Application No: A.18-11-010
Exhibit No:
Witness: R. Phillips

Application of Southern California Gas Company (U 904 G) and San Diego Gas & Electric Company (U 902 G) for Review of Costs Incurred in Executing Pipeline Safety Enhancement Plan	Application A.18-11-010

CHAPTER II

AMENDED DIRECT TESTIMONY OF RICK PHILLIPS

(EXECUTION)

ON BEHALF OF

SOUTHERN CALIFORNIA GAS COMPANY

AND

SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

November 13, 2018
(Amended April 2, 2019)

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I. PURPOSE AND OVERVIEW OF TESTIMONY

The purpose of my testimony is to describe the prudent oversight, project execution, and proactive cost management measures taken by Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E) in the continuing implementation of SoCalGas and SDG&E's Pipeline Safety Enhancement Plan (PSEP). My testimony describes the activities associated with the projects completed primarily between June 30, 2015 and June 30, 2017, representing approximately 125 miles of transmission pipeline and 147 valves.[1]

The PSEP is founded upon four overarching objectives. First, the PSEP is designed to enhance the safety of SoCalGas and SDG&E's integrated natural gas transmission system. SoCalGas and SDG&E remain mindful of the purpose and objectives of PSEP, which stem from the Commission's directive to all California pipeline operators in Decision (D.) 11-06-017 to prepare plans to pressure test or replace all transmission pipelines that do not have documentation of a pressure test, or where the pressure test does not meet certain regulatory standards, as soon as practicable, and to consider retrofitting pipelines to allow for inline inspections and enhanced shutoff valves as part of those plans. Second, as has always been our practice, SoCalGas and SDG&E strive to fully comply with the directives of the Commission. Accordingly, the Pipeline Safety Enhancement Plan establishes a process for meeting the safety enhancement directives set forth by the Commission in D.11-06-017. Third, the PSEP is designed to minimize customer and community impacts. We are proud of our long history of providing reliable service to our customers and remain mindful of the fact that our customers depend on the reliability of our service not only to heat their homes and fuel essential appliances,

[1] See Chapter IV (Mejia) for details on the 39 bundled valve enhancement projects that addressed the 147 valves that were modified either to provide remote shut off capability.

but also to maintain the reliable operation of California's electrical grid, the production of fuel, and other commercial and industrial uses that support California's economy. Fourth, through prudent and thoughtful execution of PSEP, SoCalGas and SDG&E strive to maximize the cost effectiveness of infrastructure investments for the benefit of our customers. Having been in the business of providing reliable natural gas service to our customers for over 100 years, we recognize the need to carefully invest in our system in a manner that complements previous investments in our system, avoids short-sighted or reactive actions that could result in unnecessary or duplicative expenditures, and enhances the long-term safety and reliability of our system.

In my testimony, I describe how SoCalGas and SDG&E:

- Safely, prudently, and expeditiously provide oversight and implement PSEP to enhance the safety of SoCalGas and SDG&E's transmission systems;
- Combine engineering judgement and analysis to select the most beneficial method to address each PSEP pipeline segment;
- Consider the unique conditions encountered for each project—to plan, engineer, and complete the individual pipeline and valve projects;
- Are diligent in looking for ways to avoid costs;
- Respond to unanticipated conditions; and
- Provide thoughtful sequencing of projects to avoid lulls in construction activity.

Through the activities and expenditures described in my testimony, SoCalGas and SDG&E demonstrate achievement of all four overarching PSEP objectives. First, through prudent execution of the PSEP projects presented for review in this Application, SoCalGas and SDG&E enhanced the safety and reliability of Southern California's natural gas transmission system for the long-term benefit of the communities and customers served. Through August 2018, SoCalGas and SDG&E completed over 92 miles of PSEP pipeline replacement projects, thereby modernizing and strengthening the transmission system with pipes manufactured and

installed using modern standards for safety; successfully pressure tested and returned to service over 93 miles of pipeline and enhanced the transmission valve infrastructure through completion of over 50 bundled valve projects. From the institution of the initial Commission Rulemaking (R.) 11-02-019, through the 2011 filing of the proposed PSEP,[2] to this Application, SoCalGas and SDG&E have demonstrated an unwavering commitment to the safety of their customers, contractors, employees and the communities we serve. Indeed, PSEP exemplifies the safety culture that is present at SoCalGas and SDG&E. SoCalGas and SDG&E are particularly proud of the outstanding safety record associated with PSEP projects, which have an Occupational and Safety Health Administration (OSHA) incident rate of 0.43,[3] well below the national oil and gas pipeline construction industry average of 0.8.[4] Through implementation of a comprehensive safety training program administered to both employees and contractors, SoCalGas and SDG&E have effectively promoted consistency in safety procedures and fostered a safe work environment so employees and contractors return home safely at the end of each work day.

Second, through prudent execution of the 83 pipeline and bundled valve projects presented in this Application, SoCalGas and SDG&E complied with the directives in D.11-06-017 and subsequent Commission decisions, as well as California Public Utilities Code Sections 957 and 958, and pressure tested, replaced or abandoned approximately 125 miles of transmission pipeline and automated 152 valves.

Third, throughout execution of the 83 projects presented in this Application, SoCalGas and SDG&E successfully minimized impacts to customers and communities, and continued to

[2] A.11-11-002.
[3] As reported through August 2018.
[4] Bureau of Labor Statistics data for 2017, Industry Injury and Illness Data, Supplemental News Release Tables, SNR05. Injury cases – rates, counts, and percent relative standard errors – detailed industry; available to the public at https://www.bls.gov/iif/oshsum.htm#16Summary_Tables.

provide reliable service to our customers. PSEP is the largest natural gas infrastructure safety enhancement undertaking in SoCalGas and SDG&E's operating history. Phase 1 includes over 400 individual pipeline and bundled valve projects, executed by over 100 SoCalGas and SDG&E employees, with the additional support of contractor personnel.

Finally, my testimony details how, through prudent execution of PSEP, SoCalGas and SDG&E maximized the cost effectiveness of infrastructure investments for the benefit of our customers. As described below, SoCalGas and SDG&E have created and seized opportunities to reduce PSEP implementation costs—such as through competitive sourcing, the Performance Partnership Program, and scope validation activities. My testimony describes how, by using internal expertise and critical assessment of each project, SoCalGas and SDG&E avoided costs estimated to be in the range of several hundred million dollars, which would have otherwise been borne by customers. When challenges have been encountered—such as unanticipated soil conditions, difficulties acquiring environmental permits, or land acquisition delays—SoCalGas and SDG&E have addressed these issues as expeditiously and cost effectively as possible.

