

Managing Capital Projects Successfully

An Executive Concern



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Executive summary

Whilst the need for successful management of capital projects is not a new theme, the many recent instances of substantially over-budget and behind-schedule energy projects have demonstrated that even the most sophisticated energy companies are not able to “get it right” every time. This is raising many questions for the senior management team as to what should they do to ensure that capital projects are managed successfully? To address these concerns we at Arthur D. Little regularly advise our clients to adopt a systematic and continuous approach to ensure that these companies are suitably prepared to manage and deliver their capital projects successfully.

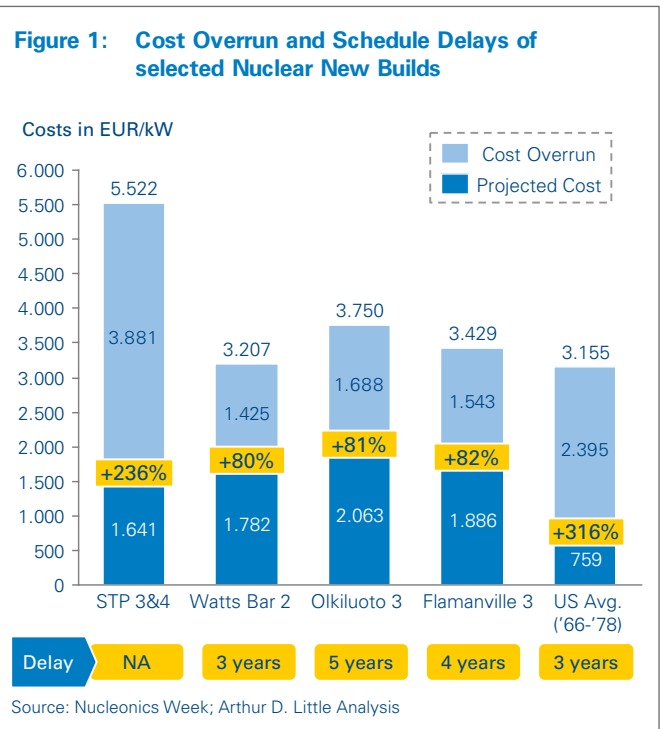
In this article we have highlighted issues that we have generally observed in our client’s projects, which are mainly around inadequate project governance and assurance and inadequate processes and accountabilities. We have also explained in this article the best practice approach that we take to help our clients not only in identifying the above mentioned deficiencies but also in suitably addressing them and in being successful in managing their capital projects.

Capital Project Performance – The Challenge

“Continuous improvement is key to the delivery of capital projects on time and within budget”

Major investments are currently being planned and are underway across all areas of the energy sector; in upstream oil and gas, refining and petrochemicals, in wind and in conventional power generation. These investments are driven by growing demand for oil and gas, by emission targets and stringent refined product specifications and by future power capacity needs with an ageing generation fleet. Future local growth in nuclear power generation is also possible. However, many energy companies may not have thoroughly assessed their processes for ensuring effective management and delivery of program and project governance.. Although some growth programs appear successful, our recent experience in Arthur D. Little indicates that there are often significant failings in the area of project governance and technical assurance, suggesting that some of the favorable outcomes are often achieved more by luck than design. The International Energy Agency (IEA) forecasts that the energy industry will invest nearly USD 37 trillion globally in energy projects by 2035¹. Whilst there are varying views about the extent of project budget overspend due to project mismanagement, a conservative estimate widely accepted in the industry is about 10% to 15%, i.e., USD 3.7 trillion to USD 5.6 trillion.

Consider the risks of current capital projects to your business. What, for example, would be the impact of a delay in project commissioning, in terms of higher project costs and lost revenues from unrealized production? Nearly USD 1.4 billion was wiped off the market value of Woodside Petroleum when it announced a six-month delay and a cost overrun of USD 800 million at its flagship Pluto gas-export project, with a corresponding delay in the export of LNG cargoes to Japan. Similarly our experience from nuclear new build projects shows significant increases in realized costs, as illustrated in figure 1.



¹ World Energy Outlook 2012© OECD/International Energy Agency 2012

The main question facing most senior management teams is what should they do to ensure that capital projects are managed successfully? To answer this question one has to address the following issues.

Strategic

- What is the impact of poor project performance on the market perception and ultimately shareholder value?
- Which objective is key – time or cost?
- What is the impact of project delays on project economics and its viability?
- How effective are the contracting strategies in order to strike the right balance between cost and risk?
- What is the acceptable level of risk?

