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About the Energy Institute

Established in July 1995, the Institute is an influential, university-based center of excellence that supports open markets for private investment in energy. Our mission is to help prepare energy business managers and government policy makers for more competitive, global markets. We concentrate on the policy frameworks that best serve global capital markets for energy resource and infrastructure development — the ingredients for successful, “bankable” energy investments — as well as on optimal strategies for investment and trade. Our interdisciplinary research is focused on three fundamental, interacting forces that are re-shaping the global energy industries:

- the role of government (at all levels) and policy models for commercial energy development,
- the business/government interface,
- corporate strategies and management responses to more competitive energy markets.

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ENERGY★INSTITUTE

Michelle Michot Foss, Ph.D., Director
E-Mail Address: energyinstitute@uh.edu
Phone (713) 743-4634 • Fax (713) 743-4881
Web: www.uh.edu/energyinstitute

Introducing *Energy Inc.*

Since establishment of the Energy Institute in 1995, we have produced an annual newsletter that also served as our annual report. With this inaugural issue of *Energy Inc.*, we introduce a new format with semi-annual commentary on energy markets and enterprises that accomplishes several objectives.

First and foremost, *Energy Inc.* serves to distribute knowledge and information accumulated through Institute-led research at the University of Houston.


Second, *Energy Inc.* provides a platform for discussion and debate on critical issues and themes prevalent throughout the worldwide energy industries. The Institute is a University-Business Learning Partnership and our external networks are vital to the work we do. The dialogues we maintain with our Corporate and Government Partners, Advisory Board and Senior Associates yield a rich source of ideas that can be disseminated to broader audiences through *Energy Inc.*

Third, *Energy Inc.* is not simply the name of our flagship publication, but a business model under development at the Institute for use in both degree and non-degree courses at the University of Houston’s Bauer College of Business. The “Energy Inc.” model provides an enterprise-level business context for exploration of the essential components of our work at the Institute — the role of government (at all levels) and policy models for energy development, the business/government interface and corporate strategies and management responses to more competitive energy markets. Our student “managers” of *Energy Inc.* play a vital role in building content at the Institute, in particular for our Energy Institute Case Study Series. Each issue of *Energy Inc.* will include current case study topics and output. You can read more about our case study series elsewhere in *Energy Inc.*

Finally, the world of energy, indeed the world in general, is always in a state of flux. But we are, at the opening of the 21st century, at a critical point in the market transformations that have played such a crucial role in the energy industries these past few years. It is fair to ask a simple, but loaded, question — how committed are governments and their societies to private market solutions, for overall economic life as well as energy development?

Across a wide range of situations and

countries, including our own, it is clear that there are common patterns and threads. One is a fear of the downside combined with the notion that government is best at protecting consumers, and perhaps also producers, against the risks and uncertainties that come with market cycles. This notion is embodied in the concept of “public service,” that there are certain functions in economic life, such as energy and associated energy utility infrastructure systems, that may be too important to trust to the market. However, the public service concept belies the strengths of individual responsibility and entrepreneurship. In this age of customer arbitrage across fixed and variable interest rates for home mortgages, diversified portfolios for personal retirement accounts and day trading for equities, competition in long distance and Internet retailing, acceptance of a risk/reward trade-off for energy is sadly behind the times. Most of us in the U.S., Canada, Western Europe and Japan are fully able to rely on market mechanisms, allowing the public policy effort to be directed toward those who cannot or where acceptance of and development of market mechanics needs to evolve. The best defenses against market disruptions are the market mechanisms that allow both suppliers and customers to “hedge” against swings in price and supply — which often means more market reform, not less, and research and education, which is where programs like our Institute come in. This is not to say that building markets for energy, or anything else for that matter, is easy. In fact, it’s very, very hard. As one observer put it, “Against any economic rationale for markets are the combined forces of history, tradition, politics and ideology.” It takes a good deal of work to evaluate the relative balance between market and government failure to ensure that, if and when government intervention happens, it is for the right reasons. *Energy Inc.* will be our platform to question, challenge and communicate solutions for issues in emerging markets for energy worldwide.

Much of the content in this, and subsequent, issues comes from expert contributors in addition to our own staff and faculty members. We treat their input anonymously. As we move forward with *Energy Inc.* your comments and input also are welcome. You can contact us at energyinstitute@uh.edu. We look forward to hearing your views! 

Commentary: Oil Market Transparency

Is it “déjà vu all over again” as many are asking?

A world crude oil price in excess of \$30 brings not-so-fond memories for anyone who has been around the business long enough to have witnessed the 1973-1986 debacle and lived to tell the tale. It also leaves most observers questioning how this is possible when just 18 months ago it seemed that prices had no where to go but down, down, and down.

On January 26, 2000, the Institute hosted “Beyond Boom or Bust in World Oil Markets” on behalf of the U.S. Department of Energy and with participation by the Independent Petroleum Association of America. The half-day program focused on issues in oil data transparency and worldwide oil market structure that impede development of sound outlooks and distort market reactions, especially during turbulent times.


These are serious concerns, representing billions of dollars to the industry. Even with its substantial depth and liquidity, the global oil business is not very transparent. Too often, the lack of transparency may be intentional. During discussions at the January forum, one of the target issues was how best to encourage both producing and consuming countries to improve and, more important, share oil market information. It is obviously not in everyone’s self-interest to do so. The most important data can be quite sensitive — spare production capacities among producing countries, for instance, which, within OPEC, is considered to be essential to the game. Companies, too, have proprietary data that many prefer to keep close to the vest. Information contributes to strategic positioning, and any savvy market actor will move to protect vital strategic positions. There are many market actors, including governments, operating at cross-purposes. Critics are quick to decry speculative trading activity as a culprit in oil price misinformation and cycles. But risk management is a vital, strategic tool in private, competitive markets. In addition, the level of pure speculative activity is relatively small. However, lack of transparency and information asymmetries that strongly advantage some market actors over others

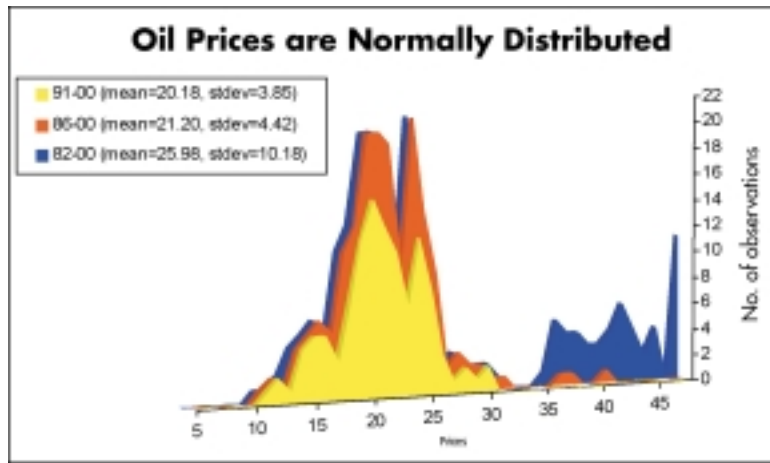
can lead to pure speculative activity that exacerbates market movements and thus is detrimental.

