

Managing capital projects for competitive advantage

Investment in capital projects is rising. First-rate contracting will help companies to get a significant leg up on their rivals.

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Article at a glance

Suppliers of energy and energy-intensive commodities are greatly increasing their investments in power stations, chemical plants, oil rigs, steel mills, and other capital projects.

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Many asset owners, however, are struggling. Some fail to align the work of their project teams with their long-term capital strategies. Others choose inappropriate contracting models or underestimate the organizational resources they require.

Yet a few asset owners are benefiting from better project designs, lower costs, and fewer delays. By standardizing engineering activities, modifying boilerplate contracting models, and ensuring that project teams collaborate across functional boundaries, these leaders are creating a significant source of competitive advantage. An examination of their methods offers lessons for asset-intensive industries of all stripes.



Spurred by rising global demand, the world's suppliers of energy and energy-intensive commodities are greatly increasing their investments in power stations, chemical plants, oil rigs, steel mills, and other capital projects. Many of these undertakings are larger and more technologically complex than ever. The result is heated competition for the basic materials, equipment, and talent that all asset-intensive industries need to deliver multibillion-dollar capital projects successfully.

Skillful management and oversight of the contractors who supply the goods and services that a project requires has always been crucial to maximizing its economic value. In power generation or petroleum, for example, up to three-quarters of a typical budget goes to the contractors that supply engineering, procurement, construction, and project-management services. By raising the cost of delay and missed opportunities, today's supercharged environment has elevated the importance of first-rate contracting.

Many asset owners, however, are struggling. Some companies approach every capital project as an isolated, individually tailored undertaking and fail to align the contracting efforts of individual project teams with their long-term capital strategy. Others hastily lock themselves into agreements; choose inappropriate contracting models; or misjudge the risks, organizational resources, or skills that capital projects involve. Such mistakes generate missed opportunities, significant delays, and cost overruns in the hundreds of millions of dollars.

Yet a few asset owners, having mastered the art of contracting, are benefiting from better project designs, lower costs, and fewer delays—a significant source of competitive advantage. To gain efficiencies across a number of projects, these companies standardize their engineering activities and modify boilerplate contracting models to adapt the economics of each project to their particular mix of skills and experience. They also look for ways to promote strong competition among the contractors hoping to work with them and conduct more detailed risk assessments than their less successful counterparts do. Finally, they invest in talent and encourage collaboration across functional boundaries to help maximize the net present value (NPV) of their capital projects.

An examination of the approaches these companies take offers lessons not only for providers of energy and energy-intensive commodities but also for other asset-intensive industries, including high tech, telecommunications, and automotive. These lessons are also relevant to public- and private-sector organizations that undertake large infrastructure projects, as well as to investors seeking to profit from them.

