

Energy Predictions 2010



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Foreword

Welcome to the 2010 Energy Predictions report.

This is the first year in which the Deloitte Touche Tohmatsu Global Energy & Resources group has published its predictions for the year ahead.

The volatility of the global economy in 2008 and 2009 and the anticipated challenges ahead for 2010 have made this set of predictions particularly important to compose.

Some have questioned whether predictions are feasible amid such turbulence. How accurate can they be, given the uncertain outlook and many of the unprecedented conditions being experienced today?

Anticipating the course of the next 12 months is likely to be hard. But, in my view, that makes having a considered perspective more crucial than ever.

Predictions, by their nature, are not facts. But properly developed predictions should encompass a diverse array of views and inputs, which can kindle debate, inform possible directions, and even identify potential courses of actions.

The methodology for developing this set of predictions involved in-depth interviews with clients, industry analysts and the most senior energy practitioners from Deloitte member firms. I am most grateful to all of them who offered up their insights and experience at a time when their attention was particularly in demand.

2010 is likely to challenge all of us. But while the energy sector is expected to be impacted by challenging conditions in the year ahead, it should be remembered how important a role energy plays and how its use affects each and every person on the planet.

In short, while global growth may be cyclical, the need for energy is and will remain constant.

I wish you all the best for 2010.



Peter Bommel
Global Industry Leader
Energy & Resources

A global economic turnaround will begin to take shape but what shape will it take?



During the fourth quarter of 2008 and the first quarter of 2009, industrialized economies were contracting at a rate not seen since the Great Depression. Unemployment was rising, corporate profits were decreasing, and consumers were continuing to suffer. Then, policymakers around the world, who had previously been on the sidelines, implemented their economic recovery plans.

Based on several pieces of new evidence, it appears likely that a turnaround – albeit a tepid one – is beginning to take shape in the seven largest OECD nations and several emerging ones. According to forecasts made by the Economist Intelligence Unit, OECD countries are expected to grow on average by 1.5 percent in 2010: more specifically, by 1.2 percent in Canada, .07 percent in France, .05 percent in Germany, 2.7 percent in Italy and the U.S., 2.3 percent in the U.K., and 1.3 percent in Japan.¹

The outlook for emerging nations such as China and India is more encouraging. China remains one of the fastest growing economies in the world, even though by Chinese standards, the country is in the doldrums. Economic growth for 2009 is expected to be in the neighborhood of seven percent, down from double-digits in the past,² but is poised to grow by 8.5 percent in 2010.³ In India too, the fog is lifting. Through much of the early part of 2009, there was a palpable gloom in a country that had previously seen growth above nine percent. Part of the grimness came from the realization that India was not immune to the global economic slowdown. But here too, there is good news. The economy is forecast to grow by 6.3 percent in 2010.⁴

Bottom line

A global economic recovery is beginning to take shape, but the question now on the minds of global policymakers and business leaders is: What shape will it take – a “V,” a “U,” or a “W”?

In a V-shaped recession, the economy suffers a brief but pointed period of economic decline with a clearly defined trough, followed by a strong recovery. A U-shaped recession lasts longer and has a less-clearly defined low point. GDP may shrink for several quarters and slowly return to growth.

What some economists are predicting now is a W-shaped, or “double dip” recession.⁵ In this scenario, overall economic growth experiences a modest upturn but the economy remains weak in certain segments. Meanwhile, consumers and businesses begin to get squeezed by increasing costs. These conditions lead to another painful trough before a strong recovery appears. This prediction is based on several factors, including the massive influx of stimulus money by governments and the rise in prices of oil, energy, and food. Escalating prices for these key commodities can, in some cases, lead to inflation, further restraining economic growth.

Oil & gas companies, in particular, will have a keen interest in which type of recession and subsequent recovery prevails. In a V-shaped recession, the recovery is strong and more pronounced, thus forcing a quick run-up in oil prices. A U-shaped recovery lasts longer, but eventually promises robust economic growth and increased demand for energy. Oil prices rise as a result; however, if they rise too much, the increase can strain the availability of equipment and labor in the oilfield services sector, further driving up exploration costs. A W-shaped recovery could also result in rising commodity prices, but with more variability and ongoing risk for oil & gas companies struggling to improve cash flow.

A key unknown is the ability of energy measures such as renewables to help drive the shape of the recovery. According to the Carbon Trust, countries could potentially profit by taking a bold new approach to commercialization of renewable energy: making investments through greater technology prioritization and to move away from technology neutrality. It has been predicted that the UK could generate up to £70 billion (US\$111.6 billion) for the economy and create almost 250,000 jobs in offshore wind and wave power alone.⁶ Offshore wind and wave could provide at least 15% of the total carbon savings required to meet their 2050 targets.⁷

No matter what shape the recovery takes, it is becoming more apparent that “easy does it” should be the watchword: The global economy cannot withstand another extreme rise in oil prices without severely impacting economic growth.