Finally, there is the question of what, exactly, today’s oil “market” is. Indeed, what we really have is an “arrangement.” OPEC controls nearly a third of world supply (governments everywhere control almost 96 percent of worldwide reserves of oil). Emerging market nations, especially those in Asia, account for nearly all of the incremental growth in demand. Huge exposure to price

that missteps by members of OPEC during the early stages of the Asian financial crisis in 1997 were the root cause of the 1998 oil price collapse. Data disparities may well have accelerated market reactions, but they did not trigger events. But a new concern arises: Was the 1998 price collapse merely a distraction for a brewing shortage, made worse by industry reactions to the sharp reductions in price?

From January 1982 through August 2000, we calculate a long-term average price in 1996 dollars of \$25.98. The average price since February 1986 has been \$21.20 and since February 1991 has been \$20.18. Thus, the industry has operated in a prolonged, low and declining price environment for quite a while. What we observe in industry restructuring and now the apparent tightness in supply reflect the full weight of history since 1982, not the cycle that culminated in the December 1998 average price of \$10.95.

With higher oil prices, the pressure to “fix” oil market data inadequacies has not gone away. Indeed, given the cyclic nature of the global oil industry, improving data and information is even more crucial. But it’s clear that we also need to attend to energy policy in light of the global oil arrangement with which we are faced and the realization that if we have to move to a different fuel era, it will be a long and painful process. 



downsides on the one hand, and price upsides on the other, means a tendency by governments to meddle, with OPEC being the strongest case. Somewhere in the middle of this extreme, bipolar structure is a clump of private actors — companies, traders and customers — attempting to make informed decisions (or even, heaven forbid, to forecast) based on thin factual information supplemented by psychology, rumor and political innuendo.

The January forum clearly established



The Energy Institute hosted a meeting for the Energy Working Group, Asia Pacific Economic Cooperation (APEC) Forum, on behalf of the U. S. Department of Energy, including a tour of the Big Hill Strategic Petroleum Reserve and discussions on oil market transparency.

Defining the Concept of Commercial Frameworks

There are many words and phrases to describe the transformations countries have made toward market economies and market-based approaches to the provision of energy. But what we all are really doing, or should be doing, is building commercial frameworks for energy development. The concept of a “commercial framework” implies several conditions.

- It means a legal, regulatory, business context that supports market-responsive private activity, rather than state corporatist approaches.
- It suggests that in many cases, if not all, private markets can produce the services that governments might ordinarily provide in the public interest. It also suggests that competition can help reduce public sector intervention, in the form of regulation, in those instances when private markets for the provision of public interest services may be inefficient.
- Last, it requires business processes on the part of energy providers that are transparent and market-responsive.

If most countries are engaged in trying to accomplish these objectives, and if there are common problems in developing energy, then it stands to reason that there may be common “principles” underlying commercial frameworks. This is a subtle, yet vastly different and more constructive, way of thinking about things than the usual refrain: that countries must implement certain standards because global capital markets and multilateral lenders require it (although that is certainly true).

The energy value chain — like any economic value chain — is composed of linked segments that are often driven by conflicting forces even though the bottom line goal of sufficient returns to justify investment is the same. At the extraction end (upstream), higher prices are much more conducive to investment, or operators must be very good at maximizing their margins in low price environments. The fiscal regimes created by governments can make or break investment opportunities. And these regimes must be appropriate for the level of risk — geotechnical, engineering, political, economic. For conversion and end use (downstream) low feedstock prices are preferable, or again, operators must be very good at maximizing their margins. In the middle or midstream business segments, energy fuels must be

transported and distributed in infrastructure that is expensive and risky to build. This is also where most concerns arise about market power in the form of monopoly or duopoly, and so public sector intervention in the form of regulation is a huge consideration. Issues in energy value chain development are not isolated to any one country or region, and thus the case can be made for shared best practices or international standards.

One of the best examples of international standards is natural gas pipeline transport in Canada and the U.S., where we essentially have a “common market” for the natural gas commodity based on shared principles of nondiscriminatory open access and unbundling for transport systems, even though implementation approaches and market “style” may vary.

The fiscal regimes created by governments can make or break investment opportunities.

In practice, there are many issues in establishing commercial frameworks based on common, international standards. Most important is that not every country or region, or perhaps even state or province, is at a comparable stage of development. There is something of a learning curve that involves not only market facilitation knowledge (within both private and public sectors), but the extent of the market itself. A country that has essentially no natural gas infrastructure and very limited domestic use cannot offer the same base for private investment upstream that the contiguous American states can. Nor are shallow markets where there are few buyers, and likely few suppliers, liquid enough for the risk management practices that are essential in open competition. The standards in these cases differ from more advanced economies, though many governments have implemented frameworks anticipating that market depth, and thus the potential for greater competition, will increase.

A second issue is how committed governments really are to private markets. Too much of what has taken place in recent years, in both emerging and transition economies as well as developed ones, were timid steps toward market structures mainly to raise

cash (privatization) without a strong enough commitment to private markets to ensure that solid frameworks and institutions could be built. As we note elsewhere in *Energy Inc.*, the problem usually is insufficient market reform, rather than too much, preventing evolution of essential market mechanisms and institutions (rules and practices) to prevent abuse.

Finally, both investors and lenders desire strong commercial frameworks before taking risks. But regulatory structures that overreach or provide inadequate insulation from political influence may be costly and burdensome, for investors and society, as well as a new source of risk for investors.

Regulatory Development Pathways: A Viewpoint on Worldwide Trends

Where there has been a long history of litigated cost of service regulation, the adversarial nature of the process and public hearings have proved to be frustrating for all parties involved and led to economically and socially sub-optimal results. In reaction, regulators have been entertaining non-traditional approaches to traditional regulatory issues such as rate setting. The success of this new process requires an environment of “trust” between the regulated entities and the stakeholders. The availability of information about and the understanding of the “regulatee’s” business strengthen this environment. This process leads to negotiated settlements with incentive features that are more sophisticated, more efficient and more enduring than litigated outcomes. These settlements are then put to the regulator for approval. This change of regulatory process as well as the introduction of regulatory innovation has been the experience in North America, especially in Canada since the mid-1980s.

Although incentive-based regulation is becoming increasingly popular, there are issues to consider. For example, how much consensus is necessary/desirable for the regulator to decide that the settlement is in the public interest? Is change in regulatory process a sine qua non, or could innovative “collectivities” — regulators, regulatees and stakeholders — arrive at the same result within the traditional regulatory forum?

Alternatively, where there has not been a long experience of traditional regulation, the trajectory tends to be established by the pol-

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Defining The Concept (continued from page 3)

icy side of government as preparations are made for first-time regulation of state monopolies after restructuring and privatization (desirably, in that order). Perhaps impressed by the U.K. experience with British Telecom and British Gas, and probably with the encouragement of major U.S. and U.K. consulting firms, the policy choice seems to have gone toward the “RPI minus X” tariff approach (essentially, a price cap with efficiency factor). With regulatory policy pre-ordained in this way, the regulator is left to deal with “regulatory technology,” the processes involved in detailed decision-taking, creating information flows, dealing with quality of service and, most challenging, dealing with periodical rate base adjustments for tariffs.

Energy Commodity Markets Served by Network Industries

In energy industry restructuring, there are two trajectories to analyze: (1) countries where the regulator regulates producer price (and quantity) and a significant element of oligopoly and/or oligopsony is present, or (2) countries where producer price and volume are auto-determined by the state enterprise with market control or, at least, substantial market power.