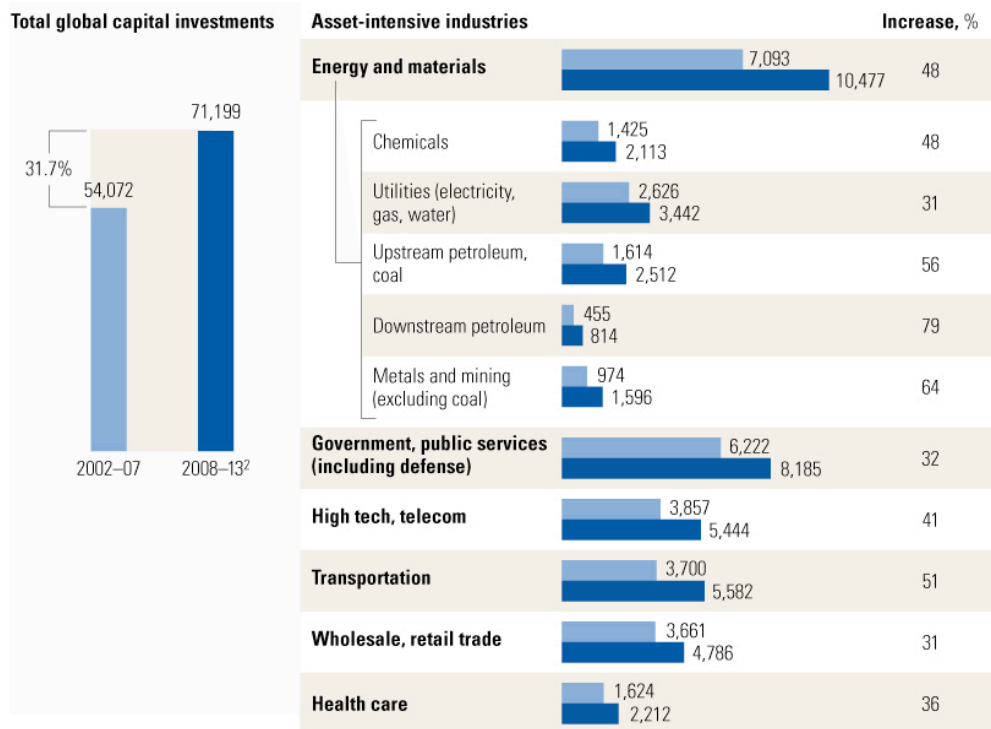
A changing environment

While economic growth in the developing world and rising demand for energy and energy-intensive commodities have created huge opportunities for asset-intensive industries, these forces have also greatly increased demand for essential materials, services, and equipment. As a result, contracting assistance is harder to obtain than it has been before. In some cases, this problem can change the economics of a project. In northwestern Canada, for example, the wages of people who work for contractors have skyrocketed as companies compete for labor to develop projects in the region's oil sands; likewise, in the mining industry, delays in obtaining trucks, tires, and other equipment have forced lengthy (and, given record commodity prices, costly) delays in mine openings around the world. Such pressures will continue. Global capital spending is expected to exceed \$71 trillion during the years 2008 to 2013—about a one-third increase from the levels of 2002 to 2007. Many asset-intensive industries will see increases of 50 to 80 percent (Exhibit 1).

EXHIBIT 1

A boom in capital spending

Real gross fixed capital formation, \$ billion¹



¹In 2005 dollars.

²Forecast.

Source: Global Insight

Heightened competition can increase the damage caused by poor decisions and, in some cases, makes them more likely.¹ Pressured to secure scarce engineering assistance for an environmental retrofit project, for example, one energy company committed itself too quickly to a contracting model that appeared to offer the lowest costs.² Once the deal was struck, however, the owner lost its leverage with the contractor, and costs that hadn't been clarified began to rise. Worse, the owner found that because the contract didn't include strong penalties for schedule overruns, the contractor more than once pulled its best personnel to work on projects for the owner's competition. These factors created hundreds of millions of dollars in additional costs, as well as delays of almost a year.

Further raising the stakes for asset owners, the number, size, scope, and complexity of projects have all increased. Planned capacity additions in petrochemicals such as styrene, for instance, are nearly twice the levels in previous economic cycles. Power stations now on the drawing boards in some countries will generate three times as much electricity as traditional plants do. In the petroleum industry, a typical offshore project involving subsea risers³ might have cost €30 million to €50 million in the 1990s, but today a comparable project, in deeper and more remote waters, might cost €600 million to €900 million.

What's more, the scale and scope of the risks that asset owners assume today have increased their financial exposure at a time when fewer options are available to mitigate risk. In the 1980s and 1990s, relatively low investment volumes gave asset owners leverage over engineering, procurement, and construction contractors, so the owners could negotiate tough fixed-price contracts.⁴ Today, such practices are difficult to use. In fact, most contractors couldn't bear the magnitude of the risks associated with some of this era's megaprojects without insisting on hefty premiums to account for worst-case scenarios.

As the risks multiply, many asset owners are stretched across a number of projects. In other cases, project-management skills have atrophied. Consider what has happened to European and North American power generators, particularly nuclear ones. Some power companies haven't made major investments in nearly two decades, in part because of long planning and construction cycles. At one power company, a dearth of institutional project-management experience meant that employees with relevant operational backgrounds weren't brought into the process early enough during the design of a new plant. Consequently, the project team chose specifications for an important component mainly to reduce its cost and ensure speedy installation, without recognizing that these benefits would be negated over the long term by its lower operating efficiency.

Meanwhile, cultural factors—notably many asset owners' strong focus on engineering—shape an environment that doesn't value commercial skills highly,

often with crippling results. At one industrial company, for instance, engineers defined the parameters for a new plant so narrowly that a critical piece of equipment could be obtained from only 2 suppliers rather than the 50 that might have been possible with a more sensible approach. That drastically limited the competitiveness of the bidding.

Such stories are commonplace, but a handful of companies are avoiding these difficulties. An examination of their approaches to contracting offers lessons for all asset owners.

Take a strategic view

Some asset owners look at individual projects in isolation, seeking to optimize engineering, costs, and timing without fully considering the implications for interrelated current projects or for future ones. By contrast, high-performing companies base their approach to contracting on a deep knowledge of their capital strategy and understand how today's projects will affect those they undertake later.