This Application demonstrates the prudence with which SoCalGas and SDG&E continue to execute PSEP and the reasonableness of the costs presented for review and recovery. Our actions have enhanced safety, complied with Commission and statutory directives, minimized impacts to customers and communities, and avoided and reduced costs for the benefit of customers. SoCalGas and SDG&E acted as reasonable managers of PSEP by carefully considering information that was known at the time decisions were made, and exercising experienced and professional judgment in their decision-making, and therefore should be granted full recovery of the revenue requirements requested in this Application.

II. PSEP BACKGROUND AND PROCEDURAL HISTORY

A. PSEP Procedural History

On September 9, 2010, a 30-inch diameter natural gas transmission pipeline ruptured and caught fire in the city of San Bruno, California. In response, on February 25, 2011, the Commission issued R.11-02-019, "a forward-looking effort to establish a new model of natural gas pipeline safety regulation applicable to all California pipelines."[5]

In a subsequent decision, D.11-06-017, the Commission found that "natural gas transmission pipelines in service in California must be brought into compliance with modern standards for safety," and ordered all California natural gas transmission pipeline operators "to prepare and file a comprehensive Implementation Plan to replace or pressure test all natural gas transmission pipeline in California that has not been tested or for which reliable records are not available."[6] The Commission required that the plans provide for testing or replacing all such pipelines "as soon as practicable."[7] The Commission required that the plans "also address retrofitting pipelines to allow for in-line inspection tools and, where appropriate, automated or remote controlled shut off valves"[8] and "includ[e] increased patrols and leak surveys, pressure reductions, prioritization of pressure testing for critical pipelines that must run at or near MAOP values which result in hoop stress levels at or above 30% of Specified Minimum Yield Stress (SMYS), and other such measures that will enhance public safety during the implementation period."[9] The Commission also directed the utilities to develop plans to "test or replace all segments of natural gas pipelines which were not pressure tested or lack sufficient details related

[5] R.11-02-019 at 1.
[6] D.11-06-017 at 18.
[7] *Id*. at 19.
[8] *Id*. at 21.
[9] *Id*. at 31 (Ordering Paragraph 5).

to performance of any such test…as soon as practicable."[10] The plans were to address "[a]ll natural gas transmission pipeline…even low priority segments,"[11] while also "[o]btaining the greatest amount of safety value, i.e., reducing safety risk, for ratepayer expenditures…"[12] The requirements of D.11-06-017 were later codified at California Public Utilities Code Sections 957 and 958.

In response to this directive, on August 26, 2011, SoCalGas and SDG&E filed their proposed PSEP. The PSEP included, among other things, a proposed Decision Tree to guide whether specific segments should be pressure tested, replaced, or abandoned; a prioritization process; a proposed valve enhancement plan; a proposed technology plan; and preliminary cost forecasts.[13]

In D.12-04-021, the Commission transferred SoCalGas and SDG&E's PSEP to Application (A.) 11-11-002 and authorized SoCalGas and SDG&E to create a "memorandum account to record for later Commission ratemaking consideration the escalated direct and incremental overhead costs of its Pipeline Safety Enhancement Plan."[14] On May 18, 2012, memorandum accounts (the Pipeline Safety and Reliability Memorandum Accounts (PSRMAs)) were established pursuant to SoCalGas and SDG&E Advice Letters 4359 and 2106-G, and SoCalGas and SDG&E began to implement PSEP on an interim basis, pending the Commission's decision approving the proposed plan.

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[10] *Id*. at 19.
[11] *Id*. at 20.
[12] *Id*. at 22.
[13] On December 2, 2011, in R.11-02-019, SoCalGas and SDG&E amended their PSEP to include supplemental testimony to address issues identified in the November 2, 2011 Amended Scoping Memo and Ruling of the Assigned Commissioner."
[14] D.12-04-021 at 12 (Ordering Paragraphs 1, 3). SoCalGas and SDG&E were authorized to continue to record and report on PSEP costs in the PSRMAs per the July 26, 2013 Administrative Law Judge's Ruling to Continue Tracking Interim Pipeline Safety Enhancement Plan Costs in Authorized Memorandum Accounts.

B. PSEP Overview

The Commission's directives in D.11-06-017 and Public Utilities Code section 957 and 958 require SoCalGas and SDG&E to simultaneously execute hundreds of unique and discrete in-service pressure test, replacement, abandonment and valve enhancement projects as soon as practicable. This entails undertaking the substantial task of separately designing, planning, and constructing multiple projects in a coordinated and concerted manner across SoCalGas and SDG&E's 24,000-square-mile service territory, which stretches from the Mexican border to Central California and serves approximately 24 million customers.

SoCalGas and SDG&E's PSEP sets forth a risk-based prioritization approach to complete the hundreds of individual pipeline and valve enhancement projects required under D.11-06-017 as soon as practicable. The work is planned to be addressed in two phases, Phase 1 and Phase 2. Both phases are further divided into two sub-phases, A and B. In Phase 1A, SoCalGas and SDG&E planned to pressure test or replace transmission pipelines in Class 3 and 4 locations and Class 1 and 2 locations in high consequence areas (HCAs) that do not have sufficient documentation of a pressure test to at least 1.25 times the Maximum Allowable Operating Pressure (MAOP). In Phase 1B, SoCalGas and SDG&E planned to replace non-piggable pipelines installed prior to 1946. As required under State law and D.11-06-017, the PSEP also includes a Valve Enhancement Plan to automate existing valves or install new automated valves to reduce the amount of time required to identify a significant drop in pipeline pressure and stop the flow of gas in the event of a pipeline rupture. The Valve Enhancement Plan is scheduled to be completed during the Phase 1 timeframe.

In Phase 2A, SoCalGas and SDG&E plan to pressure test or replace transmission pipelines in non-HCAs within Class 1 and 2 locations that do not have record of a pressure test to at least 1.25 times the MAOP. In Phase 2B, SoCalGas and SDG&E plan to retest or replace

pipelines that were pressure tested prior to the adoption of federal pressure testing requirements in 1970, and thus the pressure test documentation is not sufficient to satisfy the modern pressure test standard established under Title 49 of the Code of Federal Regulations Part 192 Subpart J. [15] There are no standalone Phase 2 projects submitted for review in this Application, but some of the projects presented in this Application include Phase 2 scopes of work that were "accelerated" and included within the scope of Phase 1 projects to achieve efficiencies, minimize customer and community impacts and/or for constructability reasons.