In the first case, consumers usually pay a price for the energy commodity that also includes the regulated cost of transmission and distribution. The service is provided by franchised monopolies with obligations to serve in exchange for their exclusive licenses. In time, commercial, policy and regulatory pressures develop for producers and consumers to achieve direct relationships. In

order to introduce competition, an essential first active regulatory step is some form of third party access to the network. Then, commodity flows are generated under freely negotiated contractual arrangements. A desirable commercial step is some means to deal with existing purchase and sale arrangements (e.g., negotiate, go to court, seek regulator approval for some mechanism to share costs).

Commodities flows under negotiated arrangements account for an increasing proportion of total trade, and are provided by intermediaries of all kinds entering the market. As a further step, regulators exclude network owners from direct participation in the commodity market and create codes of conduct for indirect participation to secure a level competitive playing field. This first type of trajectory is flatter and slower in well-established utility markets (Canada other than the Atlantic provinces, U.K., U.S.) than in “greenfield” markets. An interesting exception is network/commodity separation mandated in Atlantic Canada with separate regulatory authorizations and different entities required for network and commodity activities.


One of the best examples of the second case is provided by Argentina where the energy industries were first restructured, then privatized and finally regulated with clear advance indication of the form of regulation. The order is important. If a country privatizes the monopoly without first restructuring the industry, it may get the “wrong type” of private acquirer (e.g., one looking for a traditional monopoly). Then if the restructuring follows, the acquirer may feel that it has been misled and may pursue legal action.

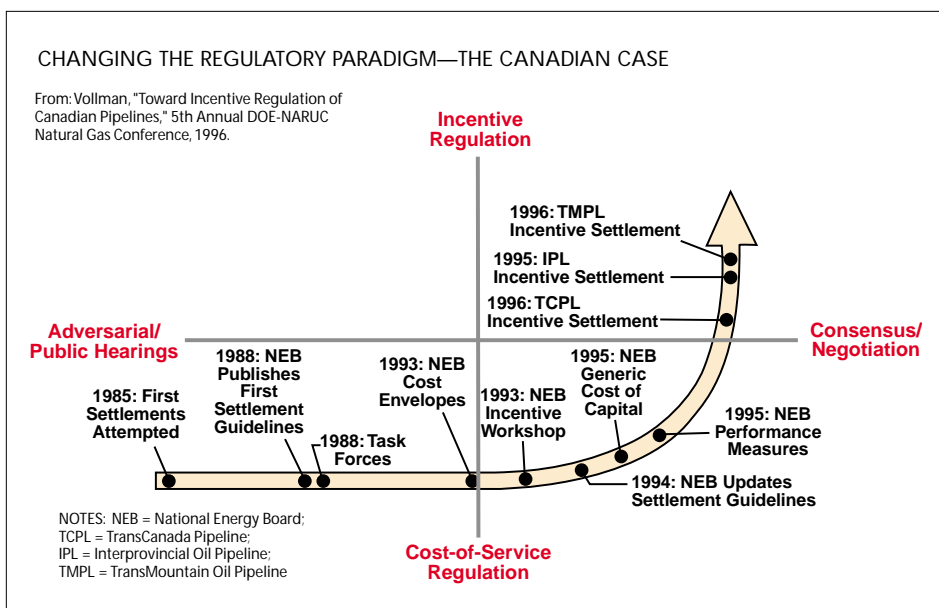
In general, countries that are transforming network industries traditionally dominated by state monopolies must carefully coordinate the restructuring, privatization and modern regulation steps in parallel with each other. They also need to take fundamental decisions regarding:

- policy on regulation (e.g., the extent of regulation, independence of the regulator, residual role for the policy side);
- regulatory policy (e.g., whether to prescribe the basic type of regulatory approach, such as cost of service or incentive regulation, or leave that to the regulator).

In addition, countries should design the regulatory institution(s); decide their relationships within government and their authority over regulatees; create, staff, provide adequate resources for and put to work those institutions to produce regulatory results.

However, there are considerations for achieving success.

- How many competitors are sufficient for a competitive market?
- What is the maximum market share one company can hold?
- How can regulatory strength to police non-market activity be established?
- What should the regulator do, if anything, if a company gains an excessive amount of market share establishing an unregulated private monopoly?
- What can be done to create a competitive commodity market where unbundling and open access is not available? Should building competing systems be allowed?
- Can a competitive commodity market be created without regulatory intervention or regulatory supervision? If yes, what would the consequences and risks be?
- An issue throughout is whether there is a critical mass of informed opinion needed to obtain satisfactory regulatory outcomes, mainly among users of the regulatee’s services but also by those who are to be regulated. In some cases, like Argentina or the U.K., mass opinion already existed or it developed quickly.
- Finally, does the presence of intermediaries from other industries (e.g., gas companies moving into electricity) and from other countries potentially steepen and shorten the trajectory? These latter investors “learned” in the traditional markets such as the U.S. and the U.K. Can they shorten the necessary transitions elsewhere? 



COUNTRY/REGION UPDATES

The Institute maintains research and market monitoring activities in a number of geographic areas. What follows are our latest outputs across a number of fuel markets.

North American Natural Gas

The North American experience serves as the base case for much of our work at the Institute, where we are a leader among university research centers on natural gas and electric power field-to-market development and convergence. During the first half of 2000, the Institute conducted a thorough review of North American gas markets for use by the Japanese government. The North American continental gas market incorporates the most open border for energy trade in the world, that of Canada and the U.S. which functions essentially as a seamless, "single market" for gas. Within the continental arrangement, the U.S. dominates as both the largest producer and consumer, with Canadian exports increasingly important as we head toward a predicted 30 tcf market and Mexico playing an uncertain role.

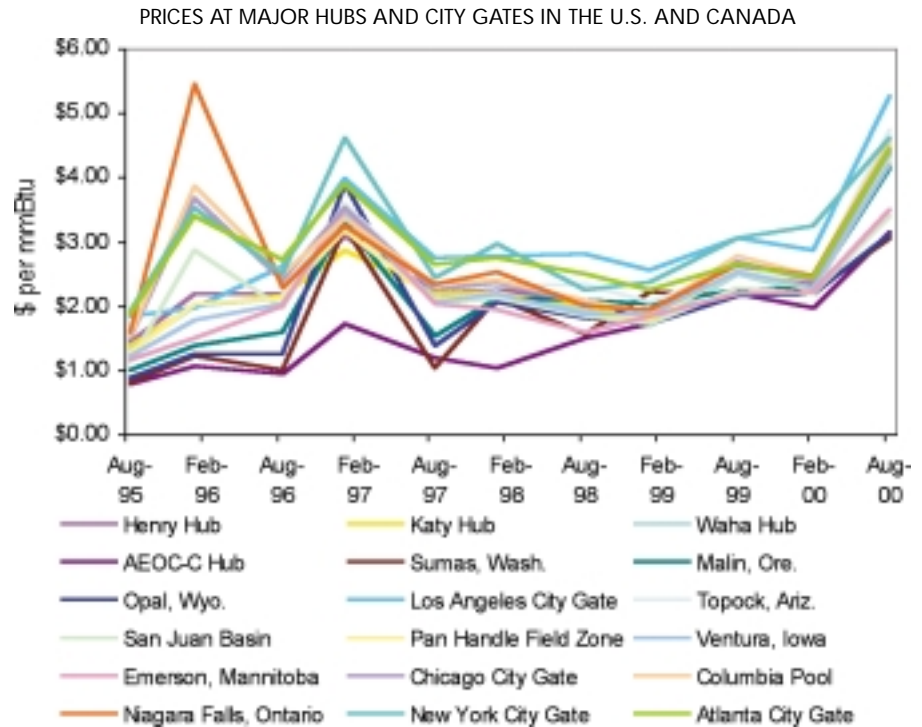
At least as interesting as the current situation in the global oil industry is the emerging view that North American gas supplies might be tighter, at least through the mid-term. It is important to place this viewpoint within the context of the large proven and potential resource base available across the continent, but also within the demands of bringing that resource to market within reasonable timeframes and cost parameters. It also is important to focus on those segments of the natural gas value chain that do not provide fully competitive options to customers.