Leading oil companies, for example, use a standardized approach to the engineering and construction of their floating offshore oil production vessels. The ships—built on efficient, repeatable platforms—are not as operationally efficient as they would be if tailored to individual oilfields. Nevertheless, standardization allows these asset owners to develop a number of fields faster than they otherwise could, which is ultimately more profitable given high oil prices. (For a platform producing 150 million barrels a day, the time to first oil of a standardized approach can be up to seven months less than that of a tailored one.) Standardization also cuts costs, and not just for oil companies. A shipbuilder we observed, for instance, reduced the number of hours required to build a series of four similar vessels by nearly one-third from the first ship to the last. The key was constructing each in the same yard to maximize the learning benefits.

Likewise, working repeatedly with the same contractor helped a European power company optimize the efficiency of the methods it used to construct boiler assemblies and other major components. The company slashed its labor costs by one-third from the first boiler to the second by preassembling boiler components on the ground instead of on cranes, using cheaper fixed cranes instead of expensive mobile ones, and building mobile platforms, which allowed workers to assemble components more quickly. As a result, the project finished months ahead of schedule.

Companies like this one, with multiple projects under way, can also adopt a long-term view that may strengthen their relationship with key suppliers. Such relationships help the asset owner to cut costs, secure access to capacity, and foster

innovation. Consider the experience of a petroleum company whose project team did a deal with an engineering, procurement, and construction contractor to build a series of oil tankers. The company's fixed-price, lump-sum arrangement with the contractor included steel and other raw materials. Nonetheless, the company recognized that its plan to build a number of tankers gave it powerful leverage over steelmakers—clout that the contractor lacked.

Therefore, instead of letting the contractor deal with them, the owner contracted directly to source the steel needed for the tankers, using its plans to build a number of ships to negotiate a better price. This move lowered the petroleum company's costs—steel represents about 40 to 50 percent of the total expense of a tanker—and also benefited the engineering, procurement, and construction contractor by eliminating its financial exposure to rising steel prices. Increasing this kind of project's attractiveness for partners is an important consideration in today's tight supply environment. A North American power company we studied adopted a similar approach and reduced the cost of the steel for a new plant by one-third.

Some companies use the relationships they develop with suppliers to spark innovation. An oil company, for example, develops close, long-standing partnerships with specialized contractors to improve its deepwater technology. Another petroleum company sequences tasks among its portfolio of projects so that it has fewer—but closer—suppliers. It uses frame agreements (bundles of long-term contracts) to lower the life-cycle costs of drilling and other project elements by 30 percent and to shave three months off its traditional procurement process.

At the project level

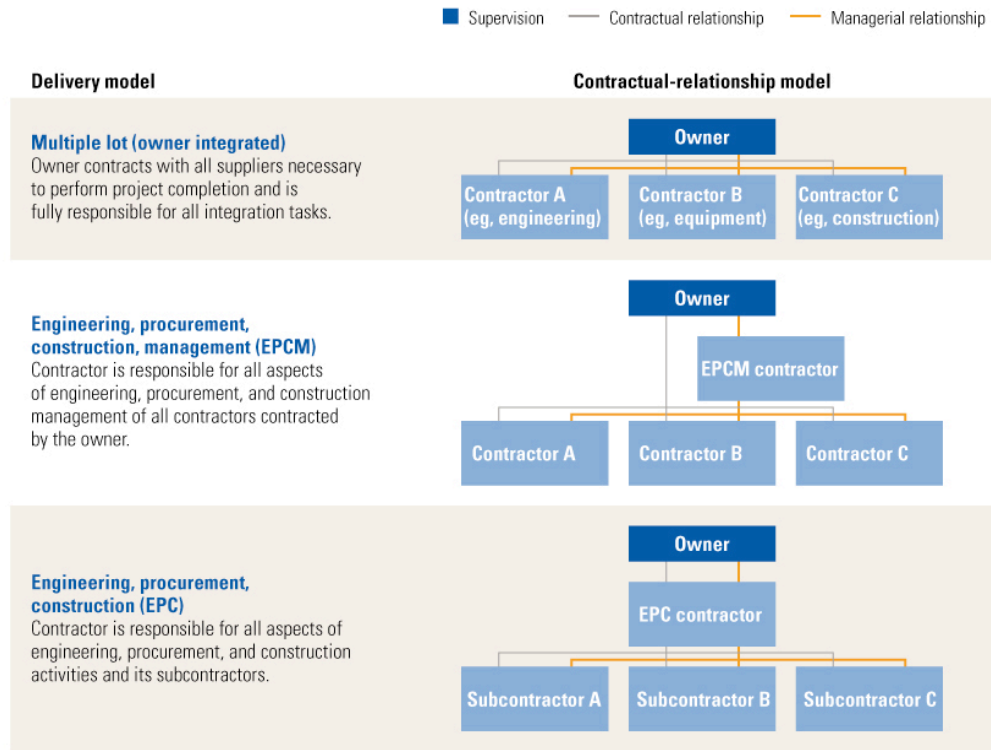
Top companies maximize the value of their individual projects in three ways: creating optimal delivery models for their deals, orchestrating contract-awarding processes to ensure strong competition among their suppliers, and structuring contracts to align the suppliers' incentives with their own.

