

### Cutbacks

What really scared the industry and consumers was OPEC’s rolling program of production cutbacks. Whether the comparatively brief period in which these were in place led to an actual shortage or the appearance of one, two lessons emerged. The first was that when consumers panic, there is a run on stocks. If secondary distributors and consumers decide to build up stocks (keeping the car’s gas tank full rather than half empty), there is a run on primary stocks and shortages happen. The second is the concept, much canvassed by energy economists at the time, of the backward sloping supply curve. It was observable that the more OPEC cut back volume the higher they could raise the price, to the huge short-term benefit of their budgets. Once they had got a taste for this, where would it end? This was the question which much exercised economists at the time. We now know where it ended: in failing demand and weakening prices. The process begun in 1973 is still with us. The 1973 price explosion saved the economics of North Sea development (and gas projects like Brunei LNG). Non-OPEC production has never looked back. The lower prices and loss of demand were the direct cause of the fall of the Shah of Persia.

The third oil weapon was boycott, named after a certain Captain Boycott of Irish revolutionary fame. There is no question that the concept of cutting off supplies to unfriendly states did carry a strong political message. The boycott was circumvented primarily by the ability of the central supply functions of the oil Majors to reallocate supplies around the globe on the principle of equal misery. Perhaps the most-remarkable example of the power of the Majors was Shell and BP’s confrontation with the British Government under Ted Heath. Heath had sent Peter Walker to Saudi Arabia to negotiate a special supply of 300,000 b/d of oil for Britain. Unwisely, Walker handed this over to Shell and BP to administer, who promptly fed the oil into their general supply systems to make up, inter alia, for the boycott of Holland. A ranting Ted Heath could not budger them. The result was that UK power stations were short of oil when the miners’ strike cut off supplies of coal. Ted Heath fell. Margaret Thatcher took over as Conservative leader and Thatcherism was born. Out of such unpremeditated consequences is history made.

This ability to shuffle oil around the system broke down when the supply systems of the Majors came to be replaced by commercial arms length dealing and the emergence of oil trading companies like Phibro, a process that had begun when the second oil crisis hit. The IEA’s oil sharing mechanisms were based on the assumption that oil companies retained this power. They do not.

There would have been no way by the time of the second oil crisis in which the Majors could have reallocated oil by administrative means, far less today. The only way of securing oil is price. He who has the biggest purse will get the oil. That is the simple message.

### The Changed Oil World

It requires a serious effort of imagination to recapture the business mind-set of 25 years ago. Fundamentally, four

things have changed.

1. "Supply" has everywhere given place to trading.
2. The OECD no longer dominates international trade.
3. Oil is now almost exclusively a transportation fuel. The potential for substitution between oil and other under boiler fuels is minimal.
4. Non-OPEC supplies have grown enormously in importance.

It is worth examining the consequences of these changes.

#### The Impact of Trading

At the start of the second oil crisis the market was still dominated by long term contracts and prices based on OPEC official selling prices. Although in retrospect there never was an oil shortage in 1979-81 the perception was there. Traditional supply patterns were disrupted, price premia were introduced to the market by some producers, oil was withdrawn from the contract market and offered out spot. The actual size of the spot market was not enormous, but rather like a volcano, pressure exerted on a narrow front exaggerated the impact. Saudi Arabia in particular made efforts to restrain official prices, without, however, understanding the dynamics of supply disruption and the need to keep a balance between crude long and crude short companies.

The period of crisis was the prelude. It loosened the system up and taught the market new tricks. "They have taught me language, and the profit of it is I have learned how to curse" said Caliban. When oil demand began to collapse in the early 80s, product prices also collapsed. Refiners put pressure on their suppliers to supply crude at bargain prices, with the very real threat that they could always look elsewhere. Increasingly trading companies had to subordinate supply security to the best short-term buy, however much this upset Managing Directors in their ivory towers, who did not like the threat to their authority any more than OPEC did.

The era of the spot market had begun. Term contracts had to be accommodated to the going market price and post-1985 all OPEC crudes abandoned the idea of setting prices in favor of mimicking the price structures of the markets into which their oil was sold. OPEC has never learned one of the primary lessons from the Seven Sisters, that integration is useless unless the oligopoly is lateral as well as horizontal with rules carefully constructed to prevent overproduction at the margin and excess capacity development. As Robert Mabro has recently elegantly put it, you have to mind both your p's and your q's - your prices and your quotas - if either is to be effective.

