8over8



WHITE PAPER

Lower prices demand a hard look at costs:

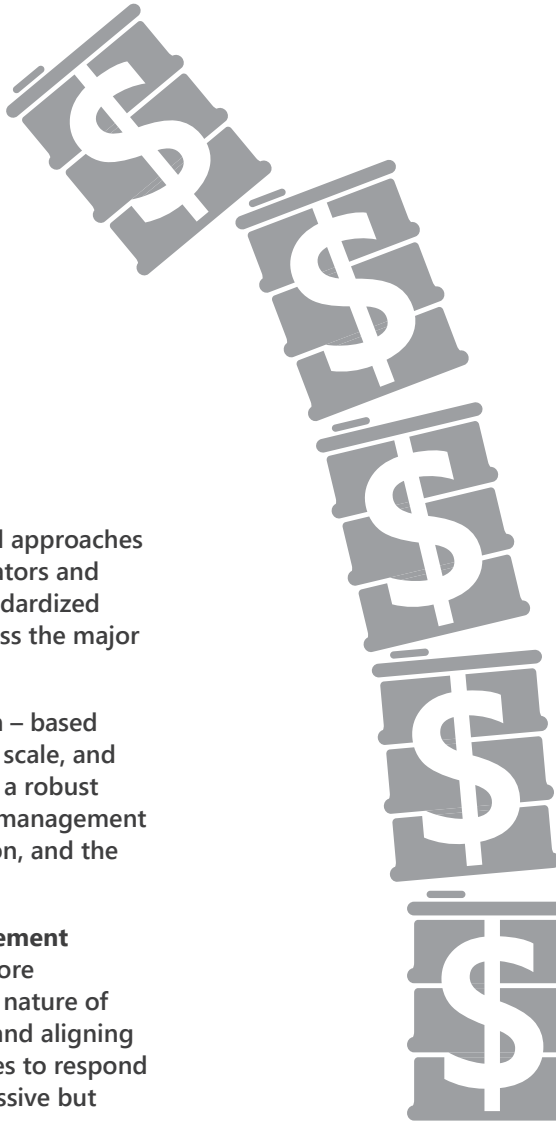
Ensuring megaproject performance in oil and gas

January 2016

ProCon



Input cost inflation and project management indiscipline are undermining the oil industry's ability to deliver complex projects successfully. Although prices may fluctuate, performance standards shouldn't.



The oil and gas megaproject industry knows how to be profitable even when prices drop below £40/bbl. But ten years of high oil prices has caused a greater than doubling of supply chain costs, and considerable overruns on nearly every major project.

The purpose of this white paper is to evaluate the methodologies which can ensure high project performance despite low prices.

There are two fundamental approaches whereby both owner operators and EPCs can benefit from standardized systems designed to address the major risks all megaprojects face:

Rigorous project selection – based on economics and not just scale, and achieved by implementing a robust framework for disciplined management of engineering, construction, and the contract itself.