C. Commission Approval of the PSEP and Implementation of an After-the-Fact Reasonableness Review Framework

In June 2014, the Commission approved SoCalGas and SDG&E's proposed PSEP and "adopt[ed] the concepts embodied in the Decision Tree," "adopt[ed] the intended scope of work as summarized by the Decision Tree," and "adopt[ed] the Phase 1 analytical approach for Safety Enhancement… as embodied in the Decision Tree…and related descriptive testimony."[16]

Because SoCalGas and SDG&E's PSEP cost estimates were preliminary in nature, rather than pre-approve cost recovery based on those preliminary cost forecasts, the Commission adopted a process for reviewing and approving PSEP implementation costs after-the-fact.[17]

[15] Certain parties disagree as to whether Phase 2B has been mandated by the Commission, or whether it is necessary, and thus the question has been presented to the Commission for a decision in Applicants' general rate case, consolidated A.17-10-007/008. The parties to Applicants' second PSEP reasonableness review for application (A.16-09-005) agreed that any decision on Phase 2B miles considered in that proceeding would not be precedential as to whether all of Phase 2B has been mandated. SoCalGas and SDG&E agree to the same for purposes of this Application.

[16] D.14-06-007 at 22, 59 (Ordering Paragraph 1).

[17] The Commission did determine in D.14-06-007, however, that certain PSEP costs should be disallowed (see Section 6, "Ratemaking Principles to be Applied in Reasonableness Applications," at 31-39).

To enable the after-the-fact review of PSEP costs, D.14-06-007 required SoCalGas and SDG&E to establish balancing accounts[18] to record PSEP expenditures.[19] Additionally, to recover PSEP costs, SoCalGas and SDG&E were ordered to "file an application with testimony and work papers to demonstrate the reasonableness of the costs incurred which would justify rate recovery."[20]

In December 2014, SoCalGas and SDG&E filed an application requesting the Commission find reasonable the costs incurred to implement PSEP projects, as well as the associated revenue requirement, recorded in the PSRMAs before June 12, 2014. The Commission found that SoCalGas and SDG&E's actions and expenses were reasonable and consistent with the reasonable manager standard, with one exception related to insurance coverage, and granted the application.[21]

D. Commission Adoption of a Procedural Framework to Transition to a General Rate Case Application Process

On August 19, 2016, the Commission issued D.16-08-003, granting an unopposed request by SoCalGas and SDG&E to establish Phase 2 memorandum accounts, adopting a staff-proposal to authorize SoCalGas and SDG&E to recover in rates fifty percent of the PSEP Phase 1 regulatory account balances each year, subject to refund, and setting forth a long-term procedural framework to transition PSEP into SoCalGas' and SDG&E's general rate case proceedings. As part of that transition, the decision directed SoCalGas and SDG&E to submit

[18] Safety Enhancement Capital Cost Balancing Account (SECCBA) and Safety Enhancement Expense Balancing Account (SEEBA).
[19] *Id.* at 60 (Ordering Paragraph 4).
[20] *Id.* at 39.
[21] See D.16-12-063, granting A.14-12-016. The decision declined to authorize recovery of costs for PSEP-specific insurance (without prejudice) after determining that SoCalGas and SDG&E did not make a sufficient factual showing in the application to support the reasonableness of those costs. Id. at 54.

two standalone reasonableness review applications for PSEP Phase 1A and Phase 1B, one in 2016 and the other 2018, and directed that future reasonableness reviews take place in the general rate cases. This Application is filed in compliance with this directive and, consistent with the Commission's directive to transition PSEP into Applicants' general rate case process, is the last standalone application for after-the-fact review of costs incurred to execute PSEP.

III. THE PSEP ORGANIZATIONAL FRAMEWORK PROMOTES PRUDENT PROGRAM AND PROJECT OVERSIGHT

The scope of work scheduled to be completed under PSEP is extensive, both in terms of the volume of projects, engineering and design complexity, and the time necessary to complete each project. A PSEP organization was created within SoCalGas and SDG&E to provide prudent oversight to manage this large and complex volume of work safely and cost effectively, incorporate continuous improvement, and manage a large pool of both company and contracted employees. The PSEP organization oversees PSEP project execution, provides project and process controls during the project life cycle, allows SoCalGas and SDG&E to assess each project's budget and schedule, and communicates PSEP progress to stakeholders.

The PSEP organization consists of separate PSEP departments with PSEP-focused roles and responsibilities to effectively and efficiently manage safety enhancement work. The separate roles and responsibilities within the PSEP organization provide for functional guidance on the various aspects of project design, construction, and project oversight. There are nine specific groups that oversee critical aspects of the PSEP functions: (1) the Program Management Office (PMO); (2) Construction; (3) Engineering; (4) Environmental; (5) Supply Management;

(6) Gas Control; (7) Non-PMO General Administration; (8) Communication and Outreach; and (9) Training. Depending on their function, these groups support and/or execute PSEP projects.[22]

The following is an overview of the primary ways the PSEP organization promotes prudent program and project oversight.

A. The Implementation of PSEP Is Subject to Prudent Governance by a Dedicated Project Management Office

PSEP is a large and complex program that requires appropriate governance and management to achieve its goal of cost effectively enhancing safety. The PSEP governance and management strategy is to comply with applicable regulatory requirements, continuously improve the program, and establish proper controls and management across PSEP functional areas to verify that each component of a PSEP project, including design, material procurement, construction, and closeout, is performed correctly and consistently.

To accomplish the above goals, various PSEP-specific governance and management efforts are undertaken. The PSEP PMO provides oversight at the organizational level, develops and maintains PSEP-specific policies to promote oversight and accountability, is responsible for gathering, documenting and monitoring lessons learned and the impacts, and develops reporting metrics to keep SoCalGas and SDG&E management apprised of PSEP progress. As acknowledged by the Safety and Enforcement Division (SED)[23] in its 2012 Technical Report on the SoCalGas and SDG&E PSEP, this oversight and management function is prudently placed within one central department: "CPSD believes the Companies are approaching the need to

[22] PSEP support groups and costs are discussed further in Chapter V (Mejia) and VI (Tran).
[23] Formerly known as the Consumer Protection and Safety Division (CPSD).

manage the PSEP in a reasonable manner and that the PMO will be critical to the proper execution of PSEP."[24] SED's assessment has proven to be true.