The upstream segment has clearly suffered from lack of investment driven by low oil and gas price environments that prevailed until recently. Gas drilling is correlated with both the major gas price benchmark (Henry Hub, the principal contract point in North America) and oil prices, since oil and gas prices periodically track each other. The big question is, with rig counts back up to healthy levels (above 1,000 rigs working at time of writing with more than 800 drilling for gas), will history prevail in terms of gas volumes found and produced as rig activity increases? Decidedly different viewpoints exist on this point. Of note are a number of factors. Technology appears to be playing a role not only in improving drilling success

rates but also in accelerating the rates of gas well production, exacerbating decline curves in certain basins. Rigs are working in basins that are mature and are drilling smaller, shallower, cheaper prospects that can yield quick returns on investment. Deep offshore prospects in the Gulf of Mexico appear to be

(LNG) become an attractive option.

Midstream, a number of pipeline developments are poised to impact gas markets. Most prominent of these is Alliance, due to begin full operation by the end of 2000, which ultimately will add as much as 1.3 billion cubic feet per day (bcf/d) to the "Lower



SOURCE: NATURAL GAS WEEK

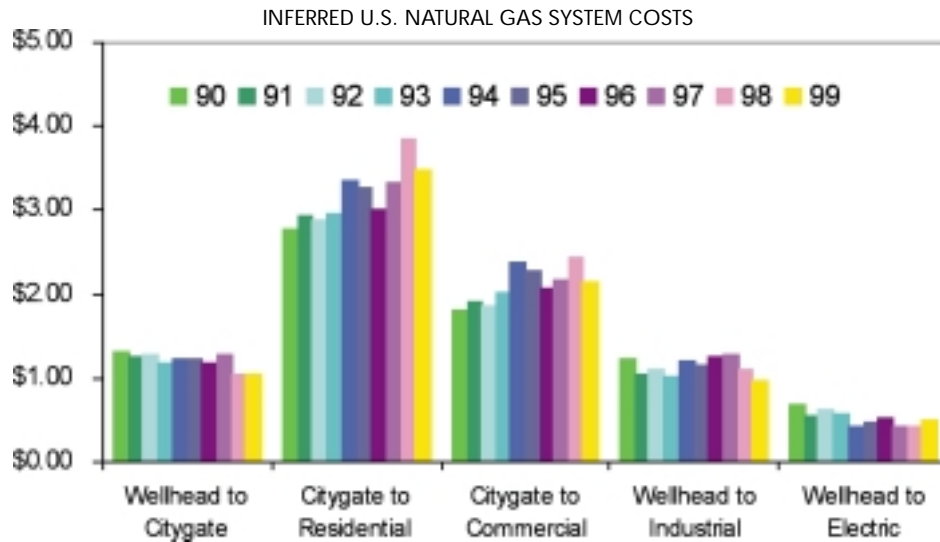
oil prone — good on the one hand (for oil) bad on the other (for gas). Coupled with a flat to declining long-term moving average of dry gas production in the U.S. since 1994, upstream indicators should be closely watched. Closely watched industry strategies include the prospect for deeper drilling in Canada's Western Sedimentary Basin (where companies have also targeted shallow, cheap wells) and attempts to move into Canada's far north for the abundant natural gas resources that exist there. An evolving policy question, at both the federal and state levels, is whether gas resource exploitation should be stimulated through incentives designed to smooth market cycles, build longer term supplies and test deeper and frontier objectives. (In our Spring 2001 issue of *Energy Inc.*, we will provide specific commentary on various proposals being put forth.) Finally, not unnoticed is that if current higher prices for gas are indicative of an overall, higher gas plateau for the foreseeable future, imports of liquefied natural gas

48" marketplace. With previously completed capacity expansion on the Northern Border system and improvements in the Rocky Mountains and other locations, some outlooks call for as much as a 50 percent increase in Canadian deliveries to the U.S. The effect of "de-bottlenecking" the U.S. gas pipeline system has been profound. Prices across our diverse market centers, hubs and major city gates have converged, raising costs for some customers while lowering costs for others (see graphic on U.S. hub and city gate prices). This ripples back to the wellhead, altering activity levels in high cost fields and basins and forcing the producer segment to become more efficient. Importantly, these capacity expansions are taking place in a highly competitive market — proving that infrastructure additions will be undertaken when justified by market conditions and in a more efficient way than with cost of service type regulation. U.S. policy makers and regulators still should reconsider

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the continued existence of the Natural Gas Act and its Section 7 certification requirements as well as streamlined environmental reviews for pipeline projects that can speed

customer eligibilities that range from just under seven to just over 82 percent. Four states that provided 100 percent eligibility (New Jersey, New Mexico, New York and West Virginia) have only three percent or less of customers participating.



Source: U.S. Energy Information Administration

decisions without sacrificing environmental and safety values. Both arenas create barriers to entry. Another crucial area of policy and regulatory development is the framework for extensive midstream infrastructure investments that must be made to bring natural gas supplies from beneath deep Gulf of Mexico waters to U.S. markets in the face of significant commercial risk.

The downstream end of the natural gas value chain deserves close scrutiny. Above the city gate, the industry worked hard, with considerable transition costs, to respond to policy and regulatory frameworks for pipeline transportation that can extend to customers the benefits of competitive upstream activity. The hope, and thinking, was that state public utility commissions and gas utilities would follow suit and restructure to facilitate unbundling and open access behind the city gate. Twenty-two years after the initiation of wellhead price decontrol, and eight years after implementation of open access and unbundling on our interstate pipeline system, only nine states have progressed toward full retail customer choice for natural gas supplies delivered by utilities (as of last summer). Of these, Georgia stands out for its aggressive approach that has resulted in all 100 percent of the more than 82 percent of eligible retail customers participating. Four other states in the implementation phase (Maryland, Massachusetts, Ohio and Pennsylvania) have participation levels ranging from 20 to 34 percent of with cus-

At a time when end use prices for residential and commercial customers remain stubbornly high, almost four times the wellhead cost even while dropping sharply from their 1983 peak, these results are startling. A number of factors are at play. The rules established by regulators and strategies exerted by incumbent utilities that affect both end user pricing and market entry to competing suppliers probably account most for disappointing results thus far. Complicating the introduction of competition are the realities of allocating gas utility system costs. Gas utility revenues have plummeted as industrial customers abandoned local distribution systems (LDCs) for other, more favorable, options. Revenues from residential sales have grown in equal proportion as LDC costs are increasingly shifted to the core residential class (see graphic on U.S. natural gas system costs). Unless state regulators force competition in LDC system operations, it is unlikely that typical households and small businesses, especially in higher cost locations, will realize much in savings (though they may see enhanced and improved services), at least until fuel costs decline. The considerations for every individual state and LDC system vary widely with differences across the contiguous U.S. becoming more pronounced during the past 20-plus years. A distinct feature of state public utility regulation in the U.S. has been for states to drift toward a common set of practices so that outputs are

largely indistinguishable (even as state political cultures and regulatory commission styles remained distinctive). The onset of industry and regulatory restructuring in the 1970s changed that, creating a patchwork quilt of state approaches that complicate industry efforts to build national marketing strategies and present very different choices to customers of all types.