The period of price hedging had begun. I recall the gasps of astonishment at an Oxford Energy Seminar when I held up a diagram of one of the first "daisy chains" - 30 transactions long. A forward market developed, and alongside it a futures market. The Wall Street traders began to show off their pyrotechnics. It was all quite exciting. Trading organizations in the Majors had to adapt very fast to survive.

The growth of demand outside the OECD has transformed the pattern of international trade. In a crisis the OECD could no longer act unilaterally to control the market, even if it had that capacity (which it does not). This means that in an open market oil will flow to the highest bidder, whatever officials may think. Non-OECD is not going to show any discipline.

The effect of oil becoming a transport fuel is that there is much less price elasticity and substitutability. There is

relatively little scope for switching power stations over to coal or gas. This means that there is no self-correcting mechanism adjusting demand to rising prices and lower supply.

Non-OPEC capacity adds little to flexibility. The growth of non-OPEC supply may create a small buffer because it is always possible to squeeze a bit of extra oil out of a production system in the short term. But non-OPEC runs flat out. Flexibility is limited.

#### In a Crisis, What Would Happen Now?

The Gulf War never really produced an oil crisis. Volumetrically oil lost from Iraq and Kuwait was replaced by Saudi Arabia and Abu Dhabi. There was a sensation of unease and the market responded. But the reality was that there was no shortage. A sensible release of some U.S. reserves calmed nerves at a critical point and things rapidly returned to normal. This was not, as is sometimes suggested, a triumph of the futures markets, giving the opportunity to buy forward and so reducing pressure on the physical market. It was simply a consequence of the crisis never having existed in the first place.

But supposing a real crisis did develop with serious disruptions to supply, perhaps boycotts? The defenses are perilously weak.

There are no government selling prices to act as a lagging mechanism in an exploding market. There are no sharing mechanisms that can be put in place. Efforts by one consuming country to put a cap on consumer prices would simply lead to the oil going elsewhere to the highest bidder. OECD on its own would be ineffective without the growing markets elsewhere joining the club. The futures markets are paper markets without any real impact on the supply/demand equation. Demand for automotive fuels, cushioned by high consumption taxes is seriously inelastic. It does not look good. And yet the chances are that another crisis will happen.

There is only one solution: to impact on the supply/demand equation through the emergency use of strategic stocks. The fact is that stocks everywhere have been run down by commercially correct "Just-in-Time" policies. Governments, including the United States, find the sale of Strategic Stocks a budgetarily convenient thing to do. Strategic Stocks are available very unevenly around the world and are far too small. Their use in a crisis does not necessarily add to the oil flow to the country releasing them, but it does help to calm markets.

An urgent rethink of the Strategic Stock issue ought to be a major international preoccupation. But governments prefer to play with aircraft carriers, altogether more dangerous toys and probably less effective. An oversupplied market is just the time to reopen the debate on stocks. This is not something that producer governments should feel sensitive about. It is in their interest, quite as much as that of consumer governments, that unease over the risk of crisis should be reduced. It will always be there, but the knowledge that there were sufficient stocks to calm markets and provide a breathing space would make the consuming world a lot less anxious about a renewed reliance on Middle East supplies. The economic cost of putting oil into storage is simply the cost of production. Why should not Saudi Arabia ship some of its oil out of the ground in Saudi Arabia and into the ground in caverns elsewhere? The economic benefit is unquantifiable.

*(continued on page 33)*

## Misleading Numbers? Despite Low Percentages, California Switchovers Highly Significant

By Fereidoon P. Sioshansi\*

Numbers do not lie, but they sure can be misleading. A case in point is the dismally low turnover rates experienced in the newly launched competitive electricity markets of CA, MA, and RI. The opening of the retail electricity markets in both New England and California has produced more yawns than excitement among average consumers with very few small and residential customers switching suppliers thus far.

In California, for example, approximately 97,000 customers, out of a population of 9.6 million (for the three investor-owned utilities – IOUs – in the state) switched suppliers as of April 1998. That is 1 percent of the customer base. Not enough to get excited about. Right? Wrong! A closer look at the accompanying table shows why. Among the highly touted 32,000 industrial customers, for example, roughly 7,500 or 23 percent have switched.

### Customer Defections in California: Small in Absolute Terms but Highly Significant

Number of confirmed direct access switchovers, 1 Nov 97 through 30 Apr 98.