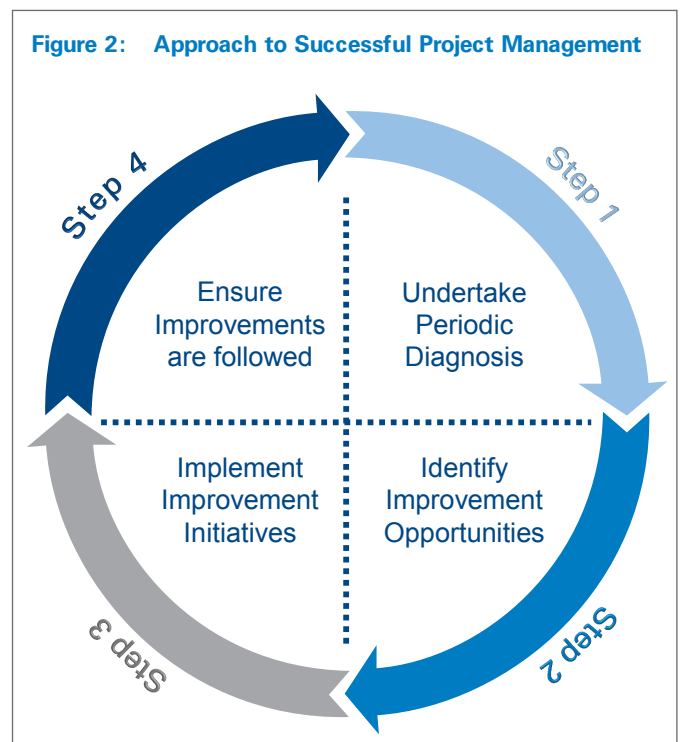
Process

- Do portfolio projects consistently follow good practice project management processes and procedures?
- How effective is the project performance measurement and reporting?
- How proactive is risk management?
- How effective is the handover to production (integration)?

Organization

- Is the project organization set up to effectively manage successful implementation of these projects?
- Does the organization have the right capability to manage the complexity of these projects?

To address the above concerns, Arthur D. Little advises its clients to adopt a systematic and continuous approach of best practice **diagnosis** and **improvement**. This approach is to ensure that they are suitably prepared to manage and deliver such projects successfully. We outline below some of the key methodologies and systems with which we support such project organizations (see figure 2).



Undertake Periodic Diagnosis

Companies often fail to realize that something may not be quite right in their approach to projects, especially when there are no visible signs of poor performance. This is not because such poor performance does not exist, but because they are unable to recognize it. We find that a capital investment growth program will often benefit significantly if it is preceded by a critical self-assessment of the company's project management processes and systems against best practice (or even merely 'good' practice), with respect to the adequacy and effectiveness of their:

- Program **governance** and **assurance** mechanisms, and the **capabilities** of those undertaking the governance
- Project management **processes** and their understanding of **accountabilities**.

In helping clients undertake such diagnosis, we observe that the following themes appear frequently:

Inadequate Project Governance and Assurance

Issues: Many companies lack consistent and uniform project governance philosophies for capital projects. We find that written policies, procedures and mechanisms, dictating how the projects will be governed and independently assured, are often not available. In many cases, Project Boards for review decisions made by project teams do not exist. Even where they do, their objectives are not clear. Nor are the roles, responsibilities and required capabilities of members. We often find that Project Boards simply perform a rubber-stamping role. Furthermore, proper value-assurance approaches are seldom implemented. Due to the lack of suitably qualified resources, it is also common for the same individuals to end up performing multiple roles both within project teams and outside. Conducting assurance functions in this manner represents a potential conflict of interest (see figure 3).

