

Outsourcing and Offshoring Engineering and Fabrication Activities

Follow these tips to get the most out of these high-risk, high-reward, third-party arrangements

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Outourcing is the subcontracting of a business function to an outside entity. The concept of outsourcing was first articulated by David Ricardo, an English economist in the 19th century. The idea is that through the use of outsourcing, companies can concentrate on those activities where they bring the greatest value. Lower-value activities are then carried out by other parties so that a company can focus its efforts and resources on its core competencies, and thereby achieve a comparative advantage in the marketplace.

This principle of outsourcing is widely applied in our personal and business lives. We routinely hire outside plumbers and electricians even if we are able to carry out these activities ourselves, so that we can spend our time on higher-value endeavors and still have time for recreation. In most corporations, such functions as landscaping, cafeteria services and security, among others, are typically subcontracted out. This provides flexibility, frees up capital and allows for lower overhead.

The maturing chemical process industries (CPI) have been undergoing drastic changes in the last three decades. Innovation was the primary growth driver in the earlier stages. However, companies are increasingly seeking opportunities to realize further cost savings and efficiency gains for further growth. In addition, competitive market factors demand faster schedules and flexibility. In the not-too-distant past, many large chemical-manufac-



FIGURE 1. This photo shows a fluegas-conditioning module, which is part of a large process plant that was fully fabricated in a local shop in the Middle East to achieve the desired schedule

turing and petroleum-refining corporations maintained their own fully staffed engineering and construction offices. However, more recently, many of these functions have been hollowed out and these days, many CPI companies now routinely rely on outside firms to carry out these functions more efficiently.

The terms outsourcing and offshoring are related. Offshoring is similar to outsourcing. However, it entails sending work outside the home country. While outsourcing can be done within the national boundaries, offshoring refers to getting work done outside of the country. Offshoring is typically done to take advantage of lower labor and material costs, and often carries potential currency-exchange risks — both positive and negative. Offshoring also has implications to domestic jobs and tends to be a more politically charged issue.

Pros and cons

The primary driver for considering outsourcing is cost savings. In today's very competitive market, every effort must be made to save costs where possible. The cost savings can come in various forms as follows:

- Lower per-hour engineering costs
- Lower fabrication costs, even after potentially adding more shipping costs
- Development of construction modules to lower field construction costs

Care should be taken to ensure that outsource economic decisions are made with eyes wide open. What may appear to be huge savings may not always be the case. For example, if overseas engineering is used at a rate that is reduced by 50% per hour (compared to home-office rates), but then requires two times the number of hours to be used,

there is no benefit.

Similarly, with overseas fabrication, care must be taken to ensure that shipping costs do not consume fabrication savings. It is also important to take into account customs duty for importing equipment through an outsourcing arrangement.

Schedule-related considerations may also be a significant driver for outsourcing. Perhaps there are insufficient resources within the company for the project to be executed, and the only way to meet schedule is through the use of external resources. Splitting up work among different entities may create inefficiencies, yet this may be the only alternative to achieve contract schedule requirements.

Different approaches

When considering outsourcing either domestically or internationally, there are various options to consider in deciding how to proceed. The common drivers for pursuing an outsourcing arrangement are the scope of the work, the level of internal resources to manage the work, and the desired outcome.

Care should be taken to make all outsourcing decisions with eyes wide open. Apparent or anticipated savings or operational advantages may not always come to fruition

If the scope includes significant engineering, there may be more of an impetus to establish a local presence in the foreign country outsource location. If the scope involves strictly fabrication by a foreign company, it may be prudent to work through a U.S. agent of the fabricator, or to utilize your own purchasing or procurement department to deal with the fabricator (this will be more of an "arms-length" arrangement).

When internal resources are limited and the desired goal is a long-term relationship, it may be wise to consider an alliance or partnership. Gaining specific technology may be another reason for considering a more formalized outsourcing structure. All facets of the outsourcing goals should be evaluated to determine the best path forward. The most commonly used outsourcing arrangements are described below.

Outsourcing through the procurement function. In its simplest form, outsourcing can be accomplished through the normal procurement process. In this manner the technical personnel develop a specification, while procurement personnel issue a request for quotation (RFQ) to qualified bidders. This method of outsourcing provides the lowest amount of control and often is not intended to establish a long-term relationship. This method tends to be very price competitive but perhaps with less focus on quality and workmanship. Often, quality audits are relied upon to ensure that quality is maintained through the engineering or fabrication processes, and there is little or no ongoing work surveillance.

Hire an agent who represents the service company. A somewhat informal or unstructured approach to outsourcing is to utilize an agent who represents the service company. This is a far more economical approach than establishing a local presence in an outsource location, and is more frequently considered for equipment or component fabrication than for

large engineering projects.

Such an agent provides the service provider with local sales capability in the U.S. in a very cost-effective manner. Not only can the agent represent multiple clients with non-competing interests, but the agent will typically understand local customs and business practices, and reside in the same time zone. For example, if services are provided in the U.S. by a foreign company, the local agent will serve as an intermediary for the foreign company. Essentially, such an agent will function as the local eyes and ears for the foreign company.

For the buyer, the agent provides local knowledge of the provider's offerings and can serve as a resource for answering questions. The agent is often counted on to be the front line with any warranty issues. The key for this outsourcing method to be effective is to have a sales agent

who is fully knowledgeable in the services, and someone who is very well connected in the industry.