China remains one of the fastest growing economies in the world, even though by Chinese standards, the country is in the doldrums.

It's acquire or be acquired for many as M&A rebounds

The 2008 oil price crash and ensuing market volatility left many energy companies in a fog of uncertainty. With limited visibility into the direction of future markets and a worldwide contraction in investment capital, many chose – or in more dire instances, were forced – to conserve cash, cut expenses, and attempt to weather the storm. M&A activity dropped precipitously, declining between 50-85 percent from pre-recession levels, depending upon the region and the specific industry sector.⁸

Even those with deep pockets have been reluctant to do M&A or they have found there is a limit to what can be accomplished. For example, many of the oil supermajors have been holding on to their cash and/or opting to pay dividends to their shareholders in lieu of pursuing M&A deals. Meanwhile, those that have forged ahead have been impeded by market conditions and a lack of desirable targets. Anglo American rejected a no-premium offer from Xstrata in the mining sector,⁹ and major players in the European power sector have been constrained by the fact that all of the mid- and lower-tier firms have already been purchased.

With a dearth of suitable acquisition targets, the appetite for M&A between the very biggest firms is likely to remain limited moving into 2010. Many other types of companies, however, may find the conditions favorable for a rebound. The recent oil-price recovery is already putting upward pressure on deal-making activity among independent oil companies, with the number of asset-level transactions steadily increasing. Emerging signs of improving capital markets also point to the likelihood of an upturn in overall energy M&A by mid-2010, with the possibility of a complete recovery to pre-recession levels by 2011.

While a broad recovery in M&A activity is anticipated, it is likely to play out differently by sector:

Oil & Gas: Independent and junior oil & gas companies have struggled in recent months due to their higher sensitivity to oil prices and tax regime changes. After the oil price collapse of 2008, many leapt into survival mode, implementing enterprise cost management programs, focusing on efficiency and revisiting their planning capabilities. Those that succeeded in freeing up cash are now poised to implement M&A strategies designed to enhance their reserve portfolios while those that remain cash strapped, which is still the vast majority, are likely to be M&A targets.

Mining Companies: During 2009, mining M&A has been led by the junior or mid-level players, which have to consolidate if they want to stay alive and not be swallowed up by the bigger firms. Indeed, many anticipate that the mining sector will continue to consolidate until there are a handful of supermajor firms like there are in oil & gas. Large mining companies will increasingly need to buy rivals and subsequently sell off assets to gain synergies if they are to compete with state-owned companies, particularly those from China. These conditions mirror those encountered by large oil companies a decade ago, when massive consolidation swept the industry in response to the rise of national oil companies (NOCs) such as Saudi Aramco, Gazprom, Petrobras, and others.

Power & Utility: While suitable targets will remain a constraint in some areas of the world, M&A in the power and utility sector will likely trend upward. Mergers and acquisitions are expected to increasingly become a strategic part of companies' plans as they respond to deregulated market opportunities and an improving capital market environment. In some cases, mergers may be necessary to raise capital for necessary improvements and new construction of additional transmission and distribution facilities. Government support, particularly in the U.S., for critical infrastructure improvements and renewable energy may also pave the way for easier regulatory approval of mergers and acquisitions.

Bottom line

The conditions are becoming increasingly favorable for an upturn in energy M&A activity by mid-2010, with the possibility of a complete recovery to pre-recession levels by 2011. The macroeconomic environment, however, remains a major concern. Commodity price stability will be required to underpin transactions, as will continued loosening of the capital markets.

Apart from the oil supermajors, consolidation will be likely across sectors. Oil & gas independents will be possible targets for reserve-hungry majors but also potential beneficiaries of portfolio rationalization among larger players. Power and utility companies will likely look at M&A activity to bolster their strategic positions, provide access to markets, and to raise cash for capital improvements.

“Acquire or be acquired” will be the new mantra for many. This theme will be especially apt for mining companies, which are now getting squeezed by tough competition from state-owned enterprises. Small mining entities that have been struggling to generate sufficient revenue will likely provide good assets at bargain-basement prices for bigger companies with deeper pockets.

Companies across sectors will need to think about how to leverage future M&A markets to support their corporate objectives. As global competition increases so will M&A’s role as a vital strategic tool for gaining much needed access to resources and opportunities.



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Think fast: The lure of centralized decision-making

During the recent economic downturn, many oil & gas companies focused their attention on developing strong cost management programs to conserve cash. With signs that the global economy is now beginning to recover, they are shifting to a centralized decision-making process.

This shift is occurring primarily in the upstream business where success can be undermined by international political events, failed project execution, and cost overruns. The strategy involves reorganizing existing exploration & production (E&P) divisions – whether they are focused on oil, gas, or unconventional/oil sands – into new geographically defined businesses. These changes are designed to sharpen a company's focus, accelerate plans to reduce complexity and costs, and promote faster decision-making. Consequently, over the foreseeable future, fewer people will be making strategic decisions within oil & gas companies. For any company, but particularly for oil & gas enterprises with geographically disbursed operations, decision-making comes down to using a decentralized or centralized model. Decentralized decision-making appears to offer several advantages.