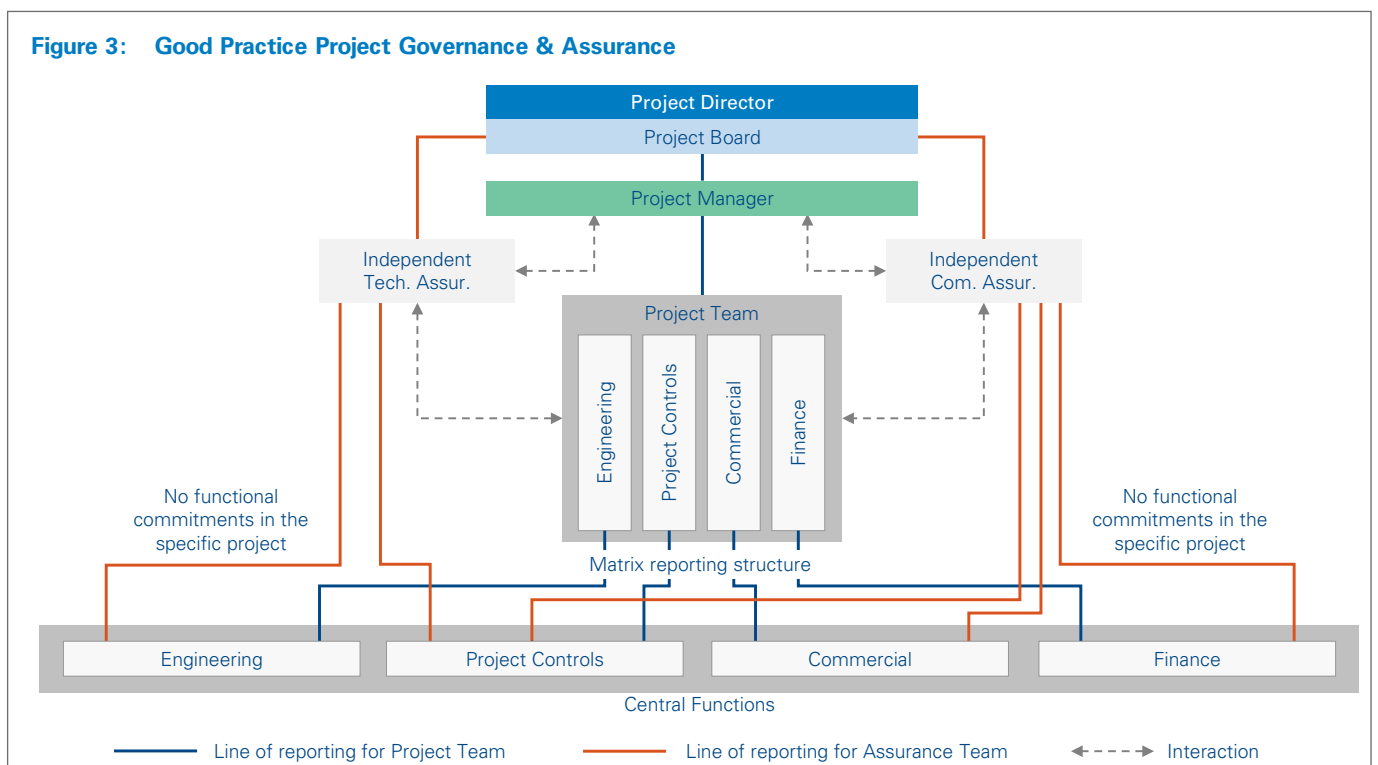
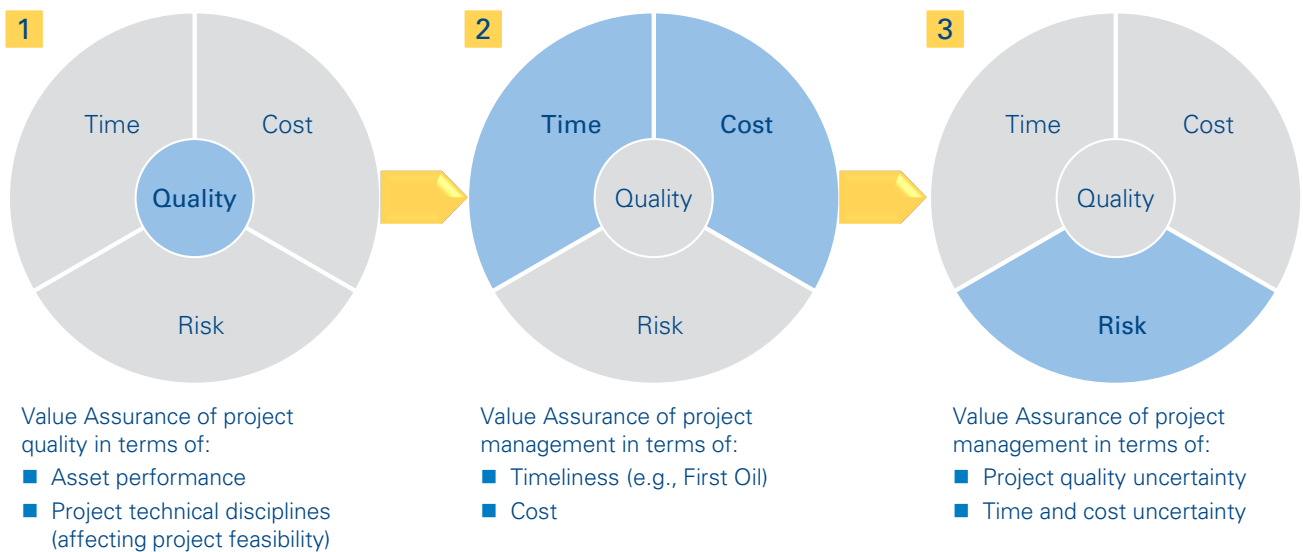


