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Spotlight

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Message From the Editor

"...the energy shortage nobody wants to talk about."

This issue of the Boyden Spotlight focuses on energy, the industry upon which all others depend. When energy is in short supply, the effect is often global. Supply chains slow, then break. Prices begin to rise. And markets take a tumble.

Yet there is one shortage in energy that is rarely talked about. This is the dangerous shortage of human capital — the expertise, the management, and the leadership – that the energy industry faces as it prepares to meet an exciting but challenging future.

This Spotlight explains how the energy sector lost its next generation of leadership. It also offers answers to questions such as these:

- Why is the shortage getting worse?
- What are the real costs of losing talent?
- How can energy organizations find and retain the new resources and management needed to succeed as demands and constraints accelerate?

Energy is a traditional industry. As new management is required, enterprises instinctively look to their own human capital pipeline. But there are problems with the industry's pipeline. It runs thinner every year, as more and more workers abandon careers in energy. Those who remain, while experienced in past practices, may not be up to handling the increased diversity and complexity of the new industries evolving today.

It is clearly time to start thinking beyond the pipeline.

For many companies that will mean discovering new pools of talent in the fastest and most expedient manner possible. An especially productive approach is to partner with a global search organization expert in search without borders.

It was Boyden Global Executive Search that essentially invented international search 63 years ago. Today Boyden maintains offices in more than 70 cities in 40 countries. We invite you to enjoy this Boyden Spotlight with a quick overview of the history, facts and figures that explain how the energy industry reached this moment in time – and how to turn this growing challenge into an even larger opportunity.

I. A Critical Industry at a Critical Time

"You cannot exaggerate the magnitude of this problem."
Matthew Simmons, Chairman
Simmons & Company, Houston, TX

There must be days when people in the energy sector roll out of bed, check their Blackberries, and wonder… "Did I end up in some weird alterative universe this morning?" That's because the energy industry does at times appear paradoxically trapped between overlapping yet disparate realities.

The demand for energy continues to grow and will not stop anytime soon. Yet in recent years the energy industry has actually reduced the number of jobs available by over a million positions.

Increasingly the industry has failed to recruit or retain sufficient human capital to assure enough career employees will be available to meet requirements for management succession. Nor have energy industries been able to attract a new generation of energy workers who would be capable to work in and manage the more diverse new technologies that will increasingly be needed to complement and later replace traditional methods of energy generation.

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That Was Then. This Is Now

The causes of the current talent shortage go back at least several decades. Throughout the first half of the 20th century, the oil industry was constantly in ascent. Exploration and production marched in lockstep with soaring demand, relatively low costs and minimal competitive pressure.

Engineers entering the world of petroleum knew their careers would bring many opportunities. And perhaps even more importantly, job security was high. "If you were skilled and worked hard, you could pretty much count on a lifetime in the industry," says Thomas Zay, a Managing Director in Boyden's Houston office.

One reason for that stability was that the industry was somewhat isolated and slow to change. It was a world that "made sense". There were few reasons to question longer term consequences or continuity.

At the same time, the rate at which technology changes and (hopefully) improves is also accelerating. The result is a much more complex and competitive operating environment. The energy industry is expected and even mandated to keep up with improvements in other industries.

Meanwhile, the demand for energy is expanding geographically. For decades, the majority of energy was used by those few developed populations who could afford living an energy-rich lifestyle. Today, however, the developing nations are catching up economically. They want cars and malls and air conditioning too. Countries like China and India have moved into the passing lane, and will soon need more energy than the US, Canada and Europe. And in the talent department, Eastern Hemisphere powers are rapidly developing their own technical expertise, according to Boyden's Zay.

Waking Up to a World of Limits

Today the energy industry is no longer young, and its customers are no longer so sanguine about the long term issues relating to the sustainability of current energy practices, the environmental, and even the increasingly likely relationship between the growing use of carbon-based fuels and the alarming increases in global temperatures as well as the possible acceleration of climate changes.

Environmental safeguards and shifting energy priorities have inevitably added complications. Regulatory bodies and legislation became involved. Complicated new emissions laws had profound implications in terms of safeguarding the environment. But they added complexity for the automotive and real estate industries.