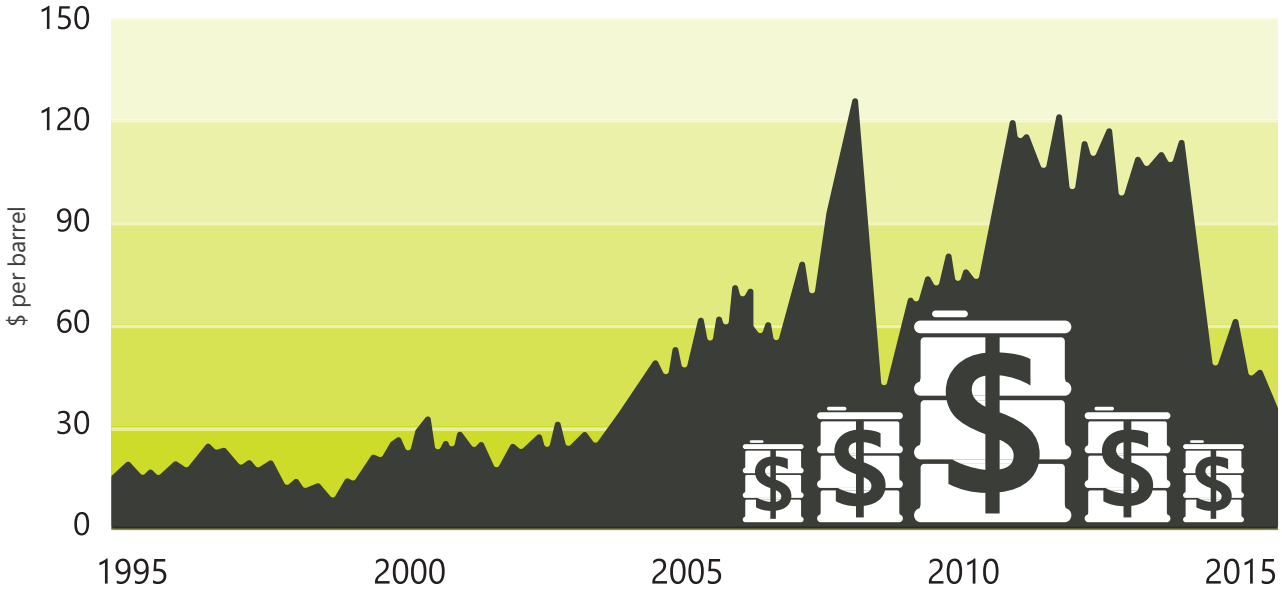
Strategic contract management approach – achieved by more closely understanding the nature of megaprojects themselves and aligning the organization's processes to respond to the unique needs of massive but transitory projects.

The oil and gas project supply chain has historically delivered below $40/bbl

For two decades, from the mid 1980s to around 2004 the oil price moved in quite a shallow range, between $25-35/bbl (real and nominal). To be sure, many companies came and went in this time, and some will say we lost a generation of engineers to the industry. But the oil business came through it, and then seemed to thrive from 2005 onwards during periods of higher income.

Figure 1 - Oil price growth trajectory

Brent Crude Oil price 1995 - 2015



Every major project has over-run; complex projects fail the cost or schedule test at some point.

Recent years have seen performance slide on two fronts: rapidly increasing costs across all project supply chains, and increasing dependence on mega-scale projects (those greater, often far greater, than $1bn), most of which have not met their targets.

To get a tighter grip on the problem, and its possible solution, let's first allow the numbers to do the talking.

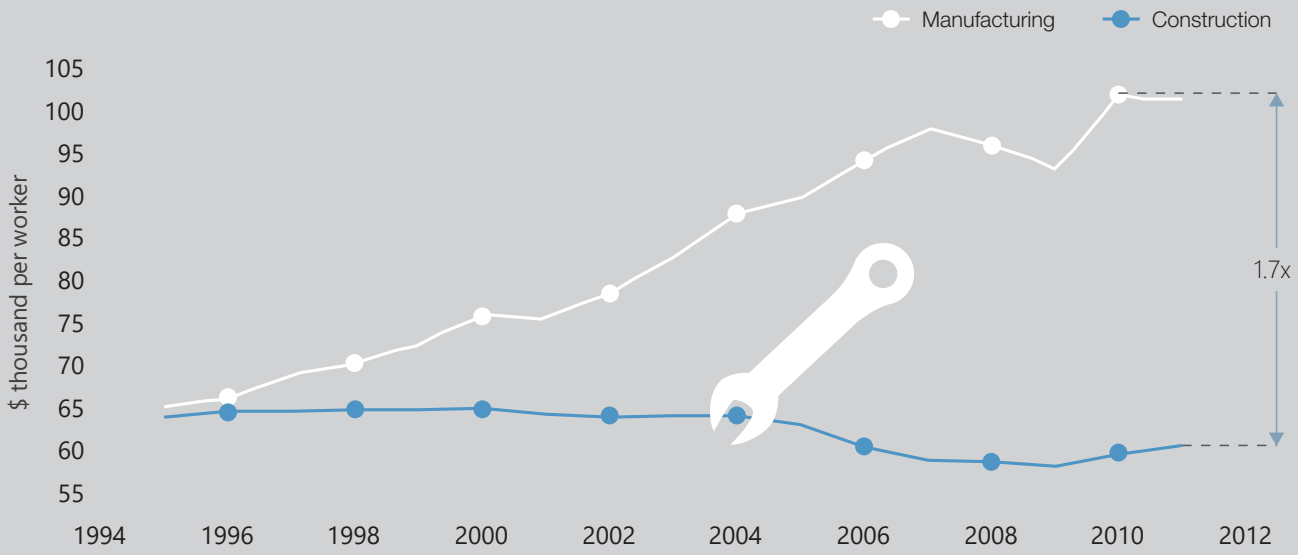
Start with costs: as a benchmark, over the last ten years global manufacturing productivity has improved by about 5-8% per year – which means today it's about twice as productive as it was a decade before. Over the same time, according to the McKinsey Global Institute, energy project construction productivity has not improved at all – totally flat, nil.