The PMO performs many key functions. The PMO collaborates, coordinates, and provides functional guidance on project design and construction to cost effectively meet or exceed compliance requirements; follows, as appropriate, industry best practices; and identifies and incorporates process improvements. In addition, the PMO develops standards and procedures for PSEP that allows PSEP to be executed in a consistent manner across projects. Through the management and facilitation of the stage gate process, the PMO ensures that the standards and procedures are adhered to, that PSEP projects are consistently executed, and that procedural discrepancies are authorized and documented. Finally, the PMO develops reports and Key Performance Indicators (KPIs) at both the granular project level and the overall PSEP level.

B. The Stage Gate Review Process Promotes Efficient PSEP Project Oversight and Execution

The Stage Gate Review Process sequences and schedules PSEP project workflow deliverables at the project level. The workflow deliverables are detailed by stage in a PSEP Work Process Map.[25] The Stage Gate Review Process consists of seven stages,[26] with specific objectives for each stage and an evaluation at the end of each stage to verify that objectives have been met before proceeding to the next stage.[27] During the Stage Gate Review Process, there are

[24] R.11-02-019, Technical Report of the Consumer Protection and Safety Division Regarding the Southern California Gas Company and San Diego Gas and Electric Company Pipeline Safety Enhancement Plan dated January 17, 2012, at p. 22.
[25] The Work Process Map details the deliverables by stage and has been formally updated 13 times since the inception of PSEP.
[26] The seven-stage Stage Gate Review Process was implemented by the PSEP organization beginning in the First Quarter of 2013. It has since been reduced to five stages that still encompass all the deliverables of the seven stages, by combining Stages 1 and 2 and Stages 6 and 7. The projects in this Application were all completed following the seven-stage Stage Gate Review Process.
[27] Evaluations are gate reviews or completion check lists. Certain stages are condensed or combined for valve and small pipeline projects.

numerous notable activities, but the decisions most affecting project scope include the decision to test or replace and, as applicable, whether to divide the project into sections and include accelerated and/or incidental mileage.[28] The following is a description of each of the seven stages.

Stage 1 (Project Initiation) is where the project team initiates a Work Order Authorization (WOA). The initial WOA is used to track costs for the early stage investigation and validation of PSEP mileage and present a project recommendation and package for approval to proceed to Stage 2. The Project Initiation Stage is where mileage originally included for remediation may be decreased due to scope validation efforts, reduction in MAOP, or abandonment of lines that are no longer required from a gas operating system perspective.

Stage 2 (Test or Replace Analysis) is where SoCalGas and SDG&E analyze data to determine whether a pipeline should be addressed through testing or replacement. Project execution options are presented and considered prior to proceeding to the next stage.

Stage 3 (Begin Detailed Planning) is where a project execution plan is finalized, baseline schedules are developed, funding estimates are developed, and project funding is obtained.

Stage 4 (Detailed Design/Procurement) is where design and construction documents are completed, necessary permits and authorizations are attained, a construction contractor is selected, and pipeline materials are purchased, received, and prepared for turnover to contractors.

[28] Accelerated miles are miles that would otherwise be addressed in a later phase of PSEP under the approved prioritization process but are advanced to Phase 1A to realize operating and cost efficiencies. Incidental miles are miles not scheduled to be addressed in PSEP but are included where their inclusion is determined to improve cost and program efficiency, address implementation constraints, and/or facilitate continuity of testing.

Stage 5 (Construction) is where construction contractors are mobilized and monitored to (1) document progress and compliance, (2) conduct replacement and testing, and (3) maintain project scope quality, budget, and schedule.

Stage 6 (Place into Service) is where commissioning and operating activities are performed to achieve completion certification for the project.

Stage 7 (Closeout) is where regulatory, contractual, and archival activities are performed to close the project in an orderly manner and issue acceptance certificates.

C. Test-Versus-Replace Analysis Supports Prudent Selection of the Execution Option that Will Provide the Most Benefit to Customers

In Stage 2 of the State Gate Review Process, as explained in more detail in Chapter III (Phillips), SoCalGas and SDG&E apply the Decision Tree and concepts approved by the Commission in D.14-06-007 to conduct a Test or Replace Analysis.[29] In undertaking this analysis, SoCalGas and SDG&E apply engineering judgment to determine a final execution scope to provide both short- and long-term customer benefits.

During this Stage 2 analysis, the project teams evaluate options for testing or replacement of the required segments identified through the scope assessment in Stage 1. This evaluation also includes review of potential accelerated or incidental mileage that can be included within the scope to avoid future costs and operational impacts that would otherwise be incurred if SoCalGas and SDG&E are required to return later to undertake a separate project on the same line. In accordance with the Decision Tree, at least two scenarios are developed for Phase 1A projects greater than 1,000 feet in length (both test and replace), and high-level estimates are calculated. Included in the analysis are an evaluation of potential customer impacts and a preliminary

[29] Similarly, as described in Chapter IV (Mejia), a detailed process is used to determine the scope of work of projects under the Valve Enhancement Plan.

assessment of the costs to provide alternate means of service during the time that each section would be out of service for construction. Further engineering review takes into consideration the age and condition of the pipe to be addressed. In this analysis, SoCalGas and SDG&E identify situations where testing the pipe may require additional investments to make the line piggable[30] (*i.e.*, capable of being assessed using in-line inspection technology). These investments include costs for removal of obstructions, such as back-to-back fittings, short radius ells, pressure control fittings, unbarred tees, and other obstructions that inhibit the ability of the existing pipeline to be assessed using in-line inspection technology. Also, as part of the pressure testing scope of work, critical wrinkle bends and other pipeline anomalies, such as miter bends, leak clamps, and pressure control fittings, are planned for removal so the pipeline can be hydrostatically tested without incident and the pipeline can be filled with water, dewatered, and dried using pigs.

SoCalGas and SDG&E apply sound engineering judgment to weigh many factors, in addition to identifying a least-cost option, when determining the final scope of a project. Given the vintage of many of the pipelines to be addressed as part of PSEP, it is not unusual for project teams to evaluate pipeline sections comprised of varying pipe diameters and/or with features and attributes such as wrinkle bends that render the pipelines unpiggable. Retirement and replacement of the existing pipe would eliminate pipeline anomalies and standardize the pipe diameter, making the pipe piggable. New pipe manufactured and constructed to modern safety standards have structural advantages compared to earlier vintage lines and improve the overall safety and quality of the pipeline and extend the life of the asset. As such, in some circumstances, replacement of a pipe may be anticipated to reduce future expenditures. Other

[30] The term "pig" initially referred to the acronym for Pipeline Inspection Gauge, but now is commonly used in the industry generally to refer to the act of evaluating a pipeline using in-line inspection technology.

considerations include relocation of a pipeline if it is known that the pipeline will need to be moved in the future, or burying the pipeline deeper to reduce the possibility of third-party damage.