First, many decisions, especially those calling for tactical judgments are more easily made by those in the field who possess knowledge of, and expertise in, local markets. Second, information may be complex and not easily understood by those in the home office. Third, decentralization may in fact motivate employees, giving them a say in the direction of the company.

Centralized decision-making processes, on the other hand, empower those with the most experience to make decisions. Companies using this approach may find that projects come on stream faster with improved execution. The use of standardized procedures may also result in cost savings. Furthermore, centralized decisions typically benefit the corporation as a whole whereas decisions made by lower levels of management often benefit certain departments while disadvantaging others.

In these uncertain times, companies are increasingly moving toward the centralized model. They are foregoing distributed management in favour of strong leadership, which is most often perceived as coming from the top.

Bottom line

The shift from decentralized to centralized decision making is likely to increase over the long-term, giving companies an opportunity to exert more control over increasingly complex and costly E&P projects.

The advantages of this strategy are many. Simplifying organizational structures can help to speed up decision-making by cutting layers of management. Plus, centralized decision-making can help make operations more efficient through performance improvement as well as organizational excellence. This does not appear to be just a onetime fad, but rather a lasting trend that can be used to increase a company's chances for long-term success.

Like attracts like as NOC-to-NOC transactions continue to increase

National Oil Companies (NOCs) are on the hunt. They are aggressively looking for corporate M&A opportunities to accomplish three goals: bolster their market strategies; expand their reserve portfolios; and develop strategic alliances. Notably, deals between Korea National Oil Corporation – Sinopec and Kuwait Petroleum International – PetroVietnam continues the trend of NOC-to-NOC transactions which suggests that state-backed companies prefer to deal with each other rather than engage with independents and international oil companies (IOCs). Further, China's loans-for-oil with Russia's Rosneft¹⁰ and Brazil's Petrobras¹¹ may portend a new wave of collaboration on upstream projects.

In 2010, NOC-to-NOC transactions are likely to increase dramatically as countries continue to see economic and political value in this type of activity. Several factors are driving what is fast becoming unprecedented NOC-to-NOC collaboration. Among them are cultural similarities and ease of doing business, in comparison to the more difficult environments often found in IOC countries, such as the one encountered by CNOOC when it attempted to buy Unocal. But even beyond mutual trust and comfort lie powerful economic realities and political motives that are forcing NOCs to increasingly partner with their own kind.

From an economic standpoint, net-consuming NOCs are seeking to gain access to sufficient reserves to fuel their countries' economic engines over the long haul, thus making deals with state-owned companies in resource-rich nations very attractive. Examples include investments by Chinese NOCs in Brazilian production and agreements between state-owned companies to build pipelines for transporting crude and natural gas from Russia to China. On the other side of the coin, producing nations must secure access to markets. For instance, Kuwait Petroleum has entered into a petrochemical agreement with China, ensuring a long-term market for its products.¹²



Ironically, from a political perspective, NOC countries often view each other as having more-stable political environments than those found in many democratic nations. This viewpoint may come as a shock to Anglo-based IOCs, but it makes a great deal of sense considering the relatively short terms of democratically elected administrations. For instance, dealing with a country such as the U.S. – which can dramatically change direction at least every four years – can be perceived as being more politically risky than dealing with a third-world nation. Additionally, NOCs are often united in the execution of their business strategies for the future wellbeing and security of their countries as in the case of OPEC. History has demonstrated that NOCs' long-term business strategies in support of national goals rarely change, even in the face of a political overthrow or significant shift in national leadership.

These factors – coupled with the fact that the skill gap is narrowing between NOCs and IOCs – are causing IOCs to be even more concerned about their constrained ability to participate in the global expansion of the oil & gas industry. Some opportunities may exist, however, for IOCs to maneuver their way out of this box. Energy demand is anticipated to grow 2.3 percent per annum in countries outside the Organisation for Economic Co-operation and Development (OECD) over the next 20 years, compared to only .6 percent per year in OECD nations.¹³ This rate will likely challenge the ability of NOCs to keep pace with demand even in their home countries. This situation is creating opportunities for IOCs to partner with NOCs in areas such as R&D, aboveground infrastructure investments, and complex exploration and production (E&P) projects such as deepwater oil and tight-gas plays.

Bottom line

NOC-to-NOC transactions will likely increase in 2010 driven by the heightened economic and political value of these deals. There will, however, be limits. For instance, mergers between NOCs will be out of the question since governments will want to maintain control.