Another reason for the slow movement to restructure the U.S. natural gas system behind the city gate is the distraction of electric power restructuring and the sharp implications born of this effort. Here, too, the patchwork quilt of approaches has added increased complexity. Intentions are sound: generation of electric power, especially power created using natural gas, can be provided by competing suppliers with broad benefits across the marketplace. The trick lies in dispatching competitively produced power to the grid using the same principles of unbundling and open access, in this case with electrons rather than gas as the commodity. Indeed, it was the reconstitution of a competitive natural gas industry that was the primary driver for electric power restructuring. Cheap wellhead prices and declining costs, coupled with increasing efficiencies for gas turbines, attracted aggressive nonutility generators. With a fleet of gas marketers and traders already established and primed for open electric power markets, a new approach to the provision of electric power seemed poised for launch.

Summer 2000 has been a reality check. Experiences not only in diverse state laboratories but around the world point to a number of challenges in using market-based approaches for electric power. Issues range from market power of incumbent players (or even newly established ones) and what to do about that, to physical considerations associated with the generation, transmission and distribution of electrons. New questions have emerged in the U.S., where gas prices are at least twice what many nonutility generation developers expected to pay. Viewpoints are diverging on whether gas will capture the lion's share of electric power generation additions or whether coal, or even nuclear, will come back into play. Organizationally, energy firms are experimenting with a wide variety of models that combine gas and power businesses, seeking optimal advantages and market positioning at a time of great uncertainty. (In our Spring 2001 edition of *Energy Inc.* we will provide a more in-depth analysis of electric power transitions in the U.S. with *A Tale of Two*

Republics: the California and Texas Approaches.)

A final consideration in the North American gas scene is Mexico, engaged in an historic political transition away from the dominance of the Partido Revolucionario Institucional or PRI, after nearly 70 years of rule. Incoming president Vicente Fox has a number of challenges ahead, not least of which is to squeeze out a better performance from Mexico's state-dominated energy sector. Two issues are particularly relevant with respect to our continental gas market. One is Mexico's lack of investment in developing natural gas supplies at home even while gas demand trends upward driven by industrial and electric power applications. If all plans are met for proposed and planned gas fired electric power generation capacity additions, Mexico could find itself struggling to stave off a shortfall of up to 900 mcf/d. With a tight market to the north, LNG may even find a foothold in Mexico. This sort of outlook is contingent upon outcomes for restructuring Mexico's electric power sector, also badly in need of new investment and new organizational approaches. And all are contingent upon political and policy success for the Fox Administration. The Energy Institute has maintained a steady research profile in Mexico and forthcoming issues of *Energy Inc.* will capture work under way to review the electric power sector, update previous work on liquefied petroleum gas (LPG) markets and explore alternative upstream policies that could encourage private and foreign direct investment.

Turkey and Caspian Oil and Gas

Turkey is emerging as one of the early winners in the Caspian oil and gas export pipeline games. There are several reasons for this, some resulting from Turkey's internal dynamics and others particularly emanating from the recent developments in world oil markets and the Caspian Sea region.

Internally, since early 1999, the most stable and credible government in a decade has ruled Turkey. Under the leadership of an experienced and well-respected politician, this three-party, left-right coalition not only survived serious political storms but also agreed on many crucial economic reform policies. As a result, there are signs of decreasing inflation. Privatization of state enterprises is moving forward again. During the first six months of 2000, approximately \$3 billion was raised through the sale of state assets. The IMF and international rating agencies appear to be pleased with the

country's economic policies.

The government also convinced the parliament to allow for international arbitration in concession contracts. The implementing law (Law No. 4501) was passed in January 2000 to be effective retroactively. The lack of international arbitration has been one of the most important legal problems limiting private sector participation in the electricity sector. A new electricity law that would liberalize the electricity market and resolve most of the remaining problems is drafted and may reach the parliament before 2001.

Coincidentally, the construction of the largest gas-fired power plant in Europe, the 2,331-MW Gebze plant by Interger-ENKA, started in July 2000. Interger-ENKA will also build a 1,523-MW plant in Izmir. Also in July, there were two significant developments. First, the rapid growth in electricity demand (about 10 percent) led the government to announce a national energy conservation program. Second, the long-delayed Akkuyu nuclear plant was cancelled. These developments will undoubtedly increase the urgent need for private power, especially gas-fired and small hydro projects.

On a different front, Turkey has virtually

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eliminated the terrorist activity in the south-east after the capture of the terrorist group PKK's leader. As a result, the region's economic development is finally closer to reality with help from the giant Southeast Anatolia Project (GAP) — a complex of dams, irrigation systems and power plants — and the expansion of natural gas network initiated by the pipeline from Iran.

Finally, the relationship between the EU and Turkey improved significantly. The postponement of the PKK leader's execution, improvements in the human rights area, and, most importantly, the "rapprochement" between Turkey and Greece since the earthquakes of 1999 played significant roles in EU's admission of Turkey as a candidate for membership in December 1999.

Externally, high oil prices, the increased doubts about excess production capacity and the expected continuation of global economic growth after the Asian crisis seems to have shifted market psychology toward higher oil prices. In such an environment, Caspian

resources provide a valuable alternative source of supply. Coincidentally, production of oil in Azerbaijan, Kazakstan and Turkmenistan increased more than 18 percent from about 0.89 million barrels per day (mb/d) in 1998 to about 1.06 mb/d in 1999.

Moreover, there have been two significant discoveries in the region: the offshore Shah Deniz field in Azerbaijan with estimated gas reserves of 25-35 trillion cubic feet (tcf) and the offshore Kashagan field in Kazakstan with estimated oil reserves of 8-40 billion barrels. In a high price environment, the cost of developing these offshore fields and building necessary pipelines should be more easily financed.

Overall, these internal and external developments benefit oil and gas pipelines to and through Turkey for export. Although the Caspian Pipeline Consortium facility nears completion, without the Baku-Ceyhan pipeline swaps with Iran could be the main alternative for about 750,000 b/d of Caspian exports by 2010. Iran might easily ask captive exporters to pay about \$7 per barrel — just under the cost of the next best alternative, railways through Russia or Georgia — in contrast to about \$3 per barrel with Baku-Ceyhan. In addition, Turkey guarantees to cover costs above \$1.3 billion for the Turkish section of the pipeline while Georgia and Azerbaijan are willing to pay for damages that may be caused by delays during the construction of the pipeline in their territory.