Project delivery performance

It's often noted that 70% of major industrial projects over-run, which is supposed to be sobering, but tends to allow many project managers and teams to assume they will be in the golden 30%. In fact, McKinsey's data tells a more chilling story – every major project in their large database has over-run – so all large-scale projects fail the cost or schedule test at some point.

Figure 2 - Energy Projects Construction Productivity has remained static over the last decade

Overview of productivity improvement over time





The impact of overruns

Since 2004, as IHS Energy Consulting Services show in their regular reports, oil industry input costs have doubled, and overall costs have bloated up to four times in key areas such as LNG. Oil prices also doubled, and briefly tripled in the period, but the response of a multiple-times increase in cost is now a systemic problem for the industry.

It's true that project scopes and scale have increased, but on a relative basis the megaproject trends have been sharply upwards. As an example, Wood Mackenzie data indicates current LNG plant costs of over $2000/mt versus previous decade costs of around $500/mt. This is caused by the increasing costs of materials and labor, plus the impact of megaproject overrun.

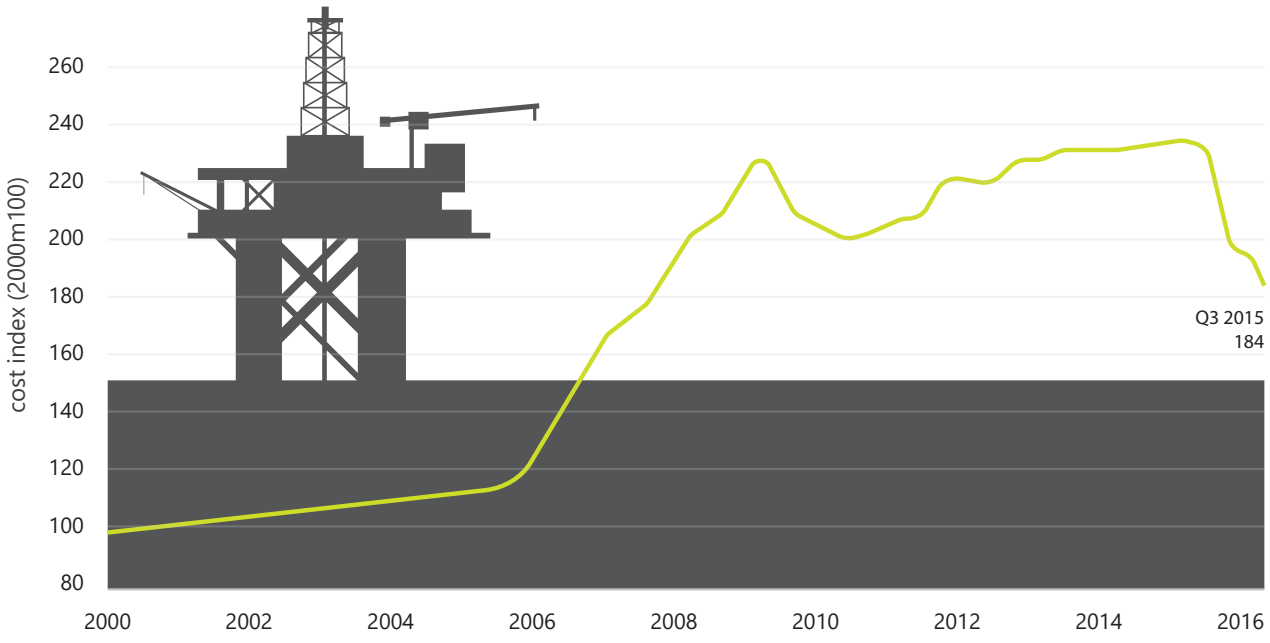
So the past can be defined by three troubling, and inter-related, performance numbers: project construction productivity was zero; 100% of major projects were over budget; overall costs quadrupled in some key sectors.

