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MEGAPROJECTS IN THE ENERGY & CHEMICALS INDUSTRIES:
A Comprehensive Guide for Boards and Executives

Part 2 of 4

PILKO & ASSOCIATES GREY PAPER

Concise summaries of key Operational/EHS and Transaction Risk challenges and how to unlock value for your organization

Pilko & Associates is the Leading Advisor to Corporate Officers and Boards on Operational and EHS Risks – working with clients in 78 countries and advising on M&A deals worth more than $600 billion.

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MOST MEGAPROJECTS FAIL
Get the Business Case Right!

EXECUTIVE SUMMARY

In this series of Pilko Grey Papers that focus on avoiding Megaproject Failure, we explore the single most important element of any project: establishing a solid business case. By clearly establishing the project business case, which includes sound fundamentals and economic justification, companies increase the likelihood of project success and minimize risk.

WHAT IS A SOLID BUSINESS CASE?

A business case is the justification for undertaking a project or program of projects. The technical components of a well-developed business case evaluate the benefits, cost, and risk of alternative options, and provide a rationale for the preferred solution.

An often overlooked component is a realistic framing of the problem and definition of the corporate objective.

Does the corporation need a new facility, or does it need to increase capacity within and outside its current capacity to meet future demand? The answer is strongly influenced by how the question (or problem framing) is defined.

Several essential elements are necessary to justify a solid business case.

Know and bound the problem and make the problem statement clear to stakeholders. Define and test the underlying business assumptions and dependencies, rigorously pressure test assumptions, and recognize dependencies.

Finally, identify business signposts that will serve as indicators of success – or failure – and construct off-ramps, avoiding the sunk cost fallacy.

What is a leader's role in defining and testing a suitable business case?

Building from the essential elements, leaders should ask questions to gain confidence in the plan and recognize the potential signposts of project failure or success:

1. **What is the problem you are trying to solve** and what are the bounding assumptions, frames, or guardrails?
2. How were the business assumptions established, what are their dependencies, and how have assumptions been pressure tested?
3. What are the signposts that may indicate the need to pause or halt progress and what are the metaphorical off-ramps at all stages of the project?
4. How has the operating organization been challenged to optimize existing facilities and what were the results? What external options were explored as alternates?

The corporate leadership team is responsible to stakeholders to ensure the project will be terminated if the business case fails at scheduled checkpoints. With this responsibility, what questions should executives ask as a project business case is developed?

WHAT IS THE PROBLEM STATEMENT?

Decision makers must be aligned on the problem to be solved and should expect/mandate that key stakeholders clearly understand and agree. Within the context of the problem statement, prove that the problem can only be solved with capital outlay.

Have you completely optimized your facilty base before considering a megaproject?

Understand the enthusiasm generated by an enormous capital project and exercise executive perspective to probe deeply, determining if a commercial or other solution might be a better choice than debottlenecking, expanding, complying with regulations, or entering a new market. A capital project should be the last resort, not first response. As noted in the first Grey Paper in this series, by some estimates 70% of megaprojects fail to perform as expected.

Executives should require documentation that clearly outlines the project objective(s) and key strategy(ies) to achieve those objectives. The document should address issues that will require resolution at the executive level and those issues beyond the control of the project team.

Initially, the document should broadly describe objectives and strategies and allow for consideration of multiple solutions. As the project progresses, typically through a "Phased Gate" process, the **project objectives and strategies should be refined as risks are mitigated and milestones are achieved**.

WHAT ARE THE BUSINESS ASSUMPTIONS AND DEPENDENCIES?

How has the business team defined the most impactful and highest risk assumptions? The momentum that builds behind a potential megaproject may mask the importance or impact of dependencies, leading to overly optimistic assumptions. Teams should first define and bound assumptions such as future market size and share, feedstock or takeoff arrangements, production ramp-up and utilization, technology capability, regulatory stability, permitting, political and monetary stability, competitive response, resource availability and productivity, local workforce inclusion requirements, internal management capacity and capability.

Assumptions should be measured against comparable projects. Leaders should expect the business and project teams to provide a comparative view of assumptions and be prepared to modify the assumptions that cannot be supported.

Each assumption should be bounded by a range of values, inside which the project meets expectations. Regular milestone status checks should reflect on changes, trends, and volatility in the expected value. Documentation for each assumption should clearly identify the business implications for trending outside the reasonable bounds.

Understand the impact of deteriorating conditions and have a process to abandon the project.

Recognizing that some assumption risks are higher at different points in the project life and that multiple assumption values may change simultaneously, leaders should expect the project team to overlay risks impacts. A Pareto chart illustrating the impact of changes helps to clearly define the priority for executive review.

Finally, within the reasonable bounds for each assumption, **define the "go/no-go" criteria**, prioritizing the critical assumptions and dependencies and establishing the "triggers" that place the project outside the success window. What happens when the "triggers" or conditions drive the project out of bounds?