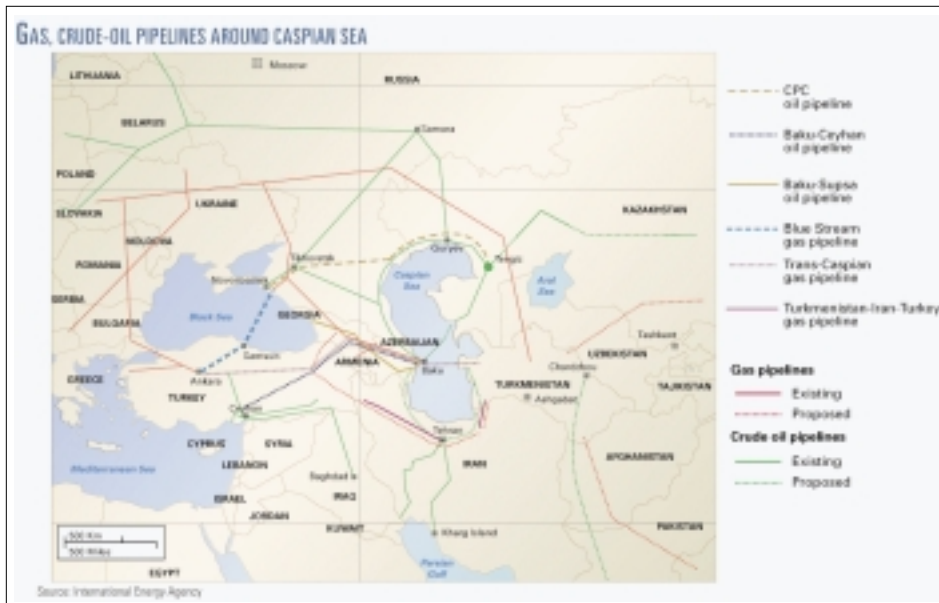
Finally, Turkey's improved international status, closer relations with the EU, and the International Maritime Organization's apparent support of Turkish views will likely limit the tanker traffic through the Bosphorus Strait.

Turkey remains *the market* for Caspian natural gas. The Blue Stream pipeline is closer to reality with financing of \$1.7 billion for the offshore section in line and ratification of tax exemptions in the parliaments of both Russia and Turkey. Offshore construction awaits Saipem's specially equipped ship to finish its tour of duty in the Gulf of Mexico. The construction of the Samsun-Ankara section in Turkey has already started.

With the rapid development of the Shah Deniz discovery, Azerbaijan has become a real contender in the race to supply Turkey with gas. It may be possible to renovate existing pipelines in Azerbaijan and Georgia to bring gas to Turkey. Early estimates discussed in the Turkish parliament indicate that Azeri gas could cost as little as 40 percent of the cost of Turkmen gas.

(Continued on page 8)

OIL AND GAS PIPELINE ROUTES FROM THE CASPIAN



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BOTAŞ (the state pipeline company, which is also slated for privatization along with the restructuring and liberalization of the petroleum sector) will deliver 3.3 bcm of natural gas a year to the InterGen-ENKA plant — an amount equivalent to more than 25 percent of current gas consumption in Turkey. BOTAŞ recently announced that Turkey has 1,610 miles of pipelines under construction. Taken together with the nuclear plant cancellation and the energy conservation program, these are all indications that gas consumption in Turkey will increase significantly within the next several years. Nevertheless, with increased flows from the existing Balkan line and LNG deals, Blue Stream, Iranian and Azeri pipelines, there is not much room left for the Trans-Caspian pipeline from Turkmenistan.

(The Energy Institute has provided a series of articles on Caspian oil and gas export pipelines including analysis of the Turkish and surrounding markets to the *Oil and Gas Journal*. For more information, contact the Institute or search *OGJ Online* at http://ogj.pennnet.com/cd_anchor_home/.)

**Developing Business in Brazil:
A Commentary**

What will it take for Latin American economies to achieve their full potential, preserving once and for all peace and prosperity in the region?

Energy sector management illustrates very well the paradox of achievement that falls short of broad success. Among the accomplishments of many Latin American leaders has been the extension of market

reforms to energy, to diminish or remove political control and influence, rationalize prices, stimulate new investment and encourage energy development within the context of sound environmental practices and with attention to needs among local communities. Experimentation first began in 1983 with electric power in Chile. The privatization of Yacimientos Petroliferos Fiscales-Argentina (or YPF-A, now a subsidiary of Repsol) remains one of the most successful transformations of a national oil company anywhere in the world. Mexico, where state control of the energy sector is most ingrained in a political system, has implemented initiatives to allow private development, ownership and operation of natural gas transportation and distribution systems. On the whole, Latin America has become a model for many other emerging market nations hoping to achieve similar gains.

However, with many assets now at stake, and needs as great as ever, investors too often are finding the frameworks created by governments for commercial energy development to be lacking in crucial components.

Policies and regulations are too weak or unclear. The agencies and ministries administering policy and regulatory initiatives and reforms are too often in conflict or subject to political influence.

In too many cases, there is a mismatch between the kind of marketplace being designed (often with encouragement from multilateral lending institutions) and the customer base that is available to new investors.

Underlying the transformations taking place throughout Latin America has been the question of whether, and how, emerging markets could “leapfrog” the development path advanced nations have had to follow. Practices intended to instill competition in the U.S., Canadian or U.K. energy sectors have been widely used in Latin American countries that do not have the market depth or liquidity to accommodate these approaches. The search for solutions becomes a confusing spiral as information is shared in endless repetitions that do not reflect the characteristics of individual markets.

Finally, above all, Latin American governments too often fail to carry through with privatizations or other critical mechanisms to separate the state from the business of providing energy.

Brazil is “a,” perhaps “the,” case in point. The largest country in Latin America, and thus the magnet for many investors, Brazil represents all of the hopes and dreams, as well as frustrations and disappointments, embedded in the region. Most critical reviews of Brazil’s prospects give short shrift to the energy requirements that will be necessary, with electric power a particular issue. Like all of the Latin American countries, the amount of electricity use per capita in Brazil is low relative to what will be required for sustainable economic development. The current outlook for Brazil is average GDP growth of four percent per year over the next 10 years. Historically, electricity demand has grown twice as much as domestic output, yet official estimates call for this ratio to be lower going forward, an assumption that could be easily upended.

Persistent brownouts and blackouts affect both existing and potential new businesses. The constraints posed by unreliable electric power supplies are particularly acute for new business investment. Clearly, for Brazil to navigate any pro-growth economic policy with a modicum of success, energy will play a vital role. In particular, for Brazil to maintain an aggressive economic growth path without a return to higher inflation levels, electric power will need to be provided via frameworks that facilitate attention to costs and efficiency.

The solutions being pursued are to transfer ownership and operation of electric power utilities to private entities, expand access to natural gas supplies that can be used for new electric power generation plants and encourage investment by independent power providers. Significant gains, notwithstanding significant risks, have been

made with the development of the Bolivia-Brazil natural gas pipeline. But after four years of energy sector reform, there has been no new investment in electric power plants and only three years remain in Brazil's target of achieving priority goals by 2003. The problem now is to improve the investment environment so as to maximize utilization of gas from the \$2 billion-plus gas pipeline as well as related initiatives to expand private activity in domestic natural gas resource development. Here, a host of issues are on the table.


- Currently, customer protections result in prices that are too low for new capacity to get built. This is a chronic dilemma in Latin America, where the transition from politically driven subsidies is made difficult by the slow progress in personal disposable income necessary to absorb the costs of new investment. No investor will build where customers cannot pay, or where payment is inadequate to cover investment cost, or where theft and abuse

rob the system of liquidity.

- The lack of indigenous capital markets for independent power projects hinders development, while at the same time regulations that prevent international capital from entering creates constraints on foreign direct investment.
- Regulators in Brazil want, and are designing, free markets for energy, but at the same time are creating barriers to entry. For example, there is a cap (based on normative value) on what local utilities distributing electric power can charge customers in keeping with political imperatives, but the result is insufficient margins for new investment and thus negative results.
- For independent, gas fired electric power projects to thrive, the domestic gas market must be open and nondiscriminatory. Yet in Brazil, the national oil company, *Petroleo Brasileiro S/A* or Petrobras, remains the sole supplier. In addition, Petrobras's interests in

Bolivian gas resource development only help extend their monopoly beyond their borders.