Form alliances with other companies. When a long-term relationship is of interest, an alliance between two or more companies is often considered as a means of outsourcing. This is often considered when one company needs a technology, and another company offers this technology. One well-known alliance exists in the hydrogen production area, in which Air Products (www.airproducts.com) has a long-term alliance with Technip (www.technip.com) for reformer technology. Often a pricing agreement is part of the alliance as a tradeoff for the provider being the exclusive source of the equipment or engineering. The downside is that price competitiveness may come into question over time with no competitive price checks are being made.

Create partnerships. A partnership may be considered as a means of outsourcing in cases when two companies offer complementary services, and together as a team they provide greater opportunity. For example, if a company is strong in EP (engineering – procurement) due to their technology strengths, but weak in C (construction), they may want to choose a partner that would improve their chances of winning large EPC projects. This is the very scenario that developed between Linde (www.linde.com) and Bechtel (www.bechtel.com) in the ethylene market. The partnership has been fruitful in winning and executing, among other things, the large Baytown ExxonMobil plant expansion project. Under the partnership arrangement, both parties have a contract with the owner, which often manages both companies. The owner is able to get the best of all elements of the project, although there is generally a cost premium under this arrangement.

Establish a local office. Establishing an office in the outsource location is a widely used method to gain access to lower-cost engineering services in foreign countries. By way of example, countless companies have established offices in locations such as India and China. Establishing these offices takes time and in-

volves key personnel from the parent company to drive the process at the location. Once key employees are hired, the next step is to indoctrinate the outsource location into the way of doing business in your company. This may involve sending key hires to the home office for extended training, and may even involve home-office technical personnel spending periods of time at the outsource location to ensure proper indoctrination and implementation of standards.

Once the remote office has been established, new challenges present themselves. Trained personnel in a foreign country become a sought-after talent. Special efforts are often necessary to retain key personnel.

And, once that local resource has been established, keeping the group busy becomes an important ongoing objective. This requires workload balancing that can affect the home office. The home office has to also remember that it accepts full responsibility for the work in the outsource location, and cannot point fingers when problems arise. The phrase "we" instead of "they" must be the practiced team terminology. Additional challenges that are often associated with this type of arrangement include: communication across different time zones and languages.

Additional challenges

Some specific challenges were pointed out above with each outsourcing method, but there are also some generic concerns that exist with offshoring and outsourcing. These can generally be overcome, yet special thought and consideration should be given as such arrangements are pursued.

Most worldwide engineering companies and fabricators have a working knowledge and certification with U.S. codes. Foreign companies have to educate themselves to U.S. code requirements. This adds to their cost and erodes some of their lower cost advantage. In instances where U.S. companies build projects for eventual deployment overseas, the company that delivers the outsourced engineering and fabrication has to have a thorough knowledge of the codes in the country where the equipment will be eventually deployed.

There are situations where local codes become involved as U.S. companies do work worldwide. These countries' codes may not be familiar to the engineering company or fabricator and can require a learning process. For example, if a U.S. company is developing a project in Korea, the Korean Gas Safety Code (KGSC) must be followed. When outsourcing work to a country that has lower labor and material costs (such as India or China), care must be taken to ensure that the provider is capable of working to the relevant code.

The time zone difference may also become an inconvenience when outsourcing to foreign companies. Very often, a parent company in the U.S. or Europe arranges meetings and teleconferences during regular working hours in the local time zone. This may correspond to the evening and late night for people who live in Asia.

For most routine interfaces, it is possible to address communications via emails and scheduled conference calls. However, the challenge arises when urgent problems occur and a quick response is needed from the outsource location. During crucial times of a project, this can be handled by requiring that the outsource location stagger their work schedule to ensure full coverage during the working hours of the parent company's office. Some companies will make whatever accommodations are necessary to facilitate communication with a foreign company. This includes maintaining staff after hours for conference calls and other communications.

Finally, language and cultural differences may come to bear when outsourcing to foreign locations. U.S. companies enjoy the advantage that technical and business professionals in most other countries speak some English with some proficiency, yet there can still be strained communications. The experience of the authors is that personal interface is the best way to avoid confusion. This can be achieved by having someone at the outsource location, or by dealing regularly through a representative.

In addition, there may be cultural differences. For instance, in some countries, young engineers are comfortable completing all defined tasks

with a lot of direct supervision. However, they are not trained to work independently or be proactive.

Closing thoughts

Outsourcing and offshoring are well-known techniques to reduce cost, improve schedule, balance workload and improve flexibility. Outsourcing can be carried out at different degrees, ranging from using the existing procurement function or hiring an agent, to forming an alliance, partnering with others or establishing an offshore office. Each approach has its own pros and cons and the appropriate arrangement must be chosen based on the scope of work, internal resources and desired cost savings. Considerations related to schedule, quality, labor productivity and control must be also examined. Finally, costs associated with freight, custom duty and currency-exchange rates have to be taken into account. The best arrangement will be dependent on the specific circumstances associated with a given project or initiative. ■

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References

1. S. Shahani, G. Shahani, M. Crisler, L. Kogan, Project management: Construction of modern-day hydrogen capacity in the Middle East, *Hydrocarbon Processing*, February 2014.
2. C. Rampell, Outsource Your Way to Success, *New York Times*, November 5, 2013.

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