

# WHO'S WHO IN THE UNCONVENTIONAL ENERGY SUPPLY CHAIN

From oil “supermajors” to small geophysical firms to lead logistics providers, it takes many players to develop new sources of energy

The tapping of unconventional energy sources worldwide has given rise to an extensive roster of specialized players, each performing a vital role in bringing massive reserves of oil and natural gas to the surface.

New sources of fossil fuels include shale oil and gas, tight oil and gas, tidal deposits, coal-bed methane, and the heavy-oil sands of Canada. Hydraulic fracturing (“fracking”) and other methods of drawing fuel out of previously untapped sources call for highly complex supply chains whose profitability depends on close partnerships and maximizing efficiency.

The huge potential rewards make it well worth the effort to tap these hard-to-reach reserves. Shale deposits beneath North Dakota and Montana alone could contain as much oil as the entire Persian Gulf, according to a 2012 report from the John F. Kennedy School of Government at Harvard University. A recent report on unconventional oil and gas supply chains by IHS Economics, meanwhile, predicts that U.S. government revenues from the unconventional energy sector will climb from their 2012 level of \$13 billion to more than \$16 billion in 2015 and to approximately \$23 billion in 2025.

What follows, then, is a guide to the links that make up a production and distribution network that is expected to generate a total gross output of US \$205.9 billion in 2025 in the U.S. alone, according to the IHS report.

## **Energy producers large and small**

Start with the national oil companies and governments that undertake the seismic surveys needed to identify new energy sources, tender the exploration and production blocks (specified geographic areas) for potential developers to bid on, and issue the necessary licenses to proceed.

Next come the international oil companies, ranging from the “supermajors” such as ExxonMobil Corp., Royal Dutch Shell plc, BP plc, and Chevron Corp., to smaller and mid-sized players such as Chesapeake Energy Corp. and Anadarko Petroleum Corp. With



licenses in hand, they conduct three-dimensional (3D) seismic assessments and exploratory drilling operations, either directly or by utilizing a range of third-party drilling and service companies.

Supporting the big oil companies are service companies and geophysical firms. Among their tasks is the identification of rock strata with the right characteristics for drilling. The service outfits might then perform exploratory drilling, typically deploying a single vertical drill to produce core samples for analysis. Their objective, in partnership with the oil companies, is to determine first the technical and then the economic feasibility of a given deposit.

A more detailed exploratory phase might involve some of the tools that have made possible the extraction of unconventional fuels – namely, fracking and horizontal drilling. Not only do those techniques uncover reserves that were once unreachable, they also allow for greater recovery rates, making such efforts economically viable.

Conventional energy exploration generally involves tapping directly into reservoirs of oil or gas, notes Jonathan Shortis, Vice President of Energy for Europe, the Middle East, and Africa (EMEA) with DHL. However, the age of “easy” oil and gas is over, and now it takes more advanced technologies to exploit the huge reserves that remain. This is the case for conventional reserves in ultra-deep water or in remote geographies such as the Arctic, as well as for unconventional basins, Shortis says.

Much of the U.S. market for unconventional energy exploration is made up of smaller oil companies. Lacking a single, contiguous reservoir from which to draw, they must employ a higher drilling frequency to reach the required production levels. The resulting operation reflects a “factory concept” for exploration and production, which emphasizes high asset utilization and low downtime. That’s an area in which the smaller operators, with their lower overheads and strong focus on efficiency, tend to excel.

“The cost of production is higher,” says Shortis, “so you need to be light on overhead, be agile, and focus on driving drilling efficiency up, increasing utilization and productivity, and maximizing output.”

### **LLPs orchestrate operations**

Crucial to the workings of unconventional energy supply chains are lead logistics providers (LLPs), particularly those with direct experience in the industry. They perform a number of vital tasks, orchestrating material movements into and out of the work site while ensuring, at all levels of the operation, that workers’ health and safety is not compromised.

At full production, a drilling site might be receiving up to 2,500 loads per month of sand (used as a proppant, which keeps fractures open during hydraulic fracturing), water, and tubular goods, while exporting cuttings (the solid material removed from drilling) and wastewater for treatment and recovery. Considering the number of wells being drilled in the U.S. today that volume translates into millions of shipments going into and out of the well pads. Ensuring high levels of supply chain efficiency and service, together with a consistent level of safety, in the midst of all that activity requires deep expertise.

LLPs must focus on journey management and vehicle scheduling in order to prevent congestion, health, and safety issues and to ensure that drill sites are never short of materials. In addition, LLPs are often required to oversee third-party subcontractors, which might not have the same focus on or expertise regarding safety requirements such as vehicle condition and drivers' personal protective equipment. This requires a local presence to audit logistics movements and instill the messages of service consistency, standardization, and a continual focus on health and safety. In this way, cultural change can happen – to the benefit of all project and supply chain stakeholders.

These complex operations can have a major impact on local communities. On the plus side, they are potentially huge sources of employment. According to the IHS report, the number of supply chain industry jobs related to unconventional oil and gas production is expected to reach 757,000 in the U.S. by 2025, an increase of 45 percent over 2012. That amounts to about 41 percent of the total workforce supporting the unconventional energy sector.

On the negative side, the large number of vehicles moving into and out of a site can be a nuisance to local businesses and residents. Getting control of that activity isn't easy, given the disjointed nature of support services. Moreover, a poorly managed and orchestrated army of subcontractors can undermine the entire operation. "Fragmentation means that accountability becomes unclear and data interchange becomes almost impossible," says Shortis. "You lose visibility and traceability to key stakeholders – particularly the guys on the rigs."

An LLP on the ground can help to ensure maximum efficiency in the deployment of trucks and drivers while adjusting the flow of materials and equipment in line with the varied pace of drilling and changes in the drilling program. It is essential to adopt an integrated, end-to-end approach to supply chain management – one that incorporates international and domestic suppliers, freight forwarders, customs clearance, warehousing, yard and forward operating-base management, and delivery to the drill site. Operators must have total visibility of shipments and data moving through all of those stages.

In addition, the LLP is responsible for ensuring that subcontractors conform to standardized processes. Central to the operation is a management "control tower," consisting of experienced, trained individuals with a supporting technology platform, who are actively monitoring every element of the supply chain.

The high cost and complexity of tapping unconventional energy sources call for centralized control of suppliers, data, materials, and logistics, Shortis says. In the process, producers achieve cost efficiency and improved control, thereby reducing their cost of production while simultaneously maximizing output.

**Further reading**

A DHL white paper: [Building the smarter energy supply chain](#)