Over the next couple of years, IOCs will still be faced with the dilemma of constrained access due to ongoing resource nationalization and the growing sophistication and ambition of NOCs. Yet, in a world where long-term demand is poised to dramatically outpace supply, it is unlikely that NOCs – or any type of company for that matter – will be able to succeed entirely on their own.

Despite a narrowing skill gap between NOCs and IOCs, state-backed enterprises will still likely need assistance in boosting production capacity to meet rapidly rising energy demand in non-OECD nations. This reality presents an opportunity for IOCs and independents to assist state-backed companies in areas where their capabilities will be stretched the thinnest such as R&D, infrastructure investments, and tapping unconventional oil & gas deposits.

Some even contend that NOCs will look to IOCs to assist them with furthering national goals. This could include activities that have traditionally been beyond the purview of oil & gas companies such as building civil infrastructure, implementing job-creation programs, and constructing alternative-energy facilities.

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Making every electron count: The rise of the Smart Grid

Electricity is projected to supply an increasing share of the world's total energy demand and is the fastest-growing form of end-use energy worldwide over the next decade.¹⁴ Given the growth and importance of electricity throughout the world, it is shocking to note that the average efficiency of the world's existing electricity grids is only around 33 percent. This contrasts with 60 percent efficiency for grids based on the latest technology.¹⁵

Just at the transmission and distribution levels, energy losses are around seven percent.¹⁶ Further, the cost of power outages and power quality disturbances is estimated at \$180 billion annually in the United States alone.¹⁷

But there may be a solution: Smart Grid technologies. These have the potential to reduce up to 30 percent of electricity consumption¹⁸ and dramatically decrease the need to construct new power plants or to operate environmentally harmful sources of generation. Broadly speaking, Smart Grid companies add computer intelligence and networking to what is otherwise a physical maze of interconnecting wires.

Some Smart Grid technologies assist with smoothing out demand – or “load leveling” on the electrical grid. This allows a generating company to run cleaner power sources, such as nuclear or hydroelectric, at full output, 24 hours a day, while reducing the need to use carbon-emitting gas, coal or oil plants in a surge (usually for only a couple of hours per day) to meet peak demand. Further, by reducing variability in demand, fewer new power plants need to be constructed. Other examples of Smart Grid activities include: making the process of generating electricity from conventional fuels more efficient; connecting sustainable energy sources to the existing grid; and deploying smart meters.

Smart Grid companies are poised to become the biggest and fastest growing sector in the GreenTech – and possibly even the entire – technology market according to several recent market studies. For instance, ABI Research forecasts worldwide shipments of smart meters to rise to 73 million in 2009, up from 49 million in 2007.¹⁹ Another report suggests that by 2014, global cumulative spending on Smart Grids is likely to exceed US\$33 billion up from US\$12 billion in 2008.²⁰



In addition, the growth of the sector is likely to receive a major boost from various power companies and stimulus packages. In China, Southern Power Grid Corporation is expected to spend between 3-4 trillion yuan between now and 2020 developing a smart grid in stages,²² whereas the Obama administration in the U.S. has allocated roughly US \$11 billion for utilities to transition their energy supply networks to digital technology.²³

Smart technologies are also expected to grow as they make further inroads into the consumer market over the next 18 months. Smart metering technologies could potentially enable consumers to “time shift” their power usage to take advantage of off-peak rates, saving them as much as 20 percent on their electricity bills.

The transformation of SmartGrid solutions providers, from catering to early adopters to undertaking large-scale implementations, will likely encourage a spurt of M&A activity, a trend in which savvy energy companies will want to participate.

... the advantages of implementing Smart Grid technologies greatly outweigh the concerns many have expressed thus far.

Bottom line

While Smart Grids appear to be on the cusp of worldwide growth, several challenges remain. Despite anticipated spending on smart grid development, consumers will likely see some rate increases as utilities pass on a portion of the costs to end users. Also, a lack of industry-wide Smart Grid standards could potentially hinder the sector’s growth potential. A number of different electrical and information technology systems must be able to cooperate in a Smart Grid. A lack of standards means that integrators must figure out which systems will work together out of the box and which ones will require additional integration. Lastly, Smart Grids will likely need vast amounts of software to work seamlessly, raising security concerns and requiring innovative security measures.

Nevertheless, the advantages of implementing Smart Grid technologies greatly outweigh the concerns many have expressed thus far. With better information, electricity users could automatically adjust their power usage to help avoid blackouts during peak demand. An air conditioning system could be programmed to raise the temperature in a home a few degrees when energy prices – and accordingly, demand on the grid – hit a certain level. Working with home automation systems, smart meters hold the promise of helping customers save money by analyzing the way they use lights, thermostats, heating, refrigerators, and TVs. Perhaps more importantly, Smart Grid systems will help all electricity users become more energy efficient.