The options to test or replace are presented to PSEP leadership during a Stage Gate review meeting to seek approval to proceed to Stage 3. During this meeting, PSEP leadership evaluates additional mileage presented, and based on future cost avoidance or constructability needs, approves the inclusion of accelerated or incidental mileage within the scope of the project as appropriate.

D. The PSEP Project Review Process Prudently Includes Collaboration with Relevant Stakeholders

To achieve the goal of minimizing impacts to customers and communities, it is important to assess how various PSEP project options and approaches may impact the SoCalGas and SDG&E transmission system and the customers and communities served. An integral part of the analysis that results in prudent decision making is the collaboration by PSEP project teams with other knowledgeable groups within SoCalGas and SDG&E (*e.g.*, Region Operations, Gas Engineering, Gas Transmission Planning, Gas Control, Commercial Industrial Services, Regional Public Affairs, etc.) to route, design, and schedule pipeline and valve work to minimize costs and accommodate capacity impacts or restrictions. For example, these groups provide information to guide project-specific decisions including: (1) the feasibility of shut-ins and alternate feeds to regulator stations or customers, (2) customer and community impacts, (3) planned projects to coordinate with PSEP, and (4) environmental requirements, rights-of-way,

and permitting needs. This information is used to help determine the scope and constructability of the project.[31]

E. PSEP Projects Are Integrated with Other Company Projects to Achieve Efficiencies and/or Minimize Customer and Community Impacts

Consistent with the overarching objectives of PSEP to maximize the cost effectiveness of safety investment and minimize customer and community impacts, SoCalGas and SDG&E coordinate the execution of PSEP projects with other projects planned throughout their service territories. For example, if an Operating District has plans to do work on the same or an adjacent pipeline, SoCalGas and SDG&E coordinate, as feasible, the PSEP project team's scope and schedule with the Operating District's scope and schedule to maximize efficiencies and minimize customer and community impacts. For example, SoCalGas and SDG&E accelerated the project schedule for the PSEP Line 4000 MP 53.00 valve project to coordinate construction with a planned blowdown for work performed by the Operating District. This allowed for a single blowdown to accommodate the work related to both projects. This decision was prudent: customers were subjected to only one outage rather than two and were also beneficiaries of the related cost savings.

Effort is also taken to integrate, whenever possible, a PSEP project with a planned Operating District project that is scheduled for the same line. For example, the Line 41-17 replacement project was initially identified as a PSEP hydrotest project. However, a planned pressurization project in the same area would have subsequently removed and relocated the hydrotested pipeline. Rather than incur duplicate costs and potentially impact customers and the community twice, SoCalGas and SDG&E coordinated the two projects. The Operating District

[31] See Chapter IV (Mejia) for a discussion of the Valve Enhancement Plan scoping process.

managed and executed a single project to address both the PSEP scope of work and the pressurization scope of work, and the costs of the single project were allocated across both organizations, thereby reducing overall costs for customers. Similarly, when prudent to do so, SoCalGas and SDG&E incorporate the scope of work of planned Operating District projects into PSEP projects to reduce overall costs and customer and community impacts.

As mentioned above, a PSEP project may standardize the pipe diameter of a project to facilitate piggability, which may result in an upsizing or downsizing of the pipe diameter. Under such circumstances, where the standardization is to facilitate constructability of a PSEP project and/or the piggability of the pipeline, such costs are allocated to the PSEP project. On occasion, SoCalGas and SDG&E identify circumstances where it would be beneficial to customers to upsize or downsize the pipe diameter to address system capacity requirements or future planned construction projects as part of the PSEP project. Under such circumstances, SoCalGas and SDG&E will modify the project design to address the system capacity requirement or future planned construction project to achieve efficiencies. To reduce overall costs for customers, the PSEP Organization plans and executes the project, and the Operating District funds the portion of the costs attributable to the upgraded materials and additional effort required for the upgrade. For example, SoCalGas and SDG&E upsized the pipe in the Supply Line 37-18 replacement project to address an operational need identified by the Operating District. The PSEP project team managed and executed the project and the Operating District funded the incremental cost for upsizing. Absent this coordination, the new pipe installed as part of PSEP may have been replaced later, and customers may have incurred additional costs.

F. Continual Process Improvement Efforts Streamline PSEP Workflows and Capture Efficiencies

SoCalGas and SDG&E regularly evaluate end-to-end PSEP processes and identify changes to capture efficiencies and improve project execution. Incremental changes meant to either standardize a process or formalize a documentation process are communicated through bulletins to the PSEP team.

For example, SoCalGas and SDG&E implemented engineering quality improvements based on their experience. The PSEP PMO team studied close-out duration and noted that completion drawings often required multiple revisions that delayed close-out of the project. The PSEP engineers, the PMO team, and Gas Engineering formed quality review groups to provide feedback for each project type. Bi-monthly meetings were held with the project teams to provide general feedback and discuss lessons learned. Focused meetings were held with engineering design firms to meet the required quality standard. These sessions led to notable improvements in final drawing quality, which reduced the number of drawing revisions, thereby reducing overall project costs for customers.

Another process improvement was directed to achieving faster close-out of PSEP projects. This process improvement shifted certain documentation reconciliation tasks to the construction stage rather than waiting until after construction was complete. Responsibilities were assigned to construction field engineers to focus on key project documentation deliverables: material reconciliation, survey data, Request for Information (RFI) management, field design changes, redline drawings, and survey coordination. The ability of field engineers to review large amounts of data in the field helped streamline the close-out process, reducing overall project costs for customers.

G. PSEP Projects Are Designed and Constructed in Adherence to SoCalGas and SDG&E Gas Standards to Achieve Compliance with State and Federal Laws and Regulations, Promote Safety, and Attain Operational Efficiency

PSEP adheres to SoCalGas and SDG&E's Gas Standards, applicable laws, and regulations to prudently implement compliant safety enhancement work.

SoCalGas and SDG&E's Gas Standards comprise the policies and procedures that govern the design, construction, operations, and maintenance of the transmission and distribution systems. Thus, in executing each project, the Gas Standards and other internal standards and practices govern the design analysis,[32] materials purchased,[33] and construction practices.[34] The Gas Standards have dual objectives: to drive compliance with applicable laws and regulations, and to promote safety and operational efficiency.