The right model

Even the best technical concepts or scenario analyses in the business case for a project become virtually worthless when asset owners choose inappropriate contracting models. Three archetypes predominate (Exhibit 2), but a top owner will tailor them by optimizing the availability of suppliers, thinking through the implications for costs and schedules, and clearly establishing its role. Such an owner determines which participant in the project can best execute each of its individual components and carefully considers the level of financial risk borne by suppliers.

EXHIBIT 2

Three delivery options



As a case in point, let’s look at how a multinational steelmaker is now building a plant in a location where it hadn’t previously operated. Although it had significant experience managing greenfield projects at home, its project team was uncomfortable doing so in the new geography and therefore envisioned a fixed-price, lump-sum deal with a single contractor, which would keep any savings. As the steelmaker explored this option, however, it recognized that a fixed-price arrangement wouldn’t help the company to capitalize on its strengths in equipment engineering and other areas. Worse, it realized that the contract’s size would require it to pay a double-digit risk premium to the contractor. Overall prices would be higher because only a few engineering, procurement, and construction contractors could tackle a job of this size, complexity, and risk. Indeed, the steelmaker ultimately determined that a lump-sum deal would elevate the project’s capital costs to a level that the company’s board would likely not support.

Instead, the company tailored the model to balance its budget with its capabilities. First, it examined the scope and determined the “natural owner” of every task that would be relevant during each stage of the project’s life cycle (from engineering to ramp-up). This analysis also helped the steelmaker to spot opportunities to bundle

jobs, which were then more attractive to suppliers. For infrastructure, an area in which the steelmaker lacked experience, it is working with a renowned local engineering bureau. Since the steelmaker has a lot of experience with equipment and related procurement, it manages those tasks itself. It also handles the project's overall management, with support from a local construction-management firm, when a greater knowledge of local suppliers helps to guarantee high quality. Not until the project is completed will the full benefits of this approach be clear, but managers indicate that it has helped to secure critical skills and bettered its relationship with equipment suppliers—as well as delivering an acceptable level of capital costs.

A robust award process

Once the base case for the contracting model is defined, it's time to seek bids. Most owners simply negotiate the price. But top asset owners follow a structured award process, which allows them to maintain both a broad view of their potential interactions with suppliers, as well as transparency throughout the award process to ensure competition and quality of the bids.

As part of the process, high performers develop a thorough understanding of what the award will entail from the contractor's point of view. These owners take pains to spot—and resolve—any areas where design, cost, or other uncertainties might cause trouble later on (for instance, by determining the role that individual suppliers will play in circumstances where joint awards are proposed). Moreover, high performers work with suppliers early in the process to spark competition among them and to uncover new ideas and opportunities for standardization. Since overspecification during the design phase often drives up costs by artificially limiting the number of contractors that can tackle a project, top owners broaden the specs to improve their negotiating position and attract suppliers. They do so in other ways as well. If a potential supplier lacks experience in a region, for example, one industrial company we know helps it master local regulations and content requirements or redefines the engineering specifications to broaden the pool of possible contractors.

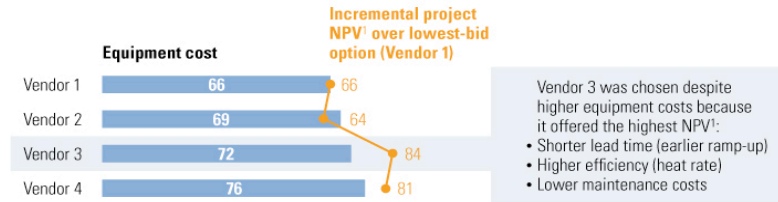
All of this, however, takes time. By contrast, average performers often compress their award processes in an effort to recapture time lost in other phases of a project and therefore lose bargaining power by prematurely locking themselves into suboptimal deals. This was true of an energy company that rushed its award processes for the construction of a new power plant (by basing awards on a preliminary plant design so as to speed its project schedule). Instead of saving time, however, the lack of clarity meant the company had to renegotiate its contract and ultimately accept a 45 percent cost premium and a more than nine-month delay in ground breaking. By contrast, a high-performing power company seeking turbines for its new plant spent a fair amount of time during the award phase defining the project's performance specifications, examining commercial factors such as lead times, maintenance costs,