Customer Class	No. Switched <sup>1</sup> (3 CA IOUs)	Total No. Customers <sup>1</sup> (3 CA IOUs)	As % of Customers <sup>2</sup>
Residential	60,000	8.4 Million	0.7%
Commercial	23,000	1 Million	2.0
Industrial	7,500	32,000	23.0
Other (e.g., agricultural)	7,000	88,000	0.3
Total	97,500	9,520,000	1.0

Source: Calif. Pub. Utilities Commission, Energy Division.

<sup>1</sup> Numbers are rounded off.

<sup>2</sup> The real percentage of industrial switchovers is probably closer to 17% across CA. This 23% figure is inflated and results from the arbitrary definition of all customers above 20 kW as “industrial,” used by Southern California Edison Company in reporting to the CPUC.

The low turnover rate among the residential and commercial customers may be partially explained by the 10 percent legislatively mandated rate reduction. The savings potential for small customers is simply not there, or too small to bother with. But it is an entirely different matter when it comes to large industrial customers.

More alarming is the lost volume of business when viewed, *not* in terms of the number of customer switchovers, but in terms of the volume of revenues at stake. It is estimated that the 3 incumbent California IOUs have already lost some \$3 billion in annual revenues through customer defections – approximately 12 percent of California’s estimated \$24 billion retail electricity market. Some industry insiders estimate that the figure may be closer to 20 percent by the end of 1998 as more customers switch suppliers.

Who are these customers switching to? There are several options:

\* Fereidoon “Perry” Sioshansi is a Partner with Convector Consulting Inc. in Menlo Park, CA. He edits and publishes the *EEnergy Informer*, a monthly newsletter. This is an edited version of an article which appeared in the July 1998 issue and is available on the web at <http://members.aol.com/eeinformer>

- In some cases, customers are merely abandoning the incumbent utility distribution company, or UDC, and signing up with its non-regulated affiliate. For example, a customer may switch from PG&E to PG&E Energy Services. In this case the parent company, PG&E Corp. is not materially affected since the customer is retained within the family.
- In some cases, customers are switching from their current incumbent UDC to the non-regulated affiliate of another UDC. For example, a customer of Southern California Edison Co (SCE) may switch to PG&E Energy Services. In this case, one utility (or its parent company) gains what the other loses.
- In some cases, the customers switch from an incumbent UDC to an independent energy service provider or ESP. For example, a customer of Pacific Gas & Electric Co. (PG&E) may switch to Enron.

The longer-term ramifications of customer defections from the incumbent UDCs (and their parent companies) depends on the number of turnovers as well as who the customers are switching to. Equally important is the question of what business they want to be in. As time goes on, it is fair to assume that:

- the UDCs will gradually lose their dominant market share to their rivals (and their own non-regulated affiliates);
- many of the more profitable customers (presumably those with fatter profit margins) will be among those defecting to rival ESPs; and
- many of the high cost customers (i.e., high cost relative to revenues) will remain with the UDCs simply because nobody else would want to serve them.

The parent utility company, for example, must decide what is good for the UDC and what is good for the non-regulated affiliate(s). Likewise, the new ESPs must decide how to position themselves vis-à-vis the incumbents as well as other ESPs. Ultimately, however, this is a zero sum game. One player’s gain will have to come at the expense of another’s loss.

The incumbent UDCs must face up to the proposition that they are starting with an enviable 100 percent market share, and they are bound to end up with something less than that before the dust settles. The important question is what position do they *realistically* wish to end up with – and what can they do to get there.

One line of reasoning may be that the UDCs should focus on being a reasonably profitable regulated poles and wires monopoly. This is an energy delivery and poles and wires maintenance business. Whether a given customer buys energy or not may not matter in the end. Moreover, if the non-regulated affiliate picks up an equivalent volume of business to what the UDC loses, then the parent company remains whole. That is one business model. There are many others. One can only speculate that many IOUs have not worked through the various scenarios, or else the message has not sunk in yet.

A *preliminary* look at the switchover numbers on a company-by-company basis suggests that – at least based on percentages – the switchover rates are not uniform among the three California IOUs. What lies behind these numbers and whether they are significant or not is hard to say. Moreover, it turns out that SCE defines, and reports, its industrial customer differently, making the comparisons difficult.

