

The price of oil has undoubtedly been the top story in the energy space over the past year or so, but examined over a period of ten years, the picture looks more stable. If there's one trend that has changed the energy markets in the past decade, it has to be the impact of technology. *Eric Fishhaut* traces its development

Evolution in energy

★ It's not easy today to be retrospective and study events of the last ten years when the markets of the last few months have been so newsworthy. The West Texas Intermediate (WTI) benchmark crude oil price has hit recent highs of more than \$55 per barrel – an astonishing increase of over 50% in less than four months and over 75% higher than one year ago (see figures 1 and 2). What's more, the natural gas price for Henry Hub is reporting at just over double the price at this time last year (see figure 3).

There are numerous industry experts that offer a myriad of reasons for the alarming price increases. Some indicate supply and demand fundamentals are the cause, while others blame the trading marketplace and speculation for the increased volatility. There is little doubt that political uncertainty has been a prominent factor. Here we will examine some long-term trends in both the markets and the technology we use to participate in the markets.

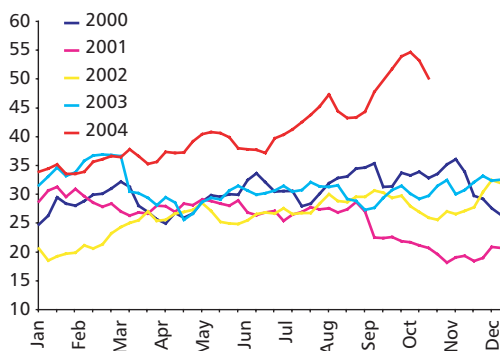
Energy markets

Currently, prices are well above anything that's politically palatable to the large importing countries – or even the Opec countries – leaving many struggling to identify the key factors driving recent price activity. Hopefully, market pressures can be relieved to the point where prices can fall to more reasonable

levels. While production has remained somewhat constant over the last year or more, demand seems to be outgrowing it substantially. However, demand consists not only of consumption but also of inventory growth. It appears to some analysts that in certain countries, inventories are growing in what could be considered a hoarding phenomenon. Optimistically, if this is true, this phase should run its course as inventories fill to near capacity.

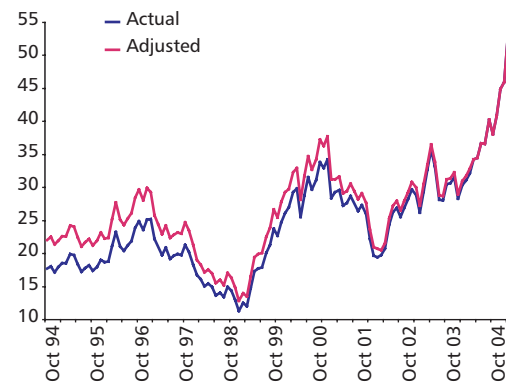
In the past decade, petroleum consumption has increased by less than 20%, and it appears that trend is consistent (see figure 4). According to the US Energy Information Administration's *International Energy Outlook 2004*, world energy consumption is projected to increase by 54% from 2001 to 2025. Worldwide, total energy use is projected to grow from 404 quadrillion (10¹⁵) British thermal units (Btu) in 2001 to 623 quadrillion Btu in 2025. This outlook projects strongest growth in energy consumption among the developing nations of the world, with the fastest growth projected for the nations of developing Asia, including China and India, where robust economic growth is occurring. In contrast to the developing world, slower growth in energy demand is projected for the industrialised world, averaging 1.2% a year over the forecast period.

F1. Comparison: 2000 – 2004 WTI crude oil price



This year-on-year seasonal comparison shows that the price of West Texas Intermediate crude oil (in \$/bbl) this year is dramatically higher when compared to the previous years.

F2. WTI crude oil in actual and inflation-adjusted dollars



This comparison shows that the price of Nymex West Texas Intermediate crude oil futures (in \$/bbl) is much higher than the previous ten years, even when adjusted for inflation.