That's the legacy of a $100/bbl oil price for project performance, and energy share price performance has consequently slumped as oil revenues have collapsed.

Overruns are on the agenda

That cost issue may be about to get bigger. McKinsey reckon over $60 trillion dollars of infrastructure projects will be sanctioned from today out to 2030 – and, even with the latest oil price forecasts factored in, over half of these projects will be energy-related. In addition, almost 80% of these projects will be "megaprojects", and if the past is our guide, then all of these will over-run, many hugely so.

Figure 3 - Project Capital Cost Input has doubled in the last 15 years



A four-fold increase in supply chain costs in less than ten years needs to be reversed no matter how generous the revenue side may become.

Extracting poor cost and project management from complex projects

Current supply chain management within the energy industry needs an overhaul to regain its effectiveness and this needs to happen irrespective of future oil price dynamics. The next wave of projects is unlikely to be much smaller or less complex than we've seen in the past. The winners will be those who can grow profitably in such a world, with far less fat in the system.

The solution comes in two parts: The first – rigorous portfolio selection and project management – is both a self-evident and a pressing expedient. The second is a more strategic consideration – using large-scale projects to your advantage, being more confident in doing them well, and not adding back the risks.

Driving better discipline between the three pillars of project delivery – engineering, contracting, and procurement & construction

There's a ready-made prescription the industry can follow in order to resolve the project delivery issues. Ed Merrow from Independent Project Analysis (IPA) and many others have been stating variations on an effective project life-cycle framework for many years. Analysts suggest that adhering to such a framework, which is clearly far from easy, will net you a 25-45% reduction in costs. That takes us roughly half-way back to the supply chain numbers of 2004, and $40/bbl oil: Wood-Mackenzie consultancy estimates that the full-cycle break-even price for major oil firms has recently decreased to around $65/bbl from over $100/bbl. The Goldman-Sachs Top 420 Projects 2015 analysis also shows cost curves improving into the $60/bbl range, dependent on project type.

The life-cycle framework is best summarized as:

- More thorough portfolio selection at the outset
- Better investment in design and planning stages
- Appropriate organization of project teams, partners and processes
- Standardization of engineering design and equipment where possible
- Strong interface management between engineering and construction
- Equitable contractual risk allocation between owner operators, EPCs and vendors
- Effective information technology selection for performance management and project control
- Careful and effective change management and claims avoidance

Already in the industry there are pockets of lean-style modular manufacturing in unconventional gas projects, making production viable at lower oil prices than before: indications that various supply chains can exist in this new financial environment.

The past is not prologue – we need to do things differently now...

If the life-cycle framework takes us half-way back to the supply chain numbers of 2004, how can we achieve the other half of the cost reductions?

Anatomy of a megaproject

The answer lies in getting to grips with the nature of the megaproject – a style of operation that dominates today's commercial landscape and will do so for many years to come. It's a new phenomenon compared to the pre-2004 world, where multi-billion dollar projects were comparatively rare.

The preponderance of such projects arises from the loss of easy-access oil, and they are inherently exposed to a high likelihood of cost and schedule overrun.

They are typically technologically challenging, geographically dispersed, with multiple strong-minded stakeholders (for example, state plus regional governments). They can take so long to complete that the expertise of any given individual or team is likely to be limited, with learning curves steep and experience gained highly contingent.

Big teams bring big challenges

Scale and complexity has led to very large project owner management teams relative to project size – typically now 12-15% of overall cost, far higher in percentage terms than for smaller projects. There appears to be a negative return to scale of megaprojects in terms of owner costs – a legacy of the complexity, longevity and increasing density of the contract management involved.