- Frameworks for energy investment change almost daily, but without clear direction or coordination between Brazil's two energy regulators, the *Agência Nacional do Petróleo (ANP)* and *Agência Nacional de Energia Elétrica (ANEEL)*.

In this milieu, the main problem is who within Brazil's political cluster for energy, which includes the ministry, president, ANP, ANEEL and Petrobras, will be the owner of price increases associated with new capacity. The hard fact is that adding new electric power capacity at world market prices to meet projected economic growth could be inflationary. The political remnants of Brazil's era of hyperinflation add to the inertia. Pressure will only increase to provide an investment climate that allows developers to bring down costs of new capacity enough to avoid inflation effects. 

ENERGY AND ENVIRONMENT

Julian Simon and the Triumph of Energy Sustainability

The late Julian Simon crafted an optimistic view of the energy sector, as he did of virtually all other areas of the modern economy. Employing brute facts within the logic of market institutions, Simon made a case that energy would become more abundant, more affordable, more useful, less environmentally invasive, and more environmentally constructive in market settings over time. These positive results would occur not in spite of, but because of, growing population and economic development.


Simon's theses are more fully validated today than when he last penned his views about energy several years ago. All major economic and environmental trends in conventional energies are positive — as they are in subcompetitive (backstop) and niche energies. Technological advances in all phases of the hydrocarbon industries have exceeded expectations. Hydroelectric and nuclear power technologies also continue to improve. Political and regulatory factors, however, have complicated the future of both of these technologies' ability to meet growing electricity consumption and clean air needs.

Energy market realities contradict the current mantra of many mainstream envi-

ronmentalists that the hydrocarbon-based energy market is unsustainable. While rising environmental demands will require continuing technological improvements in the procurement and usage of oil, gas, orimulsion, and coal — sources that compose 85 percent of world energy consumption — it is erroneous to believe that the rapid gains of recent decades cannot continue to improve sustainable hydrocarbon energy economy. As Simon argued, there will be temporary problems (such as the current oil price run-up) that call for fresh entrepreneurial strategies, new technologies, and regulatory reform. But it is unreasonable to believe that these problems will not yield to solutions and leave the market better off than if the problems had never arisen — a major Simon theme.

The depletion scare about conventional energy resources is over, although price cycles will continue for consumers depending on spot market prices. Technology is winning on each and every energy/pollution front from oil spills to emissions. Energy risks can be managed through a variety of forward markets and by energy outsourcing. Critics of conventional hydrocarbon-dominated economies are down to their last sustainability issue — the climate effects of

increasing atmospheric concentrations of greenhouse gases resulting from hydrocarbon emissions. Yet critics can make their case only by greatly exaggerating the extent of anthropogenic climate change, dismissing the potential benefits of moderately warmer and wetter world, and downplaying the benefits of higher CO₂ concentrations on plant life and agricultural productivity.

Julian Simon was as suspicious of the global warming scare of the 1990s as he was of the earlier global cooling scare. Economic interpretation of the scientific evidence of anthropogenic climate change strongly supports his skepticism. If the climate scare is proven greatly exaggerated — and the balance of evidence strongly suggest that it will be — the news can be officially proclaimed, even by environmentalist critics: Today's hydrocarbon energy economy is sustainable, and the market share of hydrocarbons can be expected to increase in the decades ahead in the U.S. and around the world to benefit consumers, economies, and the environment. 

(Excerpted from *Julian Simon and the Triumph of Energy Sustainability* by Robert L. Bradley, Jr., American Legislative Exchange Council (Washington, D.C.), May 2000).

AN UPDATE ON ENERGY INC.

Like its peer group, higher commodity prices during 1999 resulted in much improved returns for Energy Inc. and the same should hold for 2000. Energy Inc. pushed forward a number of strategic investments even as business conditions remained volatile. In a major move, Energy Inc. Global E&P participated in the March 1999 Eastern GOM Offshore Continental Shelf Area 181 lease sale, taking blocks in Destin Dome and western Desoto Canyon. Water depths average 6,000 feet. Energy Inc. and its partners anticipate reserves of about 48 MMBOE (million barrels of oil equivalent) and expect to spend \$181 million for an initial four-well program with subsea completions that commenced this year. Our Global Refining and Marketing group is seeking to re-align Energy Inc. assets through completion of joint venture arrangements that will enhance profitability. With a new division in Europe, Energy España, and expanded investments in the Americas, Energy Inc.'s Global Power unit now operates just over 2,000 MW of generation capacity in the company's key markets. Our Global Transport group, which operates 15,000 miles of natural gas pipeline (11,000 in the U.S.) will expand capacity to carry gas north from Argentina to Brazil, including sales to our new mer-

chant plant in São Paulo. Energy Inc. Global Challenge Partners, our worldwide trading and marketing segment, made a significant commitment to retail customer choice energy marketing through strategic entry in the state of Georgia with Trillium™, "Your Energy Partner for the Third Millennium," our new unit. Finally, Global Shared EcoServices will lead Energy Inc.'s expansion into key alternative fuels businesses. Last spring, MBA student managers conducted a complete review of information technology platforms and requirements across our value chains as we seek to improve our metrics and define investment requirements for business-to-business e-commerce initiatives as well as internal IT improvements. This fall, our managers are redefining and benchmarking our peer group as we wrestle with a key question—Is our \$23.5 billion-asset, diversified energy company best positioned in the competitive global industry, or do we need to grow through a strategic acquisition? To supplement this effort, we have retained an "outside consultancy" to review our overall corporate strategy in light of global energy market conditions and industry structure and our goal of boosting shareholder value by focusing on our natural gas value chain.

ENERGY BUSINESS ENTERPRISE OF THE FUTURE

Prelude to a Merger: A History of Amoco Corporation 1973-1998

The energy crises of the 1970s spawned a tornado that ripped through the post-World War II petroleum industry. Along with its competitors, Amoco was pulled this way and that by the storm of change. The company's leaders faced stiff challenges in guiding Amoco through these perilous times. After several decades of efforts to push the company up the ranks of the major oil companies, they chose in 1998 to merge with BP and become part of a giant new international petroleum company.

One key problem for the oil industry in the years from 1973 to 1998 was the price of oil. An extreme cycle of boom and bust in prices played havoc with planning. A false boom generated by unsustainable oil prices paved the way for a disastrous bust in the mid-1980s. Uncertain when or if higher prices would return, the industry made fundamental adjustments. Ways of doing business that had been successful in the boom years had to be adapted to the new challenges posed by a low-price regime in an increasingly competitive industry. CEO Larry Fuller led a cultural transformation under the banner of "renewal," which sought to decentralize authority and empower individuals by giving them the tools and the mind-set needed to assure that they could seize initiative — and responsibility — in their work. BP pursued some of the same goals under the banner of "Project 1990." But, old habits died hard; old corporate cultures proved resistant to change. At the same time, Amoco refocused on its core businesses, cutting costs, and aggressive-

ly applying new technology to find and produce oil and natural gas.

New technology was particularly important in Amoco's traditional stronghold, the United States. Here, the company worked hard — but with limited success — to expand supplies. Fortunately, it had other options outside the United States, including its well-developed partnerships with Egypt and Trinidad and ventures in the 1980s and 1990s in such frontier regions as China, Russia, and Azerbaijan. Both Amoco and BP were large enough to get in the game in these frontier areas where both geology and politics were challenging, but they had less staying power than their larger competitors Exxon and RD/Shell.