Pressure to resolve the coal conundrum intensifies

Coal is the fuel of the future. The International Energy Agency (IEA) estimates that coal will account for 29 percent of global energy requirements in 2030, compared with 26 percent in 2006.²⁴ To meet this growing demand, coal production is projected to rise by almost 60 percent between now and 2030. Most of this growth will come from non-OECD countries including China and India who will likely see their coal output double. Russian coal production is predicted to increase by nearly 75 percent, overtaking that of OECD Europe. More importantly, the majority of proven coal reserves remaining at year-end 2008 were in the hands of just three countries: the U.S., Russia, and China. But can the global economy burn coal and reduce greenhouse gas emissions at the same time? That is “the coal conundrum.”

The numbers on power generation provides some insight as to the future direction of coal use. There are currently 50,000 fossil fuel plants worldwide, with the prospect of a further 750 coal plants by 2018 based on the local availability of low-cost supply and advancements in conversion technologies such as coal gasification and coal-to-liquids.²⁵ Plus, emerging economies such as China and India still view coal as the most effective way to meet consumer demand for electricity.

But coal has a downside. Burning coal emits approximately one ton of carbon dioxide (CO₂) for every megawatt (MW) of electricity generated; natural gas emits roughly 0.4 of a ton; and wind is mostly neutral. For countries, including the U.S., that are highly dependent upon coal, commercial-scale carbon capture and storage (CCS) technologies might be the answer. Experimental projects are underway in several countries. A Swedish company opened the first CCS pilot plant in Germany, which is undergoing a three-year testing period.²⁶ The UK says it will open its first plant in 2014²⁷ and the European Union plans to open a dozen more by 2015.²⁸ In the U.S., the Obama administration has resurrected the previously canceled FutureGen project with the Department of Energy, announcing that it will inject more than US\$1.5 billion into research to build a prototype coal plant capable of capturing and sequestering the CO₂ produced.²⁹

Yet, for all the promise that CCS technology may offer, several challenges remain.

In addition to the uncertain level of upfront capital and operating costs, first generation CCS reduces power plant output between 20-30 percent – making abated power significantly more expensive than unabated.³⁰ Moreover, these experimental plants are not likely to move into commercial-scale production until well into the next decade. Until the costs of CCS-based power are reduced, companies will likely look to their respective governments for help in funding the first series of CCS investments.

Bottom line

While new large-scale oil discoveries show signs of peaking within the next several decades, the world has slightly more than 120 years worth of coal remaining on average based on current reserve estimates and usage patterns.³¹ Some believe that carbon-capture and sequestration holds the answer to mitigating the environmental consequences of the rising consumption of all that coal. Yet, this technology is costly and has yet to be proven on a commercial scale. And even still, there is a wild card in the equation. As more and more nations levy a tax on carbon, the relative price of coal will rise in comparison to the cost of cleaner energy sources such as natural gas and nuclear as well as renewables such as wind and solar.

Despite this trend, many nations, particularly emerging ones, will forge ahead with building new fleets of coal-fired plants in the coming years – regardless of the emissions consequences. Economic realities will drive this trend: Coal is simply too cheap and too abundant to be ignored as a fuel source within rapidly growing economies.

Renewable energy production heats up in key oil-producing regions



By 2050, around 10 billion people will inhabit the Earth and they will obviously need food, water, energy and other necessities. Yet even today, approximately two billion people either do not have access to, or cannot afford electricity and clean water.

For most, the Middle East and North Africa are synonymous with oil and natural gas. But soon, the connotations of these resource-rich regions will begin to shift toward renewable energy production. Why would the leading oil-producing nations be willing to embrace wind farms and solar power? Many believe that the geographic and demographic conditions are just right for the birth of a new type of energy leadership in the traditional cradle of fossil fuels.

By 2050, around 10 billion people will inhabit the Earth and they will obviously need food, water, energy and other necessities. Yet even today, approximately two billion people either do not have access to, or cannot afford electricity and clean water. The ecological strains of population growth and the increasing imbalance between the “haves” and “have-nots” are exacerbated in non-OECD nations, whose urban populations are growing at twice the rate of those in OECD countries.³² Consequently, many developing nations, especially those in Africa, Asia and the Middle East, are increasingly being challenged to balance competing priorities. These priorities include creating jobs, protecting national interests, building civil infrastructure and developing technologies to address climate change – all while meeting aggressive production targets to preserve their economies, which are often precariously based on a single commodity.

The sun offers a solution. Within six hours, deserts receive more energy from the sun than humankind consumes within a year.³³ Even more, the technology to tap this abundant resource already exists in the form of concentrating solar-thermal power plants. These plants have been in use commercially since the mid-1980s in the deserts of California and new plants have come online in Spain and Nevada.

While most regions have desert areas that can be leveraged, many investors see the most potential in the nations of the Middle East and North Africa due to their ideal weather conditions – intensely hot and significant sea breezes during the day – and their proximity to the developed population centers of Europe.