### One By One They Go... To An Alternative Supplier

Company-by-company switchover data, 1 Nov 97 - 30 Apr 98

Customer Class	PG&E <sup>1</sup>	SCE <sup>1</sup>	SDG&E <sup>1</sup>	Total <sup>2</sup>
Residential	19,500	31,200	9,000	60,000
Commercial	14,800	4,400+	3,600	22,800
Industrial	200	7,200+	100	7,500
Agricultural	250	n/a	n/a	250
Other/unknown	n/a	6,400	400	6,800
Grand Total				97,300

Source: Calif. Pub. Utilities Commission, Energy Division.

<sup>1</sup> Numbers are rounded off and may not add up correctly.

<sup>2</sup> For SCE, customers below 20 kW are defined as commercial and above 20 kW as industrial.

#### If 1973 was Repeated - (continued from page 31)

But how do you measure the economic benefit of an aircraft carrier? As Yamani used to say, oil is a strategic commodity. This is true whether managed by the market or by some General on a Commanding Height, and strategy is not governed solely by considerations of economics.

#### Future IAEE Events

Regional Conference September 9-10, 1998	GEE/IAEE European Conference <i>Energy Markets: What's New?</i> Berlin, Germany
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### 21st IAEE International Conference

### Quebec, Canada May 13-16, 1998

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- **Newsletter:** The *IAEE Newsletter*, published four times a year, announces coming events, such as conferences and workshops; gives detail of IAEE international affiliate activities; and provides special reports and information on an international basis. The newsletter also contains articles on a wide range of energy economics issues, as well as notes and special notices of interest to members.
- **Directory:** The Annual *Membership Directory* lists members around the world, their affiliation, areas of specialization, address and telephone/fax numbers. A most valuable networking resource.
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8/98 News

## Calendar

**31 August - 1 September 1998, The Ultimate Energy Convergence Risk-Management Forum.** New Orleans, LA. Contact: Infocast, 13715 Burbank Blvd., Sherman Oaks, CA 91401. Phone: 818-902-5400. Fax: 818-902-5401. E-mail: mail@informationforecast.com

**1-3 September 1998, Interactive Energy.** Houston, Texas, USA. Contact: Zeus Development Corporation, 2424 Wilcrest, Ste. 240, Houston, TX 77042. Phone: 713-952-9500. Fax: 713-952-9526.

**2-3 September 1998, Potential For FSOs & FPSOs in Asia.** Shangri-La Hotel, Kuala Lumpur. Contact: Conference Connection, 212A Telok Ayer Street, Singapore 068645. Phone: 65-226-5280. Fax: 65-226-4117. E-mail: cconnect@pacific.net.sg

**7-8 September 1998, South Asia LNG & Power.** JW Marriott Hotel, Dubai. Contact: Ms. Gamar, Event Manager, 80 Marine Parade Road #13-02 Parkway Parade, Singapore 449269. Phone: 65-346-9132. Fax: 65-345-5928.

**8-9 September 1998, World Oil Prices: What are the Prospects for Producers, Consumers and the Industry?** London, England. Contact: CW Associates Ltd., Business Design Centre, 52 Upper Street, London N1 0QH, England. Phone: 44-171-704-6161. Fax: 44-171-704-8440. E-mail: CW\_Assoc@compuserve.com

**9-10 September 1998, Energy Markets: What's New?** Berlin, Germany. Contact: Georg Erdmann, Conference Chairman, Technical University TA8, D-10587 Berlin, Germany. Fax: 49-30-314-269-08.

**10-11 September 1998, The 1999 Natural Gas Lookout & Strategies Forum.** Toronto, Ontario, Canada. Contact: Canadian Enerdata Ltd., Suite 304, 100 Allstate Pkwy., Markham, Ontario L3R 6H3, CANADA. Phone: 905-470-0117. Fax: 905-479-2515.

**12-13 September 1998, 8th Annual - Pacific Petroleum Insiders Upstream: Confidential Corporate Briefing.** Raffles Hotel, Singapore. Contact: Global Pacific & Partners, Ltd., No. 8 Victory Road, Greenside 2021, Johannesburg, South Africa. Phone: 27-11-782-3189. Fax: 37-11-782-3188. E-mail: global.pacific@pixie.co.za

**13-18 September 1998, 17th Congress of the World Energy Council.** Houston, Texas. Contact: United States Energy Association, 1620 Eye Street, N.W., Suite 1000, Washington, DC 20006. Phone: 202-331-0415. Fax: 202-331-0418. (<http://www.wec98congress.org>).