Consumption of oil, natural gas and coal is expected to supply most of the primary energy needed to meet this demand, barring any drastic government policy changes. Oil is expected to remain the dominant energy source worldwide, while natural gas is expected to remain an important supply source for new electric power generation in the future, given its relative efficiency and environmental advantages in comparison with other fossil energy sources. Natural gas burns more cleanly than either coal or oil, making it a more attractive choice for countries seeking to reduce greenhouse gas emissions.

Along with dynamic supply and demand forces, the Opec strategy has changed significantly within the last decade. Up until about four years ago, there was a considerable divide within the cartel about how to best administer the market, which led to a fair amount of oversupply. Since then, there seems to be more solidarity on pricing and less excess production, leading to supplies more closely lining up with stated objectives.

In addition, some participants feel that speculators are a negative influence on the market, and that they are to blame for higher prices and higher volatility. But in fact, it is likely the commodity markets benefit from speculators. If the market consisted only of commercial users of commodities trading to each other, the market wouldn't be balanced. These participants are looking to shed risk, and someone has to pick up the other side of that transaction. So laying blame on the speculators is not supported by the empirical data.

Technology changes

From the technology standpoint, the past ten years have witnessed spectacular advances. This period has been one of significant changes in the deployment of hardware and computing platforms. The movement from centralised, large-scale mainframe systems within enterprises to distributed desktop computing gained strong momentum as the number of

personal computers grew considerably.

It might be hard to believe now, but ten years ago, Windows 3.1 was the new desktop system. Networking PCs together was a new goal for companies. Few of us had our own email and even fewer knew what the internet was. And who could have predicted that instant messaging would be so instrumental in daily business? We have seen connection to the internet progress from painfully slow dial-up to high-speed, always-on broadband access. The internet has now become the most important source of current information for many. E-mail is no longer a luxury, but a requirement. This, combined with wireless technology, is resulting in the creation of a vast range of new products, services and applications for information consumers. Wireless use has grown substantially; our telephones combine internet connectivity along with telecommunications, allowing email and web access on the move.

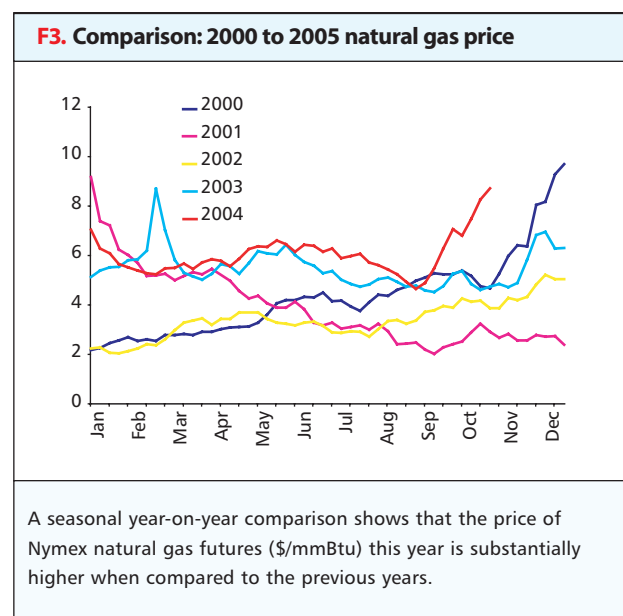
Easy and constant availability has accelerated the importance and use of the internet. And as internet experience increases, perceptions of the importance of the internet as an information source also increase. One prediction is that as email saturation and web site overload is reached, the opportunities increase to provide specific interest information to consumers via subscription feeds. People want to narrow their information flow to the core data that meets their needs.

Market information technology

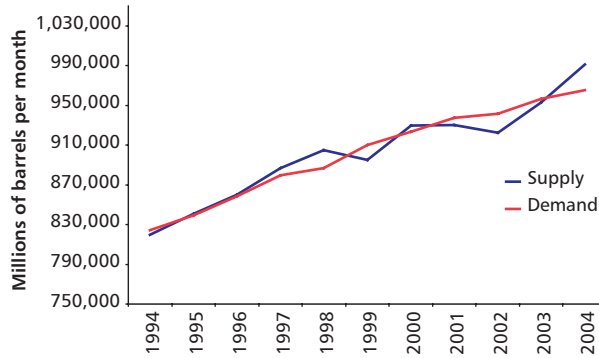
When we look back ten years, we remember individual desktop systems that were isolated from other applications. Traders often had multiple market data systems and often no interactive trading systems. Most transactions were handled on the telephone. Advances in market information systems have been substantial, along with transactional and risk management systems as well as extensive database storage now available that can be integrated with the numerous systems surrounding the marketing and trading activities. And as the needs of the market have changed, so have the products. GlobalView, for one, evolved from a standalone system to a networked Windows-based system; then to an internet-based Windows system, EnergyView; and most recently a fully web-enabled product named MarketView.