Even fundamentalist regimes in these countries realize that renewable energy production on a massive scale could address many of their nations' challenges such as the need to create jobs for a youthful and rapidly growing population. It would also supply another revenue-producing resource to offset their economic dependence on oil. The unique combination of climatologic suitability, ecological necessity and economic imperative will accelerate renewable-energy production in the Middle East and North Africa in the immediate future.

Investors and non-governmental organizations are already moving to develop this potential. The Desertec Foundation, an initiative of The Club of Rome, is working with policymakers at national and supranational levels to create an appropriate political framework and a favorable commercial environment for Desertec developments, i.e. those that produce clean, renewable power from deserts. The affiliated Desertec Industrial Initiative aims to provide Europe with electricity generated from the Sahara. The initiative has already signed on several reputable companies, including Munich Re, Deutsche Bank, RWE, E.On, and Siemens. The idea behind the €400 billion (US\$557 billion) project is to install hundreds of solar thermal power plants and wind farms with high-voltage direct current transmission (HVDC) cables under the Mediterranean Sea.

Meanwhile, ambitious investors and policymakers in the region are forging ahead with "eco-city" projects to demonstrate the feasibility of clean-energy concepts. One of the most publicized of these is the Masdar City project, in Abu Dhabi, in the United Arab Emirates. This planned city is being built by the Abu Dhabi Future Energy Company, a subsidiary of Mubadala Development Company, with the majority of seed capital provided by the government of Abu Dhabi. Once completed between 2013 and 2015, the city will be powered with 100 percent renewable energy and have zero carbon emissions. The city will also attempt to reduce waste to zero. Biological waste will be used primarily to create nutrient-rich soil and fertilizer while some will be incinerated as an additional power source. Industrial waste, such as plastics and metals, will be recycled or re-purposed for other uses.

Bottom line

New renewable energy production is heating up. The Middle East and North Africa will serve as a focal point for this activity due to their ideal weather conditions, rapidly growing populations, and close proximity to Europe and the Mediterranean basin. Underwater HVDC transmission lines will likely provide the links between producers and markets.

The acceleration of renewable energy production within the world's largest oil producing region heralds a paradigm shift in how the world thinks about energy. More and more countries are grasping the inter-relationship between climate change and energy security. To this end, they are looking for ways to reduce energy-related CO₂ emissions while meeting rising energy demand.

Although production of renewable energy is accelerating, it does not mean the end of fossil fuels any time soon. There is no single, stand-alone solution to the challenges of climate change and population growth. Over the next 25-30 years, fossil fuels will serve as a vital bridge to a cleaner, greener global economy. Successfully transitioning to this new reality will require a broad mix of energy sources, including alternatives, renewables, nuclear, and energy conservation measures. It will also require technological enablers that promote greater energy efficiency and cleaner use of conventional fossil fuels.

As the transition to a new sustainable non-hydrocarbon economy builds momentum, energy companies, including conventional oil & gas enterprises, will increasingly be challenged to lead or get left behind. The energy industry is arguably the most technologically dependent industry in existence. This also makes it the most qualified to develop both new fuels and cleaner ways of using existing ones.

Sector-specific cap-and-trade schemes emerge as viable options in carbon-intensive industries

All eyes will be on the delegates from nearly 200 countries who will be meeting in the Danish capital of Copenhagen at the end of the year. The purpose is to come to an agreement on the shape of a broader climate pact to replace the U.N.'s Kyoto Protocol, the first phase of which will end in 2012. What role should industries most affected by climate change policies play in developing emissions reductions targets? Some believe that these industries should lead the way by developing their own carbon-trading schemes before government-backed ones, which are often out of touch with market realities, are imposed upon them.

The global shipping industry has been talking about a version of this idea for years as its members have been pushed to self-regulate and trade amongst themselves to avoid eventual inclusion in national and regional trading schemes. Carbon credits, for instance, could be made available to shipping companies that invest in new technologies or employ practices to reduce their carbon footprints. The aviation industry too is exploring a sector-specific solution. Any mechanisms for dealing with its contribution to climate change must be developed at a global level to prevent competitive distortion and to avoid a patchwork of conflicting national and regional policies.

The oil & gas industry, especially the downstream sector, should be motivated by these examples to consider instituting its own carbon trading mechanism and to actively participate in policy discussions concerning climate change. Movement in this direction is especially urgent in light of pending legislation in the U.S. The Waxman-Markey bill would obligate U.S. refiners to purchase allowances for the greenhouse gases emitted from their manufacturing facilities as well as for those produced when their refined products, such as gasoline and diesel fuels, are used.

Under this proposal, U.S. refiners would bear the cost of roughly one-third of the nation's GHG emissions but receive only two percent of the free pollution permits available.

Some argue that bills such as this one illustrate the inequities that could occur if sweeping cap-and-trade legislation is enacted. They further assert that sector-specific markets, such as one focused on refiners, may offer a more balanced approach. Consequently, a number of experimental intra-industry carbon-trading schemes will likely appear in the near term as the world grapples with finding the most expedient, yet cost effective, means of mitigating climate change.

