Delivering project certainty in downstream oil & gas
A quick survey of the refining and petrochemical industry would find owners and contractors facing the challenges of a new marketing landscape. Slackened crude oil prices have depressed profit margins leading to petrochemical capex peaking in 2016. Adding to this is GDP contractions in Latin America coming to completion and an oil price that should be stable in the $50/bbl to $60/bbl range for the foreseeable future.

In spite of these conditions, U.S. petroleum refinery and petrochemical capital spending will still rise in the near term as companies prepare facilities to meet new rules from the U.S. Environmental Protection Agency. It is likely producers will build and expand existing plants to take advantage of cheap domestic feedstock, with crack spreads in refining and gas-oil ratios in petrochemicals largely determining which types of capital projects move forward.

Global crude pricing has suppressed North America’s appetite for large projects upstream. This, plus uncertainty toward downstream demand related to sluggish GDP growth and developing alternative energy, suggests brownfield expansion projects will be more prevalent.

Many large petrochemical projects are not moving as fast as planned with some companies rolling back on proposals for new cracker plants and other projects likely to be smaller than originally anticipated.

Spending is expected to pick up in 2020 with regions such as the U.S., Middle East and China having market advantage at the onset. However, the current lack of resources in the industry, particularly in terms of personnel going into retirement and/or shifting industries, continues to increase project costs—and the recent downturn has only exacerbated the problem.

Among the players, there are more new entrants and niche owners, with international competition rising on the contractor side in the U.S. market. This also results in a smaller project size mix in capex spending.

Meanwhile, with the technology mostly established, improvements will come from other areas, especially with integration of the owner-contractor interface and loss of project experience emerging as core issues. Ultimately, efficient project execution and lack of experienced people, particularly in North America, will be a challenge.

New contracting strategies
Under these circumstances, more and more petrochemical owners are adopting a longer-term view and investing in new strategies to improve the performance of their projects in the face of volatile prices and challenging profit margins—from increasing worker training to adopting innovative project management solutions. While enduring the current low commodity price cycle some companies have begun investigating new ways of executing engineering, procurement and construction (EPC) projects, including new types of contract structures that serve a changing market.

For example, taking a more investment angle in projects, SNC-Lavalin offers an approach that is not necessarily aimed at the majors that have access to capital but at smaller firms that can leverage the balance sheet of the global engineering and construction firm.

The strategy is aimed at independents planning small-scale plants and for new entrants in the downstream market, specifically, international and independent owners who are increasing their presence in the downstream industry.
In addition, structuring progressive lump-sum contracting strategies, which allow reimbursable to lump-sum conversion at completion of an agreed upon percentage of design, is emerging as a better way to control costs and schedule while reducing risk to both owners and contractors.

A lump sum conversion, while not new, achieves goals that owners want in developing some cost certainty but without incurring a huge cost increase due to unknowns early in the process.

There are similar benefits to build-own-operate contracts, which allow owners to focus on their core business while the contractor takes responsibility for the design and operation of the project. Build-own-operate projects provide customers reduced operating costs and improved technical performance with little to no capex. This type of contract essentially delivers security and service continuity without the costs and complexities typically associated with managing daily operations.

In general, taking a “project development” approach supports greater flexibility in structuring contracts. In some cases, for example, the owner might need help at the front-end with the design itself in addition to getting help to find financing and understanding environmental and permitting requirements. Depending on the project and customer in such a case, SNC-Lavalin would not necessarily be the investor or even do the EPC other than sweat equity in a FEED but would help bring the project to fruition.

Concurrent with these types of contracts is a move toward taking a greater partnering approach with owners from the conceptual design throughout the life of the project. With a strategy that maximizes their front-end planning, owners can reduce the impact of market volatility on the scope of their projects, ultimately reducing overall cost and schedule.

With businesses in today’s market primarily focusing on controlling cash flow, there is a trend toward more upfront planning on the owner side to eliminate cost overruns caused by fast-track project planning in the recent past.

Strong collaboration from the start of front-end loading ensures owner alignment with the contractor and reduces cost overruns and expense further down the project development cycle. Due to the benefits in cost and time reduction, as well as an increase in trust and collaboration among stakeholders, the trend will likely continue gaining traction as a strategy.

Communication and collaboration
To optimize the engineering approach and ensure the best talent is put on a project, collaboration across multiple engineering centers is now a differentiator and requires communication tools and planning.

Because collaboration is a particularly effective way to lower costs and simplify project management, organizational capabilities lie at the very heart of a successful capital project.

Vertical integration combining various service offerings can unlock significant value for customers, and many companies are partnering or merging with others to provide a wider range of services. SNC-Lavalin’s 2014 acquisition of engineering and construction specialist Kentz and its subsidiary Valerus expanded organizational capabilities across the full spectrum—from feasibility studies, process engineering and execution of complete FEED packages to the detailed execution of projects on an EPC and management or self-perform EPC package basis as well as self-performing construction, completions and commissioning and providing sustaining capital services.

Vertical integration can create a considerable pool of in-house technical personnel and expertise, along with an extensive network of suppliers and contractors to meet specific project requirements quickly, reliably and competitively. This critical infrastructure provides a foundation of communication and planning tools necessary for seamless collaboration with stakeholders throughout the project life cycle.

The owner–contractor relationship is going to be a long one over the entire project life cycle so establishing a solid partnership is crucial from the start. The stronger the partnership the better collaboration is possible.
Looking forward

In the long term, the downstream industry can benefit from innovations being introduced further up the value chain. The industrial Internet of Things already is linking improvements in robotics, 4-D modeling, drones, radio frequency identification and wireless transmitters that provide the enabling technology for future capabilities in process automation and remote monitoring, both already widely implemented in midstream operations.

As a result, it’s expected that automation of any of the processes will continue to gain traction among all streams of the industry. With the operations of plants already heavily automated, remote monitoring should soon be on the horizon if not already embraced.

A fully integrated, total facility remote monitoring system can capture exactly what’s happening in real time from all vital points of the facility. Using advanced data analytics to deliver a continuous stream of real-time information to key stakeholders increases situational awareness of the project. Should an event occur technicians, analysts and engineers are able to see all equipment and operations data remotely and can drill down to diagnose the problem and determine corrective action.

Continually monitoring performance characteristics of key assets reveals the causes of reduced performance earlier so timely action can be taken. The information also can be leveraged to drive preventive operations, analyzing data not just for shutdown events but potential events as well.

Also of interest in the current market is the growing trend toward modular equipment designs that meet a wide range of conditions, are quickly installed and scalable for reconfiguration. Already, modular surface facilities have proven capable of meeting the technical requirements of a midstream project while maintaining quality, safety and environmental requirements. Now there is particular interest in modular designs coming into the refining and petrochemical industries to reduce the footprint of the plants, following midstream operations that already have adopted the technology.

There is economic advantage to modular designs as well. In the past, many products were not designed with total cost of ownership in mind. With adoption of modular design, procurement and manufacturing also benefit from economies of scale that impact total cost of ownership.

While these benefits are tempered by a current lack of standardization for modularization and specifications, redesigning equipment with more modular designs to drive out inefficiencies will prove an effective strategy in downstream applications.

In the meantime, companies can find opportunity in a recovering market by examining new contract structures and strategies that incorporate a front-end approach to planning and facilitate an owner-contractor collaboration focused on full life-cycle project realization.

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