Leaders should understand the impact of deteriorating conditions and have a process to pause or abandon the project. In the heat of project execution, even the strongest voices may not be heard, so a firm plan is required.

WHAT ARE THE PROJECT OFF-RAMPS?

The quote "No battle plan survives contact with the enemy" is oft credited to Prussian Field Marshal Helmuth von Moltke (a derivative citation was conveyed by Mike Tyson). Field Marshal von Moltke's theory of war postulated that several strategies must be identified in planning, as defining what will happen after first contact with the enemy is difficult to determine. As megaprojects are highly complex — requiring uniquely skilled people, specific processes, tools, and masterful execution — corporate leaders should take the lessons from von Moltke's processes and **develop alternate plans in case project conditions change**.

> "No battle plan survives contact with the enemy"

Therefore, leaders should monitor and recognize deteriorating conditions, the trigger point, and have a process(es) to pause or abandon the project if conditions warrant. In most megaprojects, the project passes through phase gates, each requiring management review and approval prior to proceeding to the next gate. Each review should address changes in scope, cost, schedule, risks, and assumptions. If a change threatens the economic viability of the project, the plan should provide an off-ramp or exit strategy that pauses or terminates the project.

Management should expect the project team to define those signposts that reflect the "out of bounds" change in business conditions. The exit strategy should outline how to exit the project while minimizing costs and preserving the opportunity to reevaluate the project should conditions change.

Management should also be keenly aware that substantial headwinds will be encountered when a project is flagged for termination. **Corporate enthusiasm, project momentum and the Sunk Cost Fallacy (SCF) will present hurdles to stopping an in-flight project.** The SCF describes the tendency to continue a project that has absorbed significant resources and emotional energy; and, **even though current costs outweigh the eventual benefits, work proceeds since "we've invested too much to stop."** The Concorde plane development project is an oft-quote example of SCF. While the British government determined the cost would far exceed the initial predictions of development and production with no hope of commercial profitability, work continued for another four years.

As a mitigating effect to SCF, where possible, corporate leaders are encouraged to separate their project development groups from project execution teams, establishing a firewall between those who develop business opportunities and those executing the work. The development group should be disconnected from the emotional and career ties of executing a megaproject. The developers should establish signposts, make "go/no-go" decisions, and define the exit process that incorporates good business practice, discounting the consequences of terminating the capital project.

HAVE YOU OPTIMIZED THE FACILITY BASE?

As a final consideration, leaders should challenge their operating organization to extract more capacity prior to committing to a megaproject. Compel existing facility(ies) and organizations to prove full and safe optimization before expanding. Challenge organizational processes and site teams to find and correct issues that might have triggered a larger expenditure. Challenge your team to **"get the last oink out of the pig."**

Optimization is especially important when considering a megaproject at an existing site (brownfield) as substantial proven infrastructure (people, processes, tools) already exists. Coordination, communication, and creative planning can identify relatively small bottlenecks and opportunities that can make a brownfield project unnecessary.

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KEY TAKEAWAYS AND CALLS TO ACTION

Business leaders should know the keys to developing and ensuring a solid business case.

- **Understand the problem** and define what the business is really trying to achieve while developing a clear problem statement.
- **Document project objective(s) and strategies** at every stage of the project, test and align them with stakeholders.
- **Test project assumptions.** Know which assumptions most impact project performance and monitor for change at identified milestones.
- **Develop project off-ramps** and define the conditions leading to the off-ramp. Look for signposts that business conditions have changed, avoid the sunk-cost fallacy, and have the institutional courage to stop the project when conditions don't meet objectives.
- **Optimize the facility base first**, especially for incremental brownfield projects.
- **Separate the internal project development (business) group from the project execution group.** Establish separate reporting lines to prevent execution eagerness from overcoming good business decisions.

By clearly establishing the project business case, companies increase the likelihood of project success and minimize execution risks.

ABOUT PILKO & ASSOCIATES

Pilko is the Leading Advisor to Corporate Officers and Boards on Operational and EHS Risks in the energy, chemical and related industries, with a vision of transforming operations to be the safest, most reliable, and sustainable.

We help Clients solve their toughest challenges by identifying and mitigating Operational and EHS risk. We advise Clients on Driving Rapid, Dramatic and Sustainable improvement in Operational and EHS performance, as well as advise on mergers, acquisitions, divestitures, and major projects.

Pilko Advisors are always brutally honest but respectful.

Throughout 2024-25, Pilko is celebrating our 45th year as a trusted advisor to senior leaders in the energy, chemical, and related industries. The Pilko journey, spanning nearly half a century, has been enriched by each relationship we've built and every project we've undertaken.

This milestone is a significant testament to the outstanding expertise, knowledge, and practical perspective of our team, as well as the trust and loyalty of our clients and partners.

To learn more about developing a world class approach to managing risks, email us at greypaper@pilko.com or contact us at pilko.com.

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