Bottom line

If the energy industry wants to remain in control of its own destiny, it cannot take a "wait and see" attitude regarding carbon reduction. It must, instead, proactively develop technologies and processes to lower emissions as well as play an active role in shaping the type of carbon trading mechanism that will be employed.

A sector-specific approach to carbon trading may be just the ticket industry needs to jump-start climate change action. Critics of sweeping cap-and-trade legislation assert that it would impede long-term planning and investment – and therefore interfere with the ultimate goal of reducing CO₂ – because the cost of compliance (i.e., the price of a permit) would not be known in advance and it would vary over time according to market conditions. A general carbon-trading market would also be open to speculators who would introduce even more volatility into the system.

A carbon-trading scheme that is exclusive to the energy industry potentially offers greater certainty around the cost of compliance because it would more realistically reflect intrinsic factors, such as what the industry pays for technology and R&D, and it would free the market from speculators. In the long run, some argue that this would not only benefit energy companies but also the world by offering the fastest and most cost-effective path to reducing emissions from this carbon-intensive industry.

Waste not, want not: Energy efficiency goes from optional to essential

Despite the recent economic slowdown, worldwide energy consumption is still anticipated to grow at 1.6 percent per year on average between 2006 and 2030 – an increase of 45 percent.⁴⁵ What is fueling this juggernaut of demand? Developing world population growth is a major driver. Further, China, India and many other developing nations are modernizing at a breakneck pace, while consumers in developed nations are building larger homes and adopting an array of energy-consuming high-tech gadgets, ranging from HDTVs to cable or DSL modems.

With tight capital markets and regulatory uncertainty surrounding carbon emissions, particularly in the U.S., it is easy to understand why building more fossil-fuel-fired power plants does not appear to be the answer, either economically or environmentally. This reality, coupled with the unprecedented amount of stimulus money available to both consumers and businesses, will shift the emphasis over the next few years from building more generating capacity to using power much more wisely.

In 2010, the world will likely see increased conservation and energy efficiency efforts from both individuals and businesses. One reason for the renewed emphasis on this tried-and-true concept is the fact that the technologies needed to improve efficiency already exist and are becoming increasingly economical to deploy. Unlike clean-coal, biofuels, and many other proposed solutions to the world's energy challenges, efficiency represents one of the rare instances where technologies are evolving at a rate that surpasses deployment.

To tap the huge pent-up value that efficiency offers, several developed nations have begun to implement disruptive policies that encourage both rapid consumer adoption and profitability for technology makers. For example, the European Union has banned incandescent bulbs³⁵ in favor of energy-efficient models, transforming the market in an instant; the UK has introduced a new regulation – the Carbon Reduction Commitment – that is designed to encourage the owners of commercial premises to make buildings much more efficient; and President Obama has pledged to allocate billions of dollars in stimulus money to retrofitting government-owned and other public buildings.



The availability of huge sums of stimulus money is the other factor behind this inescapable trend. Of a total of approximately US\$350 billion so far allocated to green endeavors under governmental stimulus packages globally, the energy efficiency sector is due to receive more than half. That factor has already buoyed the performance of energy efficiency stocks, which have been outperforming not just the market, but other clean technology stocks.

Authorities on the subject, such as Dr. Joseph Stanislaw, Independent Senior Advisor, Energy & Resources, Deloitte LLP (United States), emphasize that greater public awareness of the value of efficiency will be needed if the trend toward conservation is to continue over the long-term.

Consumers and businesses must be given the tools to understand lifecycle costing, which incorporates the time-value of money and the opportunity cost of failing to implement efficiency measures today. In particular, demand-side management and real-time pricing will be key since consumers must know the real costs of a given resource if they are to make better decisions about how and when to consume it. Perhaps even more importantly, Stanislaw and others note that energy efficiency must become a part of our everyday vernacular and a top-of-mind consideration as we run our businesses and live our lives, if the world is to meet its energy demand challenges long after the stimulus money has run out.

Bottom line

More capacity isn't the answer; greater energy efficiency is. While cutting-edge green technologies like carbon capture and sequestration, cellulosic ethanol, and wave-generated power hold the long-term promise of addressing the world's energy challenges, they are still experimental and they have yet to be demonstrated on a viable commercial scale. That's where energy efficiency has the edge. The technologies needed to conserve energy already exist today. According to a report released by the National Research Council, deployment of existing efficiency technologies in the building, industrial, and transportation sectors could reduce projected U.S. energy use by 15 percent in 2020 and by 30 percent in 2030. Even greater energy savings would be possible with more aggressive policies and incentives.³⁶

Landmark projects, like the US\$500 million retrofit currently underway at the Empire State Building, are grabbing attention and bringing to light the huge value that can be unlocked with the right efficiency measures. The project, which will include 6,500 better-insulated windows, as well as high-tech lighting, furnaces and air conditioners, is expected to reduce the building's energy use by almost 40 percent.³⁷

Governments around the world are acting swiftly to communicate the value of energy efficiency and to implement policies aimed at supporting the rapid adoption of existing efficiency technologies. These actions herald a new movement: energy conservation is rapidly transitioning from optional to essential. Pervasive awareness of the economic benefits and environmental necessity of energy conservation will be needed if this trend is to continue over the long run.