To compensate and mitigate cost spirals, oil firms have developed corporate project standards and benchmarks to promote learnings, and have re-cycled project teams to maintain skills.

Megaprojects cannot be delivered fully by a single firm, but neither can they be bought effectively by purely market means: the standard approach of increasingly dense and more precise contracts to establish a set price for these vast ventures is unlikely to solve the cost overrun issue.

Investing in management processes

The industry is increasingly recognizing that megaprojects are a fundamental unit of the current energy business. The projects are effectively mid-size companies in their own right. They need the same sort of business management investment that internal organizations merit.

For example, whilst large energy firms expend major effort designing interior corporate management and information tools, megaproject EPCI contracts still tend to be managed via a blend of extensive and tailored contract negotiations, mixed with improvised business systems.

As a result, most effort often goes into debating contract interpretation and adherence (a traditional market model), rather than running efficient transactions with experienced contractors – a more relational-based approach.

Focussing on contract-based good relationships

Such relational-based approaches do exist when project scale is clearly vast and the limits of traditional approaches plainly undermine project value – e.g. the tri-field Azeri project by BP in Azerbaijan, or the Shell Integrated Gas portfolio for Floating LNG.

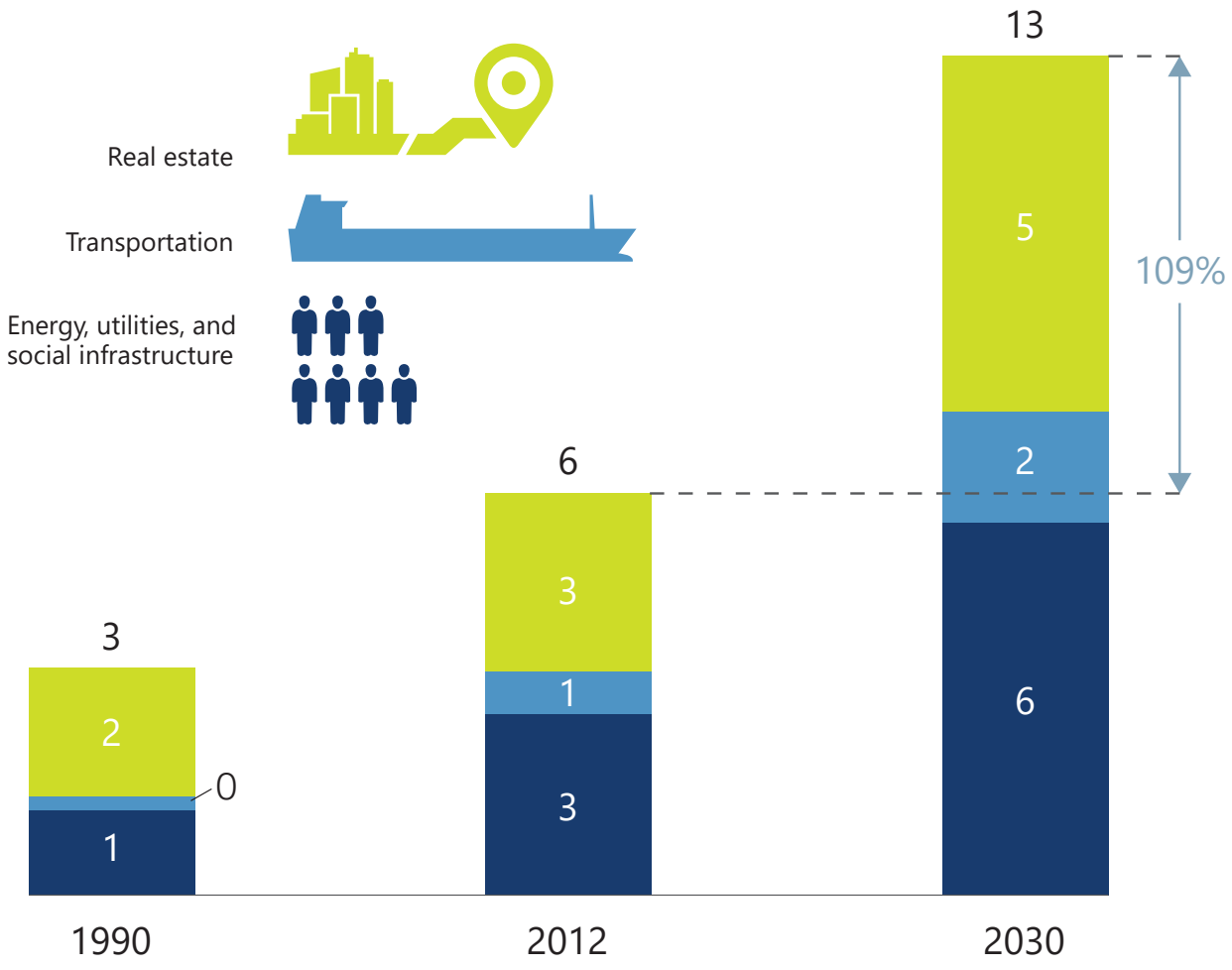
These examples are far from the loosely-defined alliance structures of the 90s. They are formally contract-based – based on pre-agreed and modularized contract forms with chosen suppliers.