**21-22 September 1998, Preparing for the Impact of Cross-Border & Interconnecting Pipelines.** Chicago, Illinois. Contact: Infocast, 13715 Burbank Blvd., Sherman Oaks, CA 91401. Phone: 818-902-5400. Fax: 818-902-5401. E-mail: mail@informationforecast.com

**28-29 September 1998, Financing International Energy Projects: An Introduction.** London, UK. Contact: Centre for Energy, Petroleum and Mineral Law and Policy. Phone: 44-1382-344300. Fax: 44-1382-322578. E-mail: cpmlp@dundee.ac.uk website: [www.dundee.ac.uk/petroleumlaw/](http://www.dundee.ac.uk/petroleumlaw/)

**29 September - 2 October, 1998 Emissions Trading.** Amsterdam. Contact: The Bookings Department, IBC UK Conferences Limited, Gilmoora House, 57-61 Mortimer Street, London W1N 8JX, England. Phone: 44-171-453-5491. Fax: 44-171-636-6858. E-mail: cust.serv@ibcuk.co.uk

**1-2 October 1998, Implementing the Directives on Gas and Electricity in the E.U. Member States.** Brussels. Contact: Centre for Energy, Petroleum and Mineral Law and Policy. Phone: 44-1382-344300. Fax: 44-1382-322578. E-mail: cpmlp@dundee.ac.uk website: [www.dundee.ac.uk/petroleumlaw/](http://www.dundee.ac.uk/petroleumlaw/)

**4-8 October 1998, BioEnergy '98 Conference: Expanding Bioenergy Partnerships.** Madison, Wisconsin, USA. Contact: Fred Kuzel, Council of Great Lakes Governors, 35 E. Wacker Dr., Ste. 1850, Chicago, IL 60601. Phone: 312-407-0177. E-mail: fkuzel@cglg.org

**14-15 October 1998, Financing Power Generation in Russia.** Vienna, Austria. Contact: Business Seminars International, Ltd., Sussex House, High Street, Battle, East Sussex, TN33 0AL, United Kingdom. Phone: 44-171-490-3774. Fax: 44-171-490-8932. E-mail: 100451.3120@compuserve.com

**18-21 October 1998, USAEE/IAEE 19th North American Conference. "Technology's Critical Role in Energy & Environmental Markets."** Albuquerque, New Mexico, USA. Contact: USAEE/IAEE Headquarters, 28790 Chagrin Blvd., Ste. 350, Cleveland, OH 44122. Phone: 216-464-2785. Fax: 216-464-2768. E-Mail: [iaee@iaee.org](mailto:iaee@iaee.org) URL: [www.iaee.org](http://www.iaee.org)

**19 October 1998, SNS Energy Day 1998: Taxation of Energy in an Increasingly Interdependent World.** Stockholm, Sweden. Contact: Susanne Rothschild-Lundin, SNS Energy, PO Box 5629, 114 86 Stockholm Sweden. Phone: 46-8-453-99-50. Fax: 46-8-20-50-41.

**20-22 October 1998, Commercial Opportunities for 1999 in the Energy Sector of Central and Eastern Europe.** Marriott Hotel, Vienna. Contact: Louise Pasha, Phone: 44-171-505-0089. E-mail: [resources@asibsi.com](mailto:resources@asibsi.com)

**21-22 October 1998, Commercial Opportunities for 1999 in the Energy Sector of Central & Eastern Europe.** Marriott Hotel, Vienna, Austria. Contact: Business Seminars International, Sussex House, High Street, Battle, East Sussex, TN33 0AL, United Kingdom. Phone: 44-171-490-3774. Fax: 44-1424-77-33-34. E-mail: 100451.3120@compuserve.com

**27-29 October 1998, Externalities in the Urban Transport: Assessing and Reducing the Impacts.** Milan, Italy. Contact: Prof. Sandro Furlan. E-mail: [evi@feem.it](mailto:evi@feem.it) Web-site: [www.feem.it](http://www.feem.it)

(continued on page 36)

## Conference Proceedings 18th North American Conference San Francisco, California, September 7-10, 1997

The Proceedings from the 18th Annual North American Conference of the USAEE/IAEE held in Boston, MA, are now available from IAEE Headquarters. Entitled *International Energy Markets, Competition and Policy*, the proceedings are available to members for \$75.00 and to nonmembers for \$95.00 (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. To order copies, please complete the form below and mail together with your check to:

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**Calendar** (continued from page 35)

**27-29 October 1998, Power Mart 1998: Conference & Exhibition.** Houston Astrohall, Houston, TX. Contact: Pasha Publications, 13111 Northwest Fwy., Ste. 520, Houston, TX 77040. Fax: 713-460-9150.