“Employment Nationalism” poses another access issue for IOCs

It shouldn't come as any surprise that today's oil & gas companies are operating in a dynamic business environment. The industry's key business challenges, such as the increasing global demand for energy, the development of unconventional reserves, and the continuous need for innovation in technology, cannot be resolved without a global talent supply. However, a new challenge is emerging that may slow the development of talent strategies. Already there are examples of “employment nationalism” in such places as Venezuela, Russia, Africa, and the Middle East – a trend that appears to be an outgrowth of resource nationalism.

Resource nationalism offers international oil companies (IOCs) an unpleasant choice: turn over majority control of their projects to a state-owned company and remain as a minority partner, or face a complete nationalization of operations. As oil prices grew during the first half of 2008, oil-producing nations sought more of the revenue pie through higher levels of ownership and the rewriting of contracts. This gave more influence to national oil companies (NOCs) at the expense of improving infrastructure and boosting productivity by tapping the expertise, experience and investment capital of IOCs. Now, employment nationalism follows a similar line of thinking: hire from the local population at the expense of hiring the best candidate. What effect this will have on oil & gas companies is open to interpretation, but one thing is clear: Both IOCs and NOCs will be affected.

IOCs have taken steps to offset resource nationalism by developing talent within their markets. An important part of this strategy involves partnering with engineering-oriented universities and sponsoring petroleum-engineering programs in the most needed geographic areas. A case in point is the Schlumberger Middle East and Asia Learning Center in the United Arab Emirates.³⁸ This state-of-the-art facility features the latest in learning technology, including high-tech classrooms and workshops as well as laboratories that are fully equipped with technical field equipment. This allows students to develop both basic and advanced skills related to upstream operations, such as data service, seismic assessment, reservoir evaluation, and directional drilling. Learning centers such as this are expected to help IOCs close the gap in upstream talent.

IOCs have taken steps to offset resource nationalism by developing talent within their markets.



On the other hand, the talent struggle for NOCs centers on the availability of a skilled labor force. While NOCs such as Brazil's Petrobras get thousands of applications for each single job opening, not every NOC has an abundance of skilled local talent from which to draw. This invites an influx of expatriate workers, who are often viewed as "taking away jobs" from the local population. For example, the double-digit unemployment rate within Saudi Arabia is largely due to the number of expatriate workers: of the 27 million people living in Saudi Arabia, one third are expatriates.³⁹

Even more telling, of the roughly 5.6 million people living in the United Arab Emirates (UAE) at the end of 2008, 85 percent were expatriates.⁴⁰ The UAE, like other Gulf Arab states, is heavily reliant on foreign workers since nationals are often unable or unwilling to do the work of expatriates. The diminished private sector participation of UAE nationals is attributed to low wages, negative stereotypes of local workers held by employers, and a lack of opportunity for training and development.

One strategy being used to bridge the gap between talent needs and available resources is the recent inclusion of women on the list of sought after talent by oil & gas companies in the UAE. Men have traditionally dominated the oil & gas industry with little representation from women in the technical side of the sector. While the trend of developing women might have been an interesting footnote in the past, it now represents a tremendous opportunity for oil & gas companies to leverage the vast untapped capabilities of the female gender. This strategy is most apparent in the UAE where oil companies signed agreements with 219 women undergoing training at the Petroleum Institute (PI) in Abu Dhabi, to work in the industry after graduation.⁴¹ This event is of great significance given the fact that the PI has never had a female graduate.

Bottom line

The ultimate success of oil & gas companies, whether IOCs or NOCs, will hinge on their ability to effectively attract, develop, deploy, and retain their human capital.

IOCs have developed innovative ways of closing the talent gap by forming partnerships with petroleum-focused universities in parts of the Middle East and Asia, but making up ground in this area will take some time.

As NOCs continue to purchase assets and globalize their operations, talent management will increasingly be one of the critical success factors. NOCs have a duty to exploit their nations' resources for the best advantage of their nation and to provide employment to their local population. While local citizens often covet the opportunity to work for a local oil & gas company, rival firms and industries are offering attractive compensation packages that may prove to be difficult for NOCs to match. At the same time, less-developed countries that once provided expatriate labor to the oil industry are themselves evolving into dynamic economies in need of skilled talent.

These circumstances portend a tight market for oil & gas talent – for both NOCs and IOCs – over the next several years.

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