In addition to SoCalGas and SDG&E's own internal oversight efforts, SED has closely interacted with SoCalGas and SDG&E in the successful execution of PSEP projects. As ordered by D.14-06-007,[35] SED provides oversight on various aspects of PSEP implementation, with

[32] PSEP design standards and practices address materials to be used and proper design in accordance with GO 112-F and applicable federal laws and regulations. PSEP design standards and practices enable: (1) the development of specific engineering requirements for materials used in PSEP projects; (2) preparation of designs that comply with applicable laws, permits, SoCalGas/SDG&E gas standards, and industry standards; (3) utilization of applicable engineering and design standards developed for PSEP; (4) consistent design and material requirements for the various engineering design firms contracted to assist with design development; and (5) the development of a project-specific design basis for each PSEP project.

[33] Once the PSEP project has been scoped, designed, and approved, materials are ordered that comply with SoCalGas and SDG&E's Materials Specifications for Gas Operations (MSPs). Unless otherwise specified, API 5L pipe, with the specific approved grades and wall thicknesses, are used.

[34] Construction is subject to extensive standards, practices, and guidelines. SoCalGas and SDG&E have implemented comprehensive standards that address, among other areas, excavation, coating application and inspection, welding, welding inspection, trenching, cover, and pressure testing. Prior to starting work, as a part of the agreement with the contractor, contractors are provided an index of standards, practices, guidelines, and requirements; and, as applicable, contractors are provided updates. SoCalGas and SDG&E monitor and document compliance with applicable standards, laws, and requirements.

[35] D.14-06-007 at 29 "Specific to SDG&E and SoCalGas' Safety Enhancement we delegate to Safety Div. the specific authority to directly observe and inspect the testing, maintenance and construction, and all other technical aspects of Safety Enhancement to ensure public safety both during the immediate

emphasis on construction activities and recordkeeping. SED personnel routinely are onsite at PSEP construction projects and monitor compliance with applicable regulations.

PSEP has had an outstanding safety record with an OSHA incident rate of 0.43, well below the industry average of 0.8.[36] In fact, in 2017, PSEP did not have a single OSHA Recordable incident over a total of 1,333,188 man-hours. For the first eight months of 2018, PSEP had only one OSHA Recordable incident over a total of 754,216 man-hours. Company employees and contractors alike are held to the same safety standards and are thoroughly trained prior to the beginning of projects.

IV. PRUDENT EXECUTION OF PSEP PROJECTS MITIGATES OBSTACLES TO MAXIMIZE EFFICIENCIES AND COMPLETE CONSTRUCTION AS SOON AS PRACTICABLE

Pipeline and valve projects are complex and require thoughtful orchestration. Many internal and external factors must align to begin construction. SoCalGas and SDG&E's execution and management teams balance competing risks when authorizing a project team to mobilize for construction. Many of the factors that determine when SoCalGas and SDG&E can begin construction are not in the direct control of SoCalGas and SDG&E. Most can be anticipated and planned for to a certain degree, and those that cannot are mitigated as they occur. Restrictions on when construction can begin must be determined and adhered to. For example, cities may have moratoriums during heavy traffic periods or their own renovation work; PSEP may need to work in concert with a large customer's planned outage or low usage period; Gas Control may have restrictions on when the pipeline can be taken out of service; or the system

maintenance or construction activity and to ensure that the pipeline system and related equipment will be able to operate safely and efficiently for their service lives."

[36] Bureau of Labor Statistics data for 2017, Industry Injury and Illness Data, Supplemental News Release Tables, SNR05. Injury cases – rates, counts, and percent relative standard errors – detailed industry; available to the public at https://www.bls.gov/iif/oshsum.htm#16Summary_Tables.

may have seasonal pressure requirements. Permits, land rights, and materials must be acquired. Availability of construction contractors, inspectors, specialty equipment, construction oversight personnel, and regional operations personnel must be considered. As a result, it is not uncommon for project teams to be engaged in last-minute efforts to acquire a permit or land rights or material, or to reschedule the construction start date due to the planned construction crew being delayed from completing another project, or to sectionalize a project so that a portion of the work can be initiated.

Other factors can influence construction timing and scheduling, such as seasonal limitations during winter or summer conditions that may restrict when a line can be taken out of service. Also, although customer and capacity impacts are vetted during Stage 3 of the Seven Stage Review Process described above, unanticipated system or customer issues may be encountered that could delay a project. For example, if a project as planned requires a pipeline segment to be taken out of service for a period of time, and a different pipeline previously assumed to be available to serve customers is taken out of service, a project may be delayed or a previously unplanned provision of an alternate supply (CNG/LNG) to serve customers may be required. Alternatively, when most but not all obstacles have been addressed, the project team may decide to sectionalize the project and delay construction for only a portion of the project in order execute the majority of the project as soon as practicable. For example, the Line 38-512 replacement project is a 5-mile project that stretches from the City of Lemoore into Kings County. Due to an imminent repaving moratorium in Kings County, the project was split into two sections so that construction in the area that would be restricted by the moratorium could be executed first, and the section that was not subject to any restrictions could be executed after. A very small portion (less than 100 feet) of the first section required a permit from Union Pacific

Railroad; however, the permit was not issued in time to complete construction before the moratorium took effect. It was therefore determined that a third section would be delineated to complete all of that section, with the exception of the portion on the railroad easement, prior to the moratorium taking effect; the second section was completed after that and, over a year later when the railroad permit was issued, SoCalGas returned to complete the final portion of the project.

A. SoCalGas and SDG&E Overcome Permitting and Temporary Land Right Acquisition Obstacles to Minimize Costs and Implement PSEP as Soon as Practicable

With respect to utility construction projects, and more specifically, pipeline projects, there is a significant difference between projects that are completely or mostly performed on private land ("behind the fence") and those that are "linear projects," i.e., located in public rights-of-way. In the latter, since SoCalGas or SDG&E do not own the land, various permits and rights must be obtained for construction to occur. PSEP pipeline and valve projects are primarily linear projects located in franchised rights-of-way (i.e., streets) but are also located on private and federal land.

PSEP projects are located in all areas of SoCalGas' and SDG&E's service territories, which leads to geographical diversity and a concomitantly wide array of challenges. These varying locations result in the need to acquire numerous permits and conduct negotiations with private landowners. Each of the various types of permits or individual landowners themselves may bring various challenges to project execution, but generally the issues center on the lead time to obtain permits, the increasing stringency of permit requirements, and the cost and time to negotiate temporary or permanent land rights.