**2-4 November 1998, 4th Annual Latin Upstream '98.** Miami, Florida. Contact: Global Pacific & Partners, Ltd., No. 8 Victory Road, Greenside 2021, Johannesburg, South Africa. Phone: 27-11-782-3189. Fax: 37-11-782-3188. E-mail: global.pacific@pixie.co.za

**2-6 November 1998, 12th CEPSEI Exhibition** held in conjunction with the bi-annual conference on the Electric Power Supply Industry. Dusit Resort Pattaya, Thailand. Contact: Ladda C. Dela Cruz, Project Manager, Bangkok Rai, 226/25 Bond Street, Riviera Tower 3, Muang Thong Thani, Chaengwattana, Nonthaburi 11120 Thailand. Phone: 662-9600141-3. Fax: 662-9600140. E-mail: ladda@bkkrai.com

**3-4 November 1998, 1998 Natural Gas Conference.** Toronto, Ontario, Canada. Contact: Industrial Gas Users Association, Phone: 613-236-8021. Fax: 613-230-9531. E-mail: igua@hypernet.on.ca

**9-11 November 1998, PQA '98 Southern Hemisphere: Power Quality in a Competitive Environment.** Cape Town, South Africa. Contact: Marsha Grossman, EPRI, 3412 Hillview Avenue, Palo Alto, CA 94304. Phone: 650-855-2899. Fax: 650-855-8576. E-mail: mgrossma@epri.com

**11-14 November 1998, EP China '98, 7th International Exhibition on Energy & Power.** Beijing, PR China. Contact: Adsale Exhibition Services Ltd., 4/F Stanhope House, 734 King's Road, North Point, Hong Kong. Phone: 852-2811-8897. Fax: 852-2516-5024. E-mail: aes@adsaleexh.com

**12-13 November 1998, 2nd Annual Global Gas '98.** Rome, Italy. Contact: Global Pacific & Partners, Ltd., No. 8 Victory

Road, Greenside 2021, Johannesburg, South Africa. Phone: 27-11-782-3189. Fax: 37-11-782-3188. E-mail: global.pacific@pixie.co.za

**19-21 November 1998, 7th International Energy Conference and Exhibition - ENERGEX '98,** Manama, Bahrain. Contact: Dr. W.E. Alnaser, Conference Secretariat, Dean, Scientific Research, University of Bahrain, PO Box 32038, Bahrain. Phone: 973-688381. Fax: 973-688396. E-mail: EA607@isa.cc.uob.bh

**9-11 December 1998, Power-Gen '98.** Orlando, Florida. Phone: 918-831-9160.

**12-17 December 1998, 2nd International Non-Renewable Energy Sources Congress and Exhibition - INRESC '98.** Tehran, Iran. Contact: URL: <http://www.uic.edu/~mansoori/INRESC.98.html>

**14-18 February 1999, DistribuTECH '99.** San Diego, CA. Contact: Nancy Wilson, Conference Manager, PennWell Conferences & Exhibitors, 1421 S. Sheridan Road, Tulsa, OK 74112-6600. Phone: 918-831-9438. Fax: 918-831-9834. e-mail: nancyw@pennwell.com

**9-12 June 1999, 22nd IAEE International Conference.** Rome, Italy. Contact: IAEE Headquarters, 28790 Chagrin Blvd., Ste. 350, Cleveland, OH 44122. Phone: 216-464-5365. Fax: 216-464-2737. E-Mail: iaee@iaee.org URL: [www.iaee.org](http://www.iaee.org)

**15-17 September 1999, PowerTrends.** Philippines. Contact: Alice Goh Project Manager, Interfama International Pte Ltd., 1 Maritime Square #09-36 World Trade Centre Singapore 099253. Phone: 65-2766933. Fax: 65-2766811. E-mail: w2608@singnet.com.sg

**7-10 June 2000, 23rd IAEE International Conference.** Sydney, Australia. Contact: IAEE Headquarters, 28790 Chagrin Blvd., Ste. 350, Cleveland, OH 44122. Phone: 216-464-5365. Fax: 216-464-2737. E-Mail: iaee@iaee.org URL: [www.iaee.org](http://www.iaee.org)

**IAEE Newsletter**

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