Figure 4: Good Practice Value Assurance



Value Assurances should be a holistic approach starting from the goal of the project (technical objectives) and ending with the uncertainties of the project (risks)

Reasons: Companies with little recent experience in managing large capital projects (such as utilities), mainly ensure that they have an experienced project delivery team when embarking on investment programs and pay insufficient attention to governance. We find that they often lack the expertise required to provide the necessary governance roles (steering, supervising, supporting and challenging), or the independent assurance functions, to an adequate level of effectiveness. An experienced and competent project governance team (as we often see in mature E&P companies) provides great benefit, even to the most experienced project delivery team. It will generally not form the hindrance perceived by some industry practitioners. The reasons commonly attributed to the lack of adequate governance are, “we are avoiding unnecessary layers of bureaucracy and avoiding unnecessary costs.” From our experience in diagnosing and establishing such systems, we do not believe this to be a valid rationale.

Consequences: Inadequate governance and assurance of decisions made by the project delivery team can expose the company to significant risks and compromise its ability to complete the project on time, within budget and on quality.

Inadequate Processes and Accountabilities

Issues typically observed are:

- Lack of consistency in processes and procedures between projects in terms of project stages, corresponding activities, deliverables, approvals required and the roles and responsibilities of various stakeholders
- Lack of common practices for key processes e.g., contracting and procurement, equipment standardization and inventory optimization to support reduction in working capital during asset operation, contingency management, and so on.
- Lack of common, integrated systems for project planning, cost monitoring, reporting and accounting, or of a centrally coordinated knowledge management system
- Lack of proper operational readiness and handover practices (from project to production) that guarantee rapid acceptance from internal clients.

Reasons: These issues can be attributed to insufficient experience in delivering capital projects, from concept to commissioning, and therefore a weak grasp of the 'essentials' required to successfully manage and deliver them. Such 'essentials' might include:

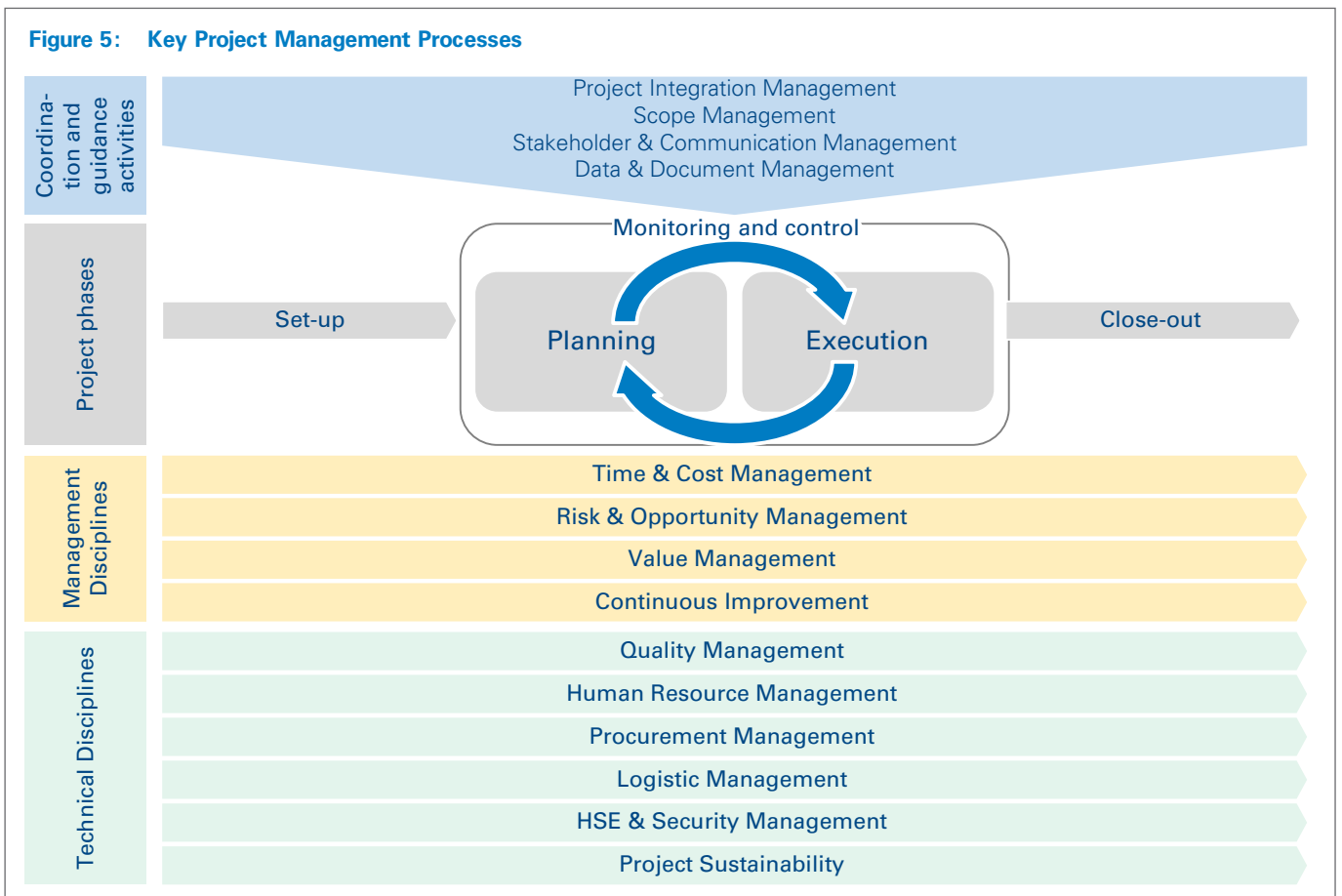
- Strategies relating to (1) resourcing - in-house vs. contracting vs. 3rd party organizations for various project elements, (2) contracting style - turnkey vs. call-off arrangement vs. contractor design with management of build by 3rd party, (3) procurement strategy - equipment standardization, etc.,
- Policies, processes, procedures and systems
- Project management organization and an experienced delivery team.