Some projects do not require extensive permitting, such as those located within existing SoCalGas and SDG&E facilities, while others, depending on the location of the projects, may require multiple additional permits ranging from those required by environmental agencies (*e.g.*, water, wildlife, cultural, etc.) to those required by agencies with impacted land rights, such as Caltrans. These permits/agreements have long lead times and can restrict projects to certain schedules. Environmental and cultural permits may also require species, cultural, or other types of monitors during the performance of construction work. At a minimum, PSEP projects require a permit from the municipal agency where the replacement or hydrotest is being executed before a project can commence construction. In total, SoCalGas and SDG&E obtained approximately 82 environmental permits, 274 municipal permits, and 268 land use agreements for the projects included for review in this Application. Although SoCalGas and SDG&E factor in anticipated permit processing time based on their experience in the project planning process, unanticipated delays beyond the length of time anticipated to acquire a permit can and do occur.

To illustrate the complexity of permit requirements, consider a project to be completed in streets. Typically, an excavation permit is needed from the local jurisdiction to establish work times, allowable length of the project, dates when work may not be performed during heavy traffic conditions ("holiday moratoriums"), etc. A permit would also be needed for traffic control (*e.g.*, arrow boards, delineations, lane closures, etc.). If the project is subject to multiple jurisdictions—city streets, county streets, Caltrans jurisdiction on freeway underpasses/crossings--the various jurisdictional agencies may all require permits, and each may have its own preferences. For example, in a few cases, one agency required work to be completed only at night while another required work only during the day, resulting in issues where the two jurisdictions met. In addition, agencies may have differing preferences on how to

handle environmental and cultural resources issues that may arise from disturbing the soil under the pavement.

In our experience, permitting agencies are also placing greater restrictions and additional requirements on SoCalGas and SDG&E when permits are issued. One change has been in limitations on work hours. For example, some permits only allow street work to begin at 9:00 a.m. and require it to be complete prior to 3:30 p.m. This results in only four to five hours of productive work for crews. (It takes a portion of each day to set up traffic control and remove road plates before the day's construction activities can commence. At the end of the day, time is needed to plate the excavations and remove traffic control.) Compared to crews with approved ten-hour work windows, these shortened work days can double the days for constructing a project. Another change in permitting restrictions is seen in the time of year when project construction is approved. For pipe segments located in resort areas, PSEP work may be severely restricted or altogether forbidden by a permitting agency during the peak season. Many municipalities also limit or prohibit construction activities along major thoroughfares over holiday seasons, with moratoriums common between Thanksgiving and New Year's Day.

The length of active construction activity allowed by the agency can also impact productivity. Some agencies restrict this length to only 500 feet at a time. This means construction activities take place very close to each other in congested workspaces, which reduces productivity while increasing of the time required to complete a given task increases. When agencies allow construction activity for lengths near 1,000 feet, concurrent construction activities are not as congested.

Permitting agencies' requirements can also change project scope, thereby necessitating a redesign. This results in delays and added cost. Pavement repairs are often extended to full lane

repairs or overlays, which add to paving costs. Specialized pavement types, such as rubberized asphalt, have been required for repairs, which also raise restoration costs.

Finally, the design of some pipeline and valve projects may require the acquisition of permanent rights from private landowners. Almost all PSEP projects require some temporary space needs for the storage of equipment and material as well as office space.[37] Temporary and permanent land rights are acquired from landowners for these purposes. These owners may not be local and can be difficult to reach. Some owners initially demand large fees for easements or temporary use agreements and may take long to negotiate reasonable terms. Some commercial or industrial property owners may even impose their own work restrictions or requirements. Private land negotiations can be challenging and may impact project schedule.

B. SoCalGas and SDG&E Prudently Manage Material Availability Delays to Minimize Costs and Implement PSEP as Soon as Practicable

Given the unprecedented level of pipeline work, not only at SoCalGas and SDG&E but at other California utilities, material availability has been an issue that has impacted cost and schedule. SoCalGas and SDG&E have purchased, when appropriate, bulk quantities of commonly used pipe fittings and pipe to have adequate material available for projects. Bulk purchases result in better pricing as opposed to purchasing material on a project-specific basis. However, there are certain materials that are not purchased "off the shelf" and must be made-to-order or modified to fit conditions. Examples are valves with extensions, vaults to house equipment underground, and instrument cabinets. Manufacturing delays occur due to capacity limitations caused by increased demand for pipeline material at a regional and national level. To

[37] To support construction in the streets, temporary land is needed for a construction laydown yard – a place to store equipment, materials, traffic plates, trailers, etc., for the duration of the project. Additionally, space is needed for temporary storage of water tanks, pumps and filtration equipment which must be acquired.

determine whether ordered materials meet company specifications, most items require inspection. When items do not meet specifications, they need to be modified or new items need to be acquired. This may result in extra time that may cause a delay to construction start.

C. SoCalGas and SDG&E Prudently Address Unforeseen Factors Encountered During Construction to Minimize Costs and Implement PSEP Projects as Soon as Practicable

Despite due diligence in the planning and engineering design phase, unforeseen factors encountered during construction may increase the complexity of projects and cause projects to take longer than planned. Some unknown conditions can only be identified after construction begins and the pipe is exposed, such as actual pipe condition, unknown substructures or unfavorable soil conditions. For example, it is not uncommon to discover during excavation substructures that were not on maps or in records. This is particularly true for older developed areas, such as the dense urban locations of many PSEP Phase 1 pipelines, because requirements for substructure recordation were not as stringent historically as they are today. Additionally, governmental records (originally in paper form) may have been lost over the years. Unidentified substructures usually require pipeline routing changes. Unanticipated soil changes (*i.e.*, loose sandy soil rather than more cohesive soil) may require a change in excavation or shoring methods. Finally, coordination with other utilities can sometimes delay project schedules. For example, for some valve projects, new communications and electricity lines are required when a valve is automated and, despite scheduling in advance, delays are often driven by the availability of electric and communication utilities crews to complete their portions of a project.

D. SoCalGas and SDG&E Sequence PSEP Projects to Maximize Efficiency and Productivity

PSEP is an undertaking unprecedented in its size and complexity. At any given time, as many as 30 different PSEP projects may be in construction simultaneously, each of which presents unique attributes and challenges. Many different project components must come together to keep the symphony that is construction progressing without having to demobilize. SoCalGas and SDG&E orchestrate and maneuver these components to strategically schedule construction projects to keep company and contractor workforces fully productive, thereby maximizing the cost-effectiveness of the PSEP workforce. Construction start dates are tentatively slated months in advance to maintain a steady flow of work to the construction teams. The various functional groups that support execution of a project are consulted prior to these dates being proposed. The expected construction completion dates of projects are monitored closely so that new projects can start soon afterwards.