Inevitably the energy industry and related professions came under attack for failing to care for the environment. "This later had serious repercussions when it came time to recruit a new generation of workers, explains Zay of Boyden Houston. "The industry's 'dumb iron' reputation made it difficult to compete for engineering talent being attracted by exciting new technology businesses."

The industry was increasingly challenged on all sides to be more involved and aware in a variety of social and environmental causes. And more effort was necessary to deal with government regulations.

Three Challenges for Today's Energy Industry

There are (at least) three challenges that obstruct the road to a successful future for the energy industry. Each challenge presents major problems and each has possible, even probable, strategies for resolution. But many of those strategies intersect and conflict.

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Finally, each of the three challenges has its own time frame.

1. Long-term Challenge: Fossil Fuels

   The first and most visible challenge is our dependence on fossil fuels. Today fossil fuels define the industry. Tomorrow they will increasingly be less plentiful and more expensive. They are not sustainable. They are heavily carbon positive, which the majority of current science sees as a direct source of global warming.

   Technology is already finding ways to improve access to harder-to-harvest fossil fuel reserves. And we may find ways to block or even reverse the dangerous effects of high carbon energy systems. In the meantime, fossil fuels expend more and more of our available funding for energy. A recent Boyden and University of Houston study notes that the more difficult it is to extract hydrocarbons, the more technical expertise is required. Without a doubt it will be more costly to recover oil and gas as difficulty increases.

2. Mid-term Challenge: Alternative Energy

   The second challenge is exploiting alternative energy sources, especially those that are renewable, sustainable, and/or especially "clean" or green energy. These alternative energy sources include solar, wind, biomass, geothermal, and even harnessing the tides. Denmark, as Thomas Friedman of the New York Times points out, has cut out instability by recycling waste heat from coal plants and deriving 20 percent of its energy from wind.

   There are three aspects to this challenge. The first is that alternative energy will require a lot of human capital, with wide and extremely diverse information, experience and business acumen to develop these different technologies. The second aspect will be cost. The total investment required will be huge. The third aspect will be the time required, which is going to be significant (think decades). And energy companies will absolutely require all three areas to be fully supported in order to develop and mature these technologies if they are to generate enough energy to fill the increasing gap between the energy we have and the energy we will need.

   Meanwhile any of these technologies may prove to have significant disadvantages. Ethanol, an early attempt at producing a money and carbon saving fuel, turned out to generate huge amounts of carbon. Additionally, diverting corn from the food supply quickly drove up the cost of many staples.

   There is also nuclear power, already used widely in Europe, which offers many advantages, but leaves us with radioactive by products for which we have not yet perfected disposal and storage strategies.

   There are many more radical innovations that may turn out to be resounding successes. Xerox PARC, for example, recently sponsored a demonstration of Lonnie Johnson's "High Efficiency Solid State Engine." This is an engine with no moving parts. It does not require oxygen. The energy is generated by a difference between the temperatures in two different parts. Johnson is well known for his work designing space craft systems for NASA.

3. Short Term Challenge: Insufficient Infrastructure

   Insufficient infrastructure is the source of one of the industry's most destructive problems. Today storage and delivery piping provides a "balancing and leveling" function that conceals variations and shortages in the delivery of energy. When energy shortages become more visible, energy markets become significantly more volatile. This volatility becomes a major contributing factor to creating boom and bust cycles. In the US, when Bill Richardson was Energy Secretary, he said, "We're a superpower with a Third

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World grid." The current energy infrastructure in the US is, in fact, limited in terms of both capacity and capability. Twenty years ago, the US infrastructure had only two weeks of storage capacity for the nation's oil supply. Two decades later, capacity has been reduced by half. At press time, US President Barack Obama's proposed $150 billion New Energy plan included development of a new smart grid.

Boom, Bust and the Loss of Trust

Historically the boom-and-bust cycle for energy was introduced during the energy crisis of 1973-1974 (which also introduced energy market volatility). The "boom and bust" phenomena frightened the financial markets as well. Tightened credit disrupted hundreds of exploration projects. This also dramatically reduced staffing, training and career development. Similar cycles occurred in the late '70s and again in 1982. It has been estimated that more than one million oil industry jobs have vanished since 1982. But arguably even more painful than the loss of jobs, was the effect that "boom and bust" cycles had on the reputation of the industry as a place to build a career.