When companies set out to organize themselves to manage capital projects, they are normally put off by the effort and the investment required in creating the above 'essentials', on the grounds that this would prevent them from being "agile, flexible and cost effective." Unless driven by an experienced capital project manager who understands the likely consequences and risk exposures associated with not having these 'essentials' in place, we find that these systems are often absent. Frequently, in our experience, initiatives to create these 'essentials' are not implemented in full and, even if they are, they are not fit-for-purpose and therefore do not deliver the intended results. This falsely confirms the views of the uninformed observer. In many cases a lack of any visible signs of failure may lead people to think that a 'light touch' approach is best for the company, rather than the tried and tested approach proposed by experienced practitioners.

The issues highlighted before can lead to severe **consequences**, including:

- Key project activities and deliverables may be missed , causing delays or incorrect decisions at stage-gates
- Project front-end loading, to maximize project value and set up project for success, is not implemented well
- Work may be inconsistent and potentially inaccurate
- Risk management becomes an administrative burden, emphasizing reporting rather than remediation or mitigation
- Multiple cost escalations during project delivery
- Contingency funds remain idle in some projects and are not available for other resource constrained projects
- Temporary false feelings of good performance as a result of inadequate project assurance

Figure 5: Key Project Management Processes

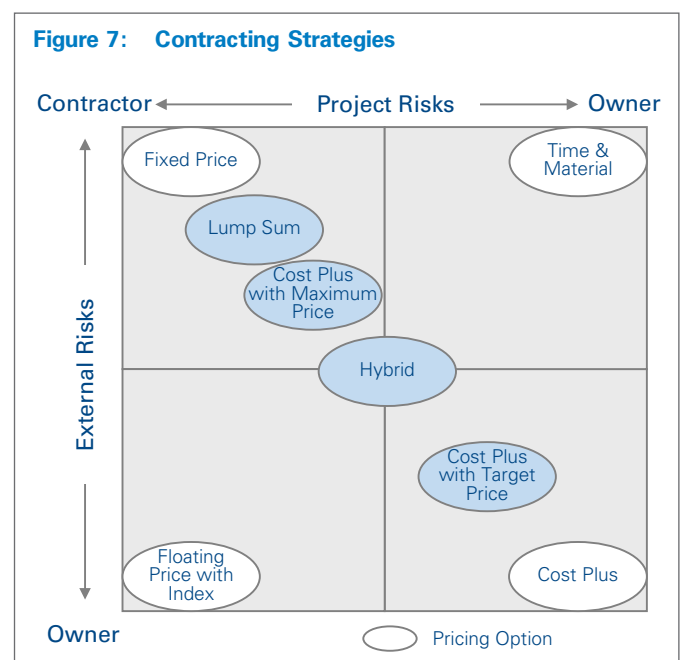