Strategically, they attempt to address megaproject complexity by working continuously with proven contractors to agreed terms and pricing formulae, and using working practices and replicated business systems set up to cater for very large, temporary organizations, working within a greater whole.

For sure, issues remain with such structures such as lock-in, but the benefits in terms of reduced engineering and specifications, organization design and deployment and systems set-up are considerable and will create substantial cost and schedule reduction.

Megaproject Dominance in Major Projects

Infrastucture investment will double in the next 15 years



Future major projects can and must be delivered at significantly lower oil prices: the infrastructural and economic value of trillions of dollars of energy industry investment depend on it.

Better project choice and design, and more disciplined execution may get us half-way back to the efficiency of the previous $40/bbl era. The other half will need to come from understanding what we have become: very dependent on massive yet transitory projects, which have failed to deliver on cost or schedule, and which now also require updated organizational and contractual systems.



Megaprojects cannot be delivered fully by a single firm, but neither can they be bought effectively by purely market means: the standard approach of increasingly dense and more precise contracts to establish a set price for these vast ventures is unlikely to solve the cost overrun issue. Some form of strategic development in organization and contracting method needs to be devised.

The benefits in terms of reduced engineering and specifications, organization design and deployment, and systems set-up are considerable and will create substantial cost and schedule reduction.



Final Thoughts:
8over8 and ProCon at $40/bbl

Megaprojects, a fundamental part of the future industry, need to have established and mature project delivery systems and avoid using improvised or inappropriate technology for delivery.

At the least we need two concurrent strategic issues to be addressed: better discipline in project choice, design and interface management between core disciplines – engineering, contracting, construction – and a greater understanding of the inherent risks and complexities of megaprojects themselves.

In a nutshell, we need to realize that megaprojects are major organizations in their own right. So they need top quality management systems, contracting technology and information control. Too often the weight of effort that goes into contract negotiation versus contract management is imbalanced toward the former.

The complete contract control platform, ProCon, has been adapted to work within the key phases and disciplines of megaproject contract management: contract repositories, change and variation correspondence, governance and approval procedures – the key elements of attention to detail and disciplined execution we require.

Critical factors such as design and portfolio analysis are also major determinants. But without mature and established systems allied to efficient contractor relationships it is very difficult to see how we can improve on our current unsustainable overall performance in major project delivery.

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About the Author

Harry Benham is a seasoned Oil & Gas professional with over thirty years' industry experience across a wide range of disciplines and regions: technical, commercial, contracting and procurement in Europe, Russia and the US. In the last 15 years Harry was managing contracts of some major upstream projects. These include the front line contracting roles with BP in the UK and Azerbaijan, with Shell in Prelude and Browse FLNG and as the Head of Discipline at BP and Shell.

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About 8over8

8over8, an AVEVA Group company, provides contract risk management software that helps companies improve performance and profitability on large and complex projects. 8over8's platform, ProCon, has been used on over 250 projects, managing $500bn of assets, saving customers up to 5% on their capital investments. Headquartered in Derry, Northern Ireland, and with offices in Europe, North America, Australia and the Middle East, 8over8 has built a global and loyal blue-chip customer base.

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