Any examination of past technology in the energy markets should certainly highlight the introduction of online trading. As we reached the new millennium, the online marketplace had exploded with annual notional energy trading estimated at over \$400 billion. Then we observed the major contraction of online trading in the wake of the Enron debacle and the excesses that it represented, along with the burst of the internet bubble. Those that have faded or disappeared include EnronOnline (EOL), Altra Market Place, Dynegydirect, and HoustonStreet. The only online trading platform still going strong with noteworthy energy volumes is IntercontinentalExchange (ICE), although there are other survivors such as Tradespark.

In line with the business world in general, the volume of market information has exploded. As the commodity markets have evolved in the last decade, the growth in complexity has posed a challenge for energy firms to stay successful. Price



F4. Comparison: world oil supply and demand



Source: EIA via GlobalView

The consumption and production of crude oil on a worldwide basis shows consistent growth over a 10-year period, while the disparity between supply and demand has remained within a small tolerance.

reporting has multiplied, and now there are literally tens of thousands of individual issues to monitor and manage.

As the markets have evolved, the critical competitive focus for energy firms has shifted from production to information use. In order to capitalise on this wealth of information, the applications used for price discovery, market information and trade execution have had to be integrated. Indeed, systems have advanced into integrated software applications that allow participants to monitor numerous markets and conduct transactions on individual markets completely transparently. Energy market professionals need these functions merged into a cohesive display that allows them to use the information and actively trade.

Web browser technology has fast become the standard for building applications that integrate many sources of data. Slick new interfaces have emerged that can be more rapidly developed and modified, are also easier to deploy and cost less to maintain due to lower overheads. To maximise productivity, the objective is to present to the user what appears to be a single unified database for all price storage, discovery, transactions and analysis.

Behind that single interface is a comprehensive data framework that allows access and management of real-time information and transactional processes across an entire organisation. This framework consists of both platforms and software that handle

the key functions of aggregating, storing and distributing data. This structured approach can minimise or eliminate time-consuming manual entry and data transfer between disparate systems – resulting in cost savings and allowing resources to be redeployed for generating revenues.

IT investment cycle

But there is still some way to go. It appears that technology investment has gone full cycle in the last ten years. Budgets grew rapidly in the late 1990s as migrations took place in a rush to adapt to the internet age and move away from clunky mainframes. But the last few years have been a time for cutbacks in IT investment for most energy companies, due to the economy and the state of the industry. In many cases, IT departments are operating at barebones and are focused on the day-to-day issues of supporting legacy systems, addressing data issues and trying to keep up with business needs.

There is a significant challenge to update and consolidate systems, achieve simplification and respond to new and more complex business and compliance needs. Most environments still consist of numerous applications; many are not integrated and include internally developed legacy systems with weak technology, clumsy interfaces and manual operation requirements. These complex architectures can cause excessive expense and represent roadblocks to providing technology that can meet growing needs.

It is critical to the success of today's energy company to formulate an IT strategy that includes a flexible architecture that can provide connectivity and integration. The goal should be to bring in new and updated application solutions with the least disruption. An adaptable infrastructure framework is an investment that will bear high returns.

The past ten years have provided widespread transformation for the energy marketplace that has dramatically changed the way business is done. Technology has been challenged to keep up with the growth in the markets. In some ways, the technology improvements have actually helped grow the markets by providing the tools to transact and track more. While we may not fully understand where we stand in the progression of the markets, we can be confident that still more changes in energy are coming and the evolution of market technology will continue. [ER](#)

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