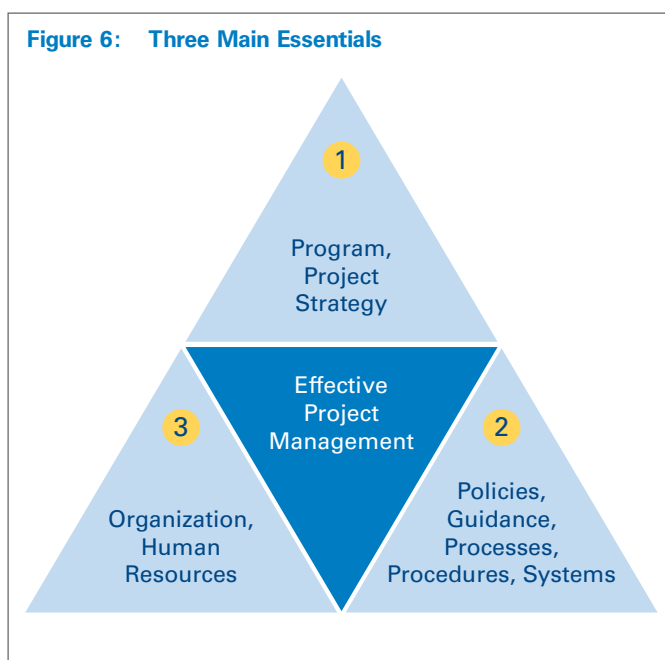


- Poor optimization of equipment and spares inventory during the project design stage
- High levels of rework and troubleshooting during commissioning and production phases
- High project costs due to incorrect competition process for procurement of materials and services
- Lack of visibility – performance measurement and reporting does not give senior management an accurate picture
- Resource management is not effective, resulting in either under-delivery and/or huge project cost
- Lessons learned in one project are not easily available to another, resulting in the repetition of mistakes
- People are unclear of their scope of work, potentially creating inefficiencies through duplication of effort
- Project becomes heavily dependent on a few individuals, severely impacting project delivery if they leave.

Identify improvement opportunities

Having performed a diagnosis we will usually be able to identify improvement opportunities for our clients, aiming to ensure that their capital projects are optimally managed and delivered successfully. We find that improvement opportunities can be grouped around three main 'essentials' as illustrated in figure 6 below, with our methodology areas as follows:

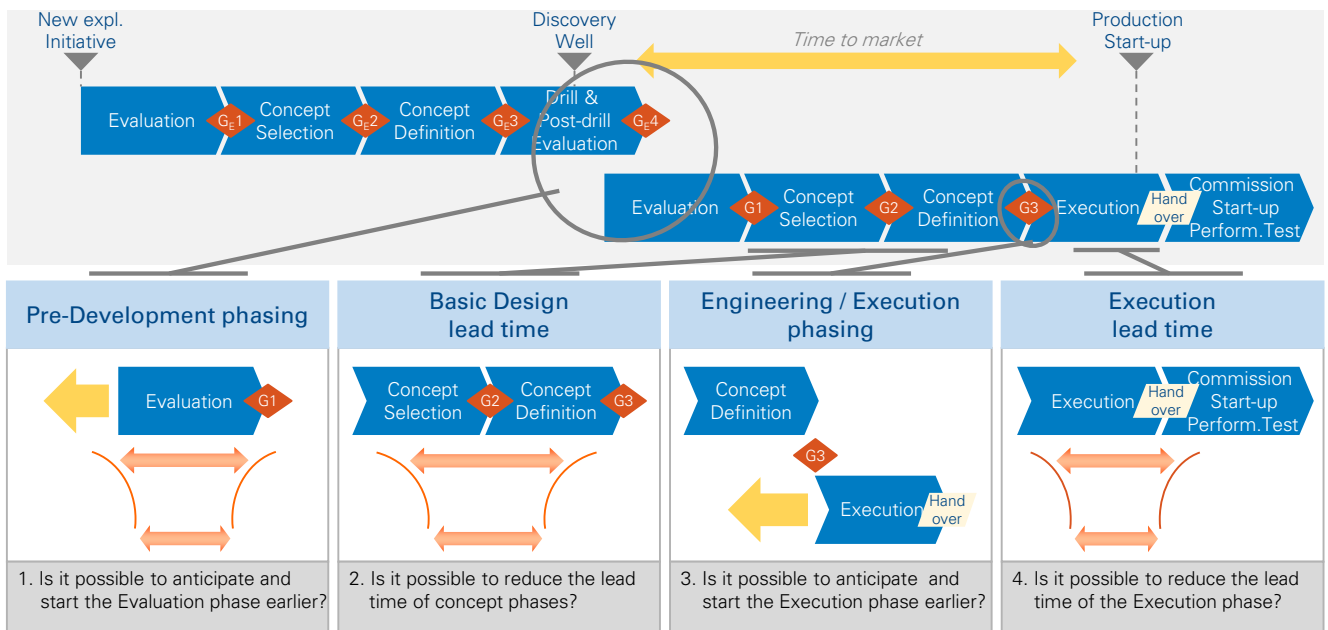
Contracting style: This is an important area for companies to focus on early in their investment cycle as it will determine the cost a company is willing to incur, commensurate with the level of risk they are able to accept. Contracting styles should be decided according to a range of key issues such as flexibility in the contract to make changes, quality of scope definition, ability of the company to take risks, and a company's ability to control performance.