Look behind the record-breaking results of recent years, and you will find the energy industry has continued to alternate between boom and bust. Again, the effects have been detrimental to the trust an industry needs to inspire in order to entice management and employees to commit to career status.

But there has also been a more subtle effect. The energy industry is trapped in a paradoxical situation where it must function in two different universes simultaneously. The first is the day-to-day universe defined by all the different real time market effects. Organizations must plan, price, operate and compete within a complex framework that is ultimately defined by increasingly volatile energy markets. The second universe is one where the long view rules, and organizations must optimize their opportunities and resources over many decades.

The conflict is most visible when viewed in terms of human resource issues. The energy industry made and nurtured human capital investments when times were good and growth was stable. But as boom turned to bust, those responsible for operational efficiency viewed many career employees as redundant. Actively or passively, the HR pipeline was bled of those who would otherwise continue to fill the talent pipeline for long term strategic stewardship.

Market forces cannot be ignored, but they are blind to the requirements of longer view strategies. And that is how the energy industry lost its next generation of leadership.

"2009 may well be a pivotal year, because companies really need to keep recruiting younger generations into the industry . . ."

Candida Scott
Senior Director, CERA

Q & A with Candida Scott

Senior Director of Cost and Technology, Cambridge Energy Research Associates

BOYDEN: What are the core challenges for energy industry recruiting?

CANDIDA SCOTT: Last year the challenge was finding personnel with the skill sets we really needed. It was hard to recruit and retain them. Coming into 2009, the industry is considering cutting staff. But it has also been worried about losing its more experienced engineers. The silver lining in the financial crisis (with its impact on pensions) is the aging work force might actually stay longer.

BOYDEN: What is the concern about the generation gap?

CANDIDA SCOTT: 2009 may well be a pivotal year, because companies really need to keep

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Candida Scott (con't)

recruiting younger generations into the industry. Ultimately we are at risk of losing our older and more experienced skills. Traditional engineering skills have not been popular with younger people. When they come out of college, they're more interested in renewable energy, wind and solar.

Any young graduate requires years before he or she can be put in a decision-making role. We did a survey that suggests it takes eight years before young engineers have picked up enough skills and experience to really do project design. So yes, building up the younger generation skills is quite important.

BOYDEN: Do all these boom and bust cycles create a problem for recruiting?

CANDIDA SCOTT: Boom and bust cycles are absolutely why the younger generation has concerns about working in energy. We laid off staff in the 80s that just dropped out of the energy industry. We lost those skills. There may be cutting staff again in 2009. Cutting staff is easiest and quickest way to cut costs.

BOYDEN: What about the loss of "institutional memory"?

CANDIDA SCOTT: If you cut experienced people because they are paid more, you risk having no mentors to pass on institutional memory to the next generation. Inexperienced engineers

result in expensive remedial work when you get to construction.

BOYDEN: What changes are imperative in order to improve recruiting for a new generation of energy executives?

CANDIDA SCOTT: The industry needs to find out what is truly attractive to the next generation. They need to improve job security. And companies need to figure out how to hold on to recruits once they've had enough experience to be valuable. Today's younger generation has become "the move-on-quickly" generation.

II. The Energy Industry: Running on Empty

"The fewer skilled people you have, the less work you get done, the fewer projects you can take on. If you can't execute, you won't provide shareholder value or produce enough of it."

Robert Travis, Managing Director, Boyden Calgary and Atlanta

How We Lost the Next Generation of Talent

The financial insecurities in the energy sector led the industry to choose short term efficiency over long term investment in human capital. Plagued throughout much of the '80s and '90s by constant layoffs, hiring freezes and early retirements, many of the best and brightest in the industry sought careers with more security. The oil industry failed to create a new generation of young engineers – and ultimately lost the next generation of future leaders as well.

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While such fields as high technology flourished, undergraduates with a predisposition towards studying science and entering technical fields became increasingly less likely to consider oil, gas and energy as viable career choices. Besides, bereft of the glamour and potentially massive financial payoff of such areas as Silicon Valley, the world of oil and gas – rechristened as the energy industry – also lacked the possibility of long-term, sustainable job security.