While searching the world for reserves, the company also made fundamental adjustments in its refineries. As it sought to modernize these plants, Amoco had to meet demanding environmental regulations. Aspiring to build a reputation as the 'greenest' big oil company, Amoco sought to move beyond existing laws to find creative ways to reduce pollution efficiently. At the same time, the company built a profitable international chemical business led by the production of PTA, polypropylene, and other products. The PTA business remained central to Amoco's worldwide expansion in chemicals, which added value to raw materials from the company's refineries.

By the 1990s, the company also learned to add value to its giant natural gas reserves by moving deeper into the sale of this clean-burning fuel. A competitive revolution via deregulation and privatization was trans-

forming this dynamic industry around the world, and Amoco emerged as a leader among the major petroleum companies in natural gas. The company has become the largest owner of gas reserves in North America where liberalized gas trade between Canada and the U.S. provided excellent opportunities. Amoco moved to the forefront of the petroleum industry in seeking ways to "monetize" these reserves by creating new markets for them, partially taking advantage of cleaner burning qualities of natural gas during a period when environmental regulations were increasingly stringent.

In the years from the energy crisis of the 1970s to its merger with BP, Amoco sought preeminence in its industry. When its efforts stalled in the late 1990s, its leaders chose to pursue the same goal as a part of a much larger company that included BP, Amoco, and Arco. Many view the disappearance of Amoco as an independent company as a symbol of its failure. But, mergers and acquisitions have always been a natural part of the history of the petroleum industry. Amoco itself acquired numerous companies since its creation after the break-up of Standard Oil. The important question is whether a particular consolidation makes economic sense. In the case of Amoco and BP, the answer thus far is a clear "yes." And one important reason for this is the historical strengths brought to the merger by Amoco. ☐

(Synopsis of *Prelude to a Merger: A History of Amoco Corporation 1973-1998* by Joseph Allen Pratt, Hart Publications (Houston), 1999.)

New Era in Oil, Gas and Power Value Creation, May 14-25, 2001

The Energy Institute is launching an annual two-week program that targets oil, gas and power commercialization within the context of international standards for legal and regulatory frameworks and business investment and worldwide trends in energy sector and industry restructuring. The U.S. Department of Energy and other agencies, and international organizations as well as leading multinational energy companies, support the program.

New Era will be especially valuable for mid-level to senior managers of government ministries, regulatory commissions, national energy companies and private energy and energy-related enterprises from non-OECD countries. Professionals with increasing levels of responsibility in their home government or business organizations will gain most from the program. A limited number of places for participants from OECD markets will be available. The *New Era* program is designed to complement other compatible education programs, including in-country capacity-building efforts. For a more intimate learning environment, total enrollment is restricted to 45 participants. Participants will be selected on the basis of credentials, experience and need in their home markets. The principal language for the course is English. Participants should already have knowledge of and experience with economic and finance principles and be fully aware of global trends and market reforms.

New Era emphasizes energy sector

restructuring and investment strategies within the context of commercial development of oil and gas resources and the associated value chains (oil production, transportation, refining and marketing; natural gas production, transportation, distribution and gas-fired electric power generation). The underlying theme for the program is development of policy and regulatory frameworks and investment approaches that are compatible with the dominant features of the commercial oil, gas and power value chains.

Major features of the program include the following.

- **IMPORTANCE OF CONTEXT.** Facilitated global scan to build world energy outlooks and macroeconomic considerations for private investment and commercialization, and a country dialogue on the role of government and markets, including economic reforms, technology change and adaptation.
- **EMPHASIS ON THE “GLOBALIZING” ENERGY VALUE CHAIN.** Commercial value chain segments and linkages that must be addressed in legal, regulatory and financial policies and practices. Distinctions between international and regional export businesses (such as crude oil, petroleum product and LNG movements as compared to regional gas transportation and gas-to-power conversion for value attainment). Global capital movements and their impact on national and sub-national policies and investment patterns.

- **EMPHASIS ON “COMMERCIAL FRAMEWORKS” AND THE INTEGRATION OF BUSINESS AND LAW.** Building legal, regulatory, fiscal frameworks to support commercial energy value chain investment and development. Includes innovations in upstream arrangements for private participation; contractual distinctions for natural gas resource exploitation; oil and gas pipeline transportation issues; refining economics and investment; specific considerations for integrated, field-to-electric power burner tip natural gas projects; and implications for midstream and downstream oil and gas value creation from upstream resource ownership models. UH Law Center faculty are collaborating in the program.
- **FOCUS ON IMPLEMENTATION.** For *New Era* we will use a logical process flow from initial development of strategic policy approaches through development of commercial frameworks, investment negotiation, implementation and operational issues including environmental and social considerations, dispute resolution and conflict management.
- **INTERNATIONAL COLLOQUIUM ON ENERGY SECTOR RESTRUCTURING.** Closing, one-day summary session with invited keynote speakers and special guests.

For more information on *New Era*, contact the Institute or explore the *New Era* page on our Web site. [E](#)

The Energy Institute Case Study Series

The Institute maintains several major program areas — gas/power marketization, our continued studies on oil market issues and energy/environment trends and the Energy Business Enterprise of the Future and “Energy Inc.” model. In addition, the Institute is helping expand energy-related content in business and other UH degree programs, as well as develop nondegree courses that offer life-long learning and advancement for energy professionals. To support all of these activities, the Institute is developing a case study series that will contribute substantively to the knowledge base on energy markets, industries and firms.

The case studies we produce will include these topic areas.

- **Commercial Frameworks: Country/Region Experience.** A large component of our research activities at the Institute are directed toward policy and regulatory

frameworks created by governments for commercial energy development through private markets. These case studies use “country perspectives” to analyze and critique best practice approaches within the milieu of worldwide transformations. In addition, we are creating composite “virtual” countries for *New Era in Oil, Gas and Power Value Creation* that will provide useful platforms for “what if” scenarios.

- **Energy Business Enterprise of the Future.** This group of cases will help challenge conventional thinking about energy organizations and industry structure, and management issues, innovation and entrepreneurship within energy enterprises. Major themes are technology deployment and strategy development, in particular the implications of disruptive technologies ranging from information

systems and e-commerce to alternative energy systems. These cases also will focus on company perspectives in developing energy projects and balance country perspectives. They will emphasize the role of project development within the context of corporate strategy and target commercial practices required for successful project development.

- **Energy and Environment.** The energy-environment nexus is possibly one of the most sensitive arenas for energy companies, their customers and governments. These cases will touch on both local and global issues and emphasize workable solutions and problem solving.

Energy Institute Case Studies will be available in bulk quantities for higher education markets, professional training programs and in-house professional development. Contact the Institute for more details. [E](#)

Energy Institute Personnel Resources

In addition to current staff and students, 29 current and retired Bauer College and UH faculty have participated in Institute activities along with 27 former graduate and undergraduate student research assistants, three international research fellows, six visiting scholars, 30 Corporate and Government Partner Fellows and our Senior Associates. Several of our participating faculty and past graduate students are UH Shell Interdisciplinary Scholars as a result of research projects funded through that program. We maintain an international advisory board to provide balance and world standing. Our greater network numbers in the hundreds and reaches into key corporate, government and research organizations worldwide.

Energy Institute Staff (student degree program areas)

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Aisha Jamal, Administrative Assistant (BBA-MIS)
Gürçan Gülen, Ph.D., Research Associate
Fisoye Delano, Research Assistant (Ph.D.–Petroleum Engineering)
Mario Valderama, Research Assistant (MBA–Finance)
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