Program / project strategy

Centralized or de-centralized approach: Companies planning a significant capital investment portfolio across their BUs should focus on this area at the beginning of their investment cycle. There is no right or wrong approach but Arthur D. Little advises companies in ensuring that the approach taken is fit-for-purpose. This decision will then determine the shape of the underpinning processes and the organization for project development, management and delivery.

Figure 8: Challenges

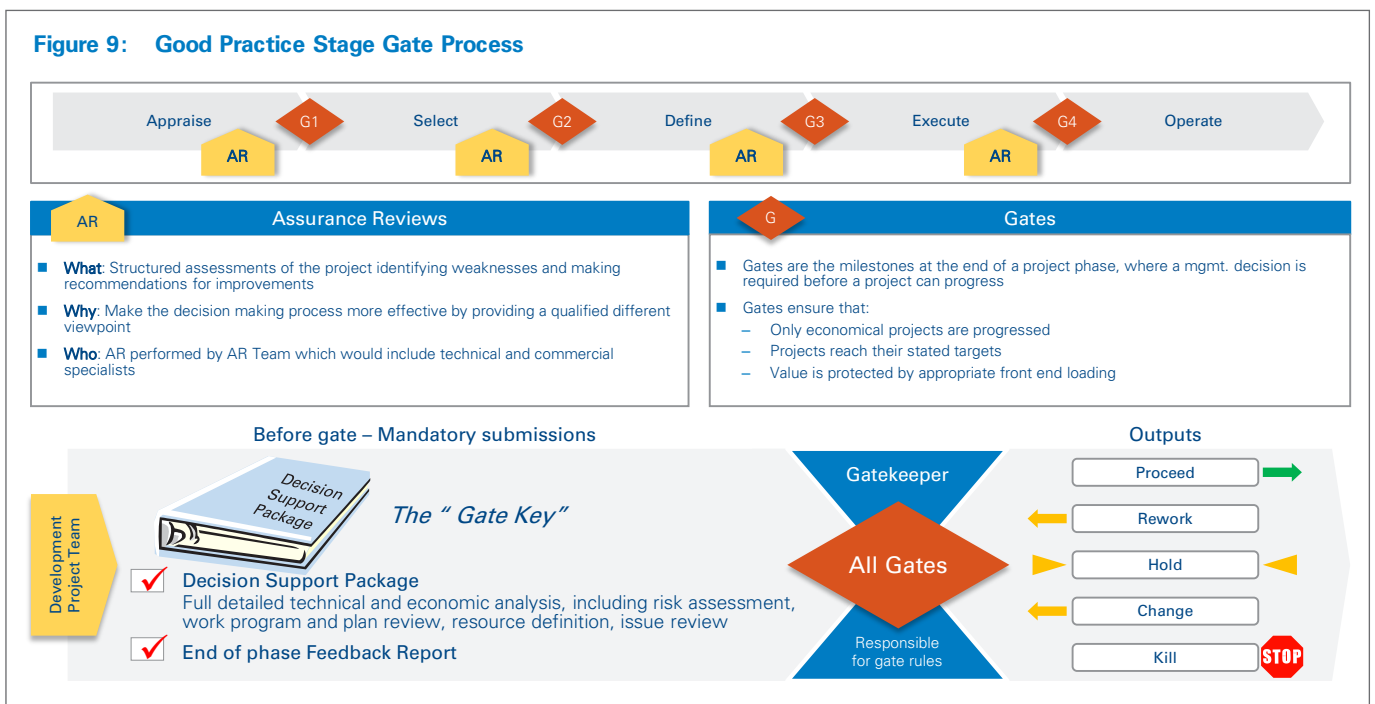


Equipment standardization: This is only possible when the company has a robust, refined database of its entire current asset inventory. It helps in the design, specification and procurement of equipment for new projects (see figure 8).