The current energy landscape makes the talent shortage exceptionally painful. A recent International Energy Agency report estimates that $5 trillion of new oil investment will be needed over the next 25 years. With power demand across the world expected to leap by 50 percent in the next two decades, many new nuclear and conventional plants are also expected to be built. The Cambridge Energy Research Associates (CERA) study estimates that more than 400 major projects are expected to go live by 2012. There are plans throughout the world to construct 180 new offshore rigs. On the average, a typical new offshore drilling operation requires a combination of 200 land-based and offshore workers.

But the lack of skilled employees threatens to greatly hinder these projects. According to Candida Scott, CERA Senior Director, "CERA expects this short-term deficiency to lead inevitably to a trend of increasing delays and problems on mega oil and gas projects. Given the number of large complex projects scheduled for the next few years, and this trend of decreasing capacity, one has to ask if all of them are going to hit their target dates, or will there be some delays."

"It's important to look at this from at least two perspectives," says Boyden's Travis. "In the short term, traditional oil and gas as a source of tremendous activity is not going away. People are needed to work in that world, and if they're not skilled enough to work effectively, it's going to take more time – and that means higher overall costs. But the second part is also significant: As alternative energy becomes more a part of the business, the talent shortage is going to become even more pronounced as the industry looks to understand and effectively execute in these new areas. It's very challenging to find the best people and simultaneously create a whole new series of technical processes."

Even amid a volatile economy and increases in unemployment, the energy industry is suffering a significant talent shortage. This will likely only get worse in the years to come. Although they're reducing reliance on outside expertise, even state-owned oil companies that have their own in-house staff in Africa, the Middle East, Asia or Latin America, depend on Western oil-services companies for key technical expertise, explains Andy Baggus, a Partner in Boyden's London office.

All upstream-related sectors are affected by this shortage, including exploration, production, nuclear energy, utilities and renewables. The energy industry's talent shortage cuts across the full spectrum of job categories including leadership, senior engineers, plant operators and line workers.

But the problems experienced in these fields only tell part of the story. When a leadership shortage is coupled with the current desire to minimize capital expenditures, a ripple effect ensues. Energy industry service sectors including architecture/engineering firms, equipment makers, pipe manufacturers, rigs, manufacturers, compressors and many other providers of goods and services also suffer.

The numbers reveal the sober truth:

Aging and Existing

A 2007 survey of international and regional energy executives conducted by CERA anticipates that more than 50 percent of current engineers will be retired by 2015, triggering a significant "people deficit" throughout the energy industry. "Even now, with the economic situation delaying some retire-

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"This is a fundamental problem that strikes to the core of the energy industry.

Jim Hertlein,
Managing Director,
Boyden Houston,
Leader of Boyden's
Global Industrial Practice

ments by several years," says Hertlein, "These experienced engineers will soon be gone from the workforce. We will lose their skill and, most important for future generations, their knowledge."

Carnegie Mellon University Electricity Industry Center's survey of utility industry human resources executives overwhelmingly listed the aging work force as their number one concern.

A study of energy industry executives working across the globe conducted by the Energy Institute and consulting firm Deloitte reveals that 70 percent believe they will not have enough leadership to meet the industry's future needs.

Dropping supply, diminishing confidence

According to a recent piece by FORTUNE magazine, in the 1970's, 40 US colleges offered degrees in petroleum engineering. Today, there are less than 20 in the US. In 1984, these US-based colleges awarded 1,500 undergraduate degrees in petroleum engineering. It's anticipated that there will only be 800 such degrees awarded in 2008.

What the talent shortage really costs the energy industry

Boyden Global Executive Search's Houston office had long been aware that the shortage of talent for the upstream oil and gas industry was impacting industry bottom lines in a very negative way. The question was how much was it really costing? And what was the collateral damage?

Jim Hertlein, the Leader of Boyden's Global Industrial Practice, brought Boyden's energy team together with the University of Houston's Global Energy Management Institute and the Program for Applied Strategic Finance at the University of Houston's C.T. Bauer College of Business. Hertlein's goal was to quantify the real cost to the shareholders as well as the industry. The results were dramatic.