and equipment efficiencies, so it succeeded in identifying a partner that would maximize the project’s value. Tellingly, this partner didn’t quote the lowest price—but both of the owner’s supposedly cheaper options would have lowered the project’s NPV (Exhibit 3).

EXHIBIT 3

The tale of the turbines

Turbine selection for coal power plant, \$ million



¹Net present value (NPV) calculations took into account total cost of ownership for equipment, as well as impact on plant capacity and heat rate.

Seal the deal

When designing contract terms, top asset owners focus on critical risk factors that influence costs, scheduling, and performance, as well as the risks associated with a partner’s subsuppliers. They establish terms that are simple and transparent and that will foster a performance mind-set among suppliers by creating appropriate incentives that allocate risk to its natural owner. Likewise, these owners develop models to systematically assess and eliminate risk—thereby ensuring that contracts don’t overlook important risks or inadvertently burden suppliers with costs they cannot realistically bear.


Careful analysis helped one asset owner to determine that its engineering, procurement, and construction contractor was building an excessively high labor risk premium into a contract. Using this information, the owner tailored the contract’s incentives to reward the contractor for keeping costs below a threshold that was reasonable for both parties and also optimized the owner’s costs. By contrast, one steelmaker’s failure to account for relevant risks translated into significant delays and disputes with a supplier when critical goods necessary to complete a project were stuck in customs because the contract didn’t specify which company was responsible for managing customs processing and pay import taxes.

People power

Leading owners also distinguish themselves by the organizational approach they apply to contracting and the importance they place on talent. First of all, they recognize that good decisions require a collaborative environment where project teams have access to the best information and expertise. That may seem obvious, yet in practice many teams fail to involve experts from purchasing and other functions throughout a project's life cycle, or staff teams with relatively inexperienced purchasers and functional representatives. Oftentimes, they leave important contracting decisions to engineers, who, while technically skilled, tend to lack a commercial view.

Top owners, by contrast, ensure the participation of employees in finance, procurement, marketing, and even plant operations from the earliest contracting phases onward. Plant managers and other operations specialists help project teams judge the real-life ramifications of the myriad design and engineering trade-offs under discussion, so owners don't make decisions that appear to lower capital costs or accelerate schedules but inadvertently reduce NPVs. Procurement specialists bring valuable external market perspectives that improve a project's economics; one asset owner's purchasing group uses workshops with suppliers to generate ideas for its project teams. Another company uses simple visual displays—called “procurement dashboards”—to summarize its contracting activities and to chart the status of individual contracts. The dashboards help the asset owner to prioritize its efforts (and thus forestall potential delays) and to coordinate its overall risk-management activities.

One asset owner's senior executives decided to raise the profile of its project teams (and to attract up-and-coming employees to them) by explicitly comparing them to its business units during strategic-planning discussions. Thinking of project teams in this fashion—they are, after all, comparable to a \$2 billion P&L—forced the leaders of the business units to think more carefully about staffing them and ultimately helped the company improve its skill base.

A rising global appetite for energy and energy-intensive commodities heralds a massive wave of investment in large capital projects. While this boom represents a huge opportunity for asset owners, it also presents big challenges. In this environment, companies that can maximize the value they gain from contracting for the goods, equipment, and services such projects require will have a significant source of competitive advantage. 

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Notes

¹ A recent survey by Oxford University's Saïd Business School of more than 100 project and program managers based in the United Kingdom found that 48 percent of major programs (defined as related projects that together last more than five years and have budgets approaching \$1 billion) were bid for incorrectly and that no formal audit had been scheduled in more than 50 percent of them.

² The model in this case was a cost-plus arrangement, under which the project owner reimburses the contractor for all the costs it incurs and adds a profit fee.

³ Risers, the oil platform's physical link to the seabed, are a critical component of offshore oil production.

⁴ Such practices had a severe effect on contractors and the supply industry. From 2000 to 2006, for example, the net income of the top ten petroleum engineering and design firms decreased by half, while the net income of the ten largest petroleum companies nearly tripled.

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