Policies, governance, processes, procedures and systems

In suggesting improvement opportunities in this area, companies should focus on issues such as governance, which clearly add value and have a direct impact on the bottom line. Typically Arthur D. Little’s support would provide clarification and detailing of the methodologies and models that companies might adopt for their program. Support would also include project governance to ensure that their boards are able to provide appropriate direction, supervision, support, challenge and independent technical and commercial assurance for their projects prior to stage-gate decision making.

Figure 9: Good Practice Stage Gate Process



At this stage it is also important to identify any improvement opportunities in stage-gate processes, in order to mirror good practices in the industry, see figure 9. This includes stage-specific activities, deliverables, roles and responsibilities and decision making. These improvement opportunities, drawn from our benchmarks and case expertise, might range from filling gaps in existing processes to creating new processes. One area that often concerns senior management is contingency management, as their expectations are often poles apart from those of project managers. Typically senior managers will expect to see the contingency fund returned to the business if the associated risks and uncertainties fail to materialize, whereas project managers will generally expect contingency funds to be spent on their project activities.

Systems proposed for project-related planning, monitoring, reporting, accounting, knowledge management and document control must always also be kept aligned and integrated with the rest of the organization to effectively manage the portfolio of projects.

Insights for the executive

Whilst the need for successful management of capital projects is not a new theme, the many recent instances of substantially over-budget and behind-schedule energy projects demonstrate that even the most sophisticated energy companies are not able to “get it right” every time. Based on our experience in supporting our Energy clients through the improvement and introduction of best in class Project Management practices, systems and methodologies, we believe that:

- Sound Value Assurance practices are critical for project success, both in identifying improvement opportunities and in the proper delivery of these improvement opportunities and capturing the lessons learned
- Established project delivery processes are essential for the integration of teams and the streamlining of delivery while ensuring proper accountabilities
- Robust contracting practices and effective design standardization are crucial to improving time-to-market and reducing risks
- A major capital project where risks are not proactively managed has the potential to bring a company to its knees. Therefore risk management should always be in the mind-set of the project team and included in their day-to-day work (please refer to recent ADL viewpoint “Project Risk Management – An Executive Concern”).

Arthur D. Little take a pragmatic approach to the assessment of ‘as-is’ project management practices and the identification of improvement options, based on our experience of best practice. This has been shown to provide significantly increased confidence in project delivery, assuring Senior Management that the capital projects on their watch can be managed and delivered successfully.

At Arthur D. Little we have a proven and well-established project management toolbox to support our clients with the design and execution of project management systems. This includes project framing, team management, project administration, project planning and control, project reporting, data & document management, HSEQ management, procurement management and materials management. All are tailored to the unique needs of each client.



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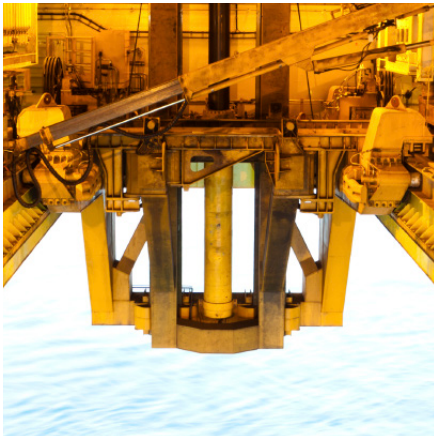
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Recent instances of substantially over-budget and behind-schedule energy projects demonstrate that experienced energy companies are not able to manage capital projects successful every time. In this report Arthur D. Little shows best practice approaches to identify and resolve deficiencies, as well as approaches how to successfully manage capital projects.

Arthur D. Little

As the world's first consultancy, Arthur D. Little has been at the forefront of innovation for more than 125 years. We are acknowledged as a thought leader in linking strategy, technology and innovation. Our consultants consistently develop enduring next generation solutions to master our clients' business complexity and to deliver sustainable results suited to the economic reality of each of our clients.

Arthur D. Little has offices in the most important business cities around the world. We are proud to serve many of the Fortune 500 companies globally, in addition to other leading firms and public sector organizations.

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