The annual loss to shareholders was determined to have been up to $45.8 Billion dollars in market value. This did not include, however, losses due to strategic opportunity cost.

Direct impact to industry bottom lines was less dramatic, adding up to $5.2 billion annually. Three billion of this was lost profits resulting from lack of experienced personnel. And $2.2 billion was attributed to Direct Employee Costs.

Not included in any of these figures were the potentially much greater losses the team estimated had resulted from situations where leadership was needed but not available.

Hertlein explains it was just as important to understand the most vulnerable areas for potential losses as it was to quantify the actual losses. "What gets measured gets fixed," Hertlein says. "We have a pretty good idea about what needs to be done now."

III. What Can Be Done?

If you follow the history of how the talent shortage in the energy industry began, you can see that it took many things happening over multiple years. Everything that happened combined to break the relationship between the industry and the people who worked there… or between the industry and those whose job it was to serve.

Reversing the problems will therefore not happen over night. But it can be done. Here are four critical points for reentry, where energy can begin to close gaps that have been left open for too many years.

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Look for leaders as well as experts and managers

The traditional HR pipeline has always been better suited to bringing along practitioners and managers than leaders. Management and leadership are actually two different functions. It is leaders the segment has missed most.

It takes a leader to see the bigger picture, and Boyden's Jim Hertlein explains how: "The feast and famine mindset will only continue to deteriorate the industry's image," explains Hertlein. "The challenge for leadership is to think about the business over the long-term. We know now is a tough time, but we also know long-term demand is rising significantly. There's growing momentum in so many new energy solutions and energy is a fundamental enabler to the world economy. Maybe shareholders too need to be mindful of the long-term gains that can be had. So, leadership has to be very careful not to make the quick and emotional decisions to stop hiring or to cut the many people it needs if the business is to prosper in the years to come."

And the best way to find leaders, both proven and potential, is to partner with those who have years of experience doing just that. The energy sector can end its talent shortage a lot faster if it uses professionals who are already up to speed and ready to roll.

Look in all the new places

For years the energy industry essentially hired from the same pool of people. Overseas it chose expatriates rather than local leaders. The industry was slow to recognize that diversity increases the number of new ideas and fresh solutions. In contrast, the international energy services company Schlumberger, for example, became successful in part because it always hired the brightest and most creative people it could find, regardless of nationality. Maybe the biggest innovation was to pay all nationalities equally, whether Algerian, Australian or American. Today, most energy companies have adopted a global perspective in their operations and hiring.

Now is the right time to make up for lost time. Think outside the pipeline, outside the country, even outside the industry. It is the new models and technologies that will be the industry's

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bridge to the future. Yes, the industry needs people who carry key institutional knowledge with them, but it also needs people with new kinds of knowledge. Experts in social networks, for example, can help find better methods of building communities of committed users to help with support and emergency services.

Redefine the opportunity of energy work for a new generation of workers

For years energy was the scapegoat and villain for many different movements. In fact, the industry was often rigid in defining and providing services. But now energy has new and important roles to play in promoting conservation, sustainability and the development of cleaner energy generation. The new goals for the energy industry converge and align well with the next generation to enter the work force. Communicating these new opportunities can reintroduce the industry to the very people it needs to be working with.

It Starts With Education

Corporations have an opportunity to directly get involved in nurturing energy industry-related fields of study. According to Boyden's Baggus, "Schools need to teach that energy is a fully vertically-integrated business that offers great learning opportunities, international travel – an incredible way to develop a sustainable career. They need to approach the field as broadly as possible."

BP has invested more than $50 million to train engineers in Libya. OilGrads.com is a website dedicated to encouraging high school and college students to study science, math and engineering as a path towards a career in the energy industry. The site includes extensive information about scholarships, learning programs and global internships.

As you might expect in a city that's the center of America's energy industry, the University of Houston has taken a major step by creating the first energy-specific executive MBA. Aimed currently at senior-level executives, the program seeks to round out existing technical skill with coursework in management, finance and other leadership-related disciplines.

There remain many challenges ahead, but now is a time for new hope.