Another consideration is the repercussions of having a lull between projects, and the impacts this could have on the construction contractor workforce. Specialized contractor resources, such as welding and coating inspectors, that have completed the SoCalGas and SDG&E Operator Qualification process and training on SoCalGas and SDG&E safety requirements and procedures may leave SoCalGas and SDG&E jobs to find more steady work if there is a significant lull in construction activity. To bring a new welding inspector on board would necessitate a total of nine days to complete the above-referenced training before they are authorized to work on PSEP projects. Further, inspector resources typically come from out-of-state, so daily costs may accrue regardless of whether there is work for those contract employees. Welders tend to reside more locally than inspectors and can typically obtain other work in the area. To mitigate the risk of losing necessary skilled and experienced contractor resources,

SoCalGas and SDG&E sequence construction schedules to optimize the resources available to PSEP.

In addition to the impact of contractor resources leaving PSEP if there is a lull in construction work, there are efficiencies gained over time when all project team members (*e.g.*, welders, inspectors, foremen, etc.) work together over multiple projects. Having PSEP-experienced welders and inspectors also increases efficiency as they are already well-versed in SoCalGas and SDG&E standards. Companies vary to some extent in their requirements, work methods, nomenclature, and work processes. When new personnel are added, efficiencies may be reduced as new personnel take time to become familiar with company-specific work methods and requirements.

E. SoCalGas and SDG&E Implement Proactive Community Outreach Efforts to Minimize Community and Customer Impacts, Manage Costs and Implement PSEP as Soon as Practicable

Phase 1A projects are located in more densely populated areas. As such, proactive community outreach efforts—to inform customers, elected officials and government entities about PSEP projects taking place in their communities—are an integral part of SoCalGas and SDG&E's prudent execution of PSEP to minimize community and customer impacts, manage costs and implement PSEP as soon as practicable. Since the inception of PSEP, SoCalGas and SDG&E have distributed approximately 67,800 customer notification letters and delivered over 4,000 door hangers to customers. Numerous meetings have been held with elected officials and municipal agencies to provide advance notice and ongoing updates regarding PSEP projects. Additionally, SoCalGas and SDG&E established a PSEP webpage, which provides information about construction activities and project status to give customers and stakeholders easier access to information.

The Community Outreach team works closely with external stakeholders early in the planning stages to identify and help remove potential obstacles and roadblocks that could affect PSEP project execution and maintain a positive customer experience by mitigating the effects of construction with targeted communications and efforts to fully inform external stakeholders prior to PSEP construction activity. Additionally, Community Outreach maintains good relationships with external stakeholders including community-based organizations, Home Owners' Associations, Chambers of Commerce, Associations, and local media to reach sensitive communities and customers.

These various outreach efforts were instrumental in avoiding project delays and, in some instances, resulted in less onerous permitting conditions being imposed on PSEP projects, which helped minimize costs and benefited customers. For example, for the Line 43-121 replacement project SoCalGas and SDG&E received permission to shut down the Moraga offramp of the 405 freeway to execute weekend construction work and negotiated with the city to allow weekend night work and shortened the revised permit approval process to help the project team meet their execution schedule. In another example, the relationship established with the City of Los Angeles resulted in successful coordination with the city and avoided costs for street repaving. In fact, SoCalGas and the PSEP team have been lauded by several communities for their proactive communication. Among the commendations are:

- City of Lakewood: SoCalGas was commended for its commitment to safety and community outreach and communication effort executed prior to and after construction.
- Inglewood: Inglewood Councilman Ralph L. Franklin thanked the PSEP project team for providing weekly and timely construction updates. This proactive outreach effort resulted in zero customer complaints.

- City of Ventura: SoCalGas was commended for its proactive outreach to the community, especially accommodations made to work with the local school's testing schedule.
- Van Nuys / City of Los Angeles: SoCalGas received the Cloud 9 award for its support of the people and animals experiencing homelessness in the community near the Sepulveda Dam project located in Van Nuys. This proactive outreach effort resulted in zero customer complaints.

V. SOCALGAS AND SDG&E PRUDENTLY MANAGES PSEP COSTS FOR THE BENEFIT OF CUSTOMERS

As previously explained, the scope of PSEP work that is planned for and executed is extensive, complicated, and costly. The PSEP project teams look for ways to avoid costs and exercise diligence: (1) during the planning and detailed design phases to find the least-cost approach to design the pressure test, replacement, or valve work; (2) by negotiating with permit agencies and land owners to avoid costly permit conditions or unreasonable land acquisition costs; and (3) by minimizing the cost impact of design conflicts and scope changes when unforeseen conditions arise during construction.

SoCalGas and SDG&E have put in place controls and measures to manage costs and maximize customer value and execute projects cost effectively. This has been achieved through scope validation, competitive procurement efforts, coordination with internal and external groups, and other cost avoidance actions.

A. Scope Validation Efforts Have Identified Cost Avoidance Opportunities

A key first step in project execution is the scope validation efforts conducted in Stage 1 (Project Initiation). SoCalGas and SDG&E do not proceed with the projects identified in the

initial PSEP Application[38] without first performing due diligence to verify the project scope through diligent scope validation activities. From the initial phase of a PSEP project, the PSEP management team identifies the potential for cost avoidance when studying the proposed project. To do this, data from the initial PSEP application and internal databases are reviewed by the project team to validate project mileage. Through this scope validation step, mileage reduction may be accomplished through the critical assessment of records, reduction in MAOP, or abandonment of lines that were no longer required from an overall gas operating system perspective.[39]

SoCalGas and SDG&E have achieved verifiable cost avoidance through these proactive scope validation measures. The scope of Phase 1A in the initial PSEP Application was 388 miles. Through scope validation, the current Phase 1A mileage is approximately 173 miles, an approximate 215-mile reduction.[40,41] As a result, SoCalGas and SDG&E have avoided an estimated cost of over $500 million for the benefit of customers. These efforts exemplify SoCalGas and SDG&E's prudent management of PSEP and efforts to minimize costs for customers.

B. Through Prudent Procurement, SoCalGas and SDG&E Achieve Reasonable and Market-Based Costs for the Benefit of Customers

SoCalGas and SDG&E continue to minimize PSEP project execution costs through cost-avoidance efforts that focus on efficiencies identified in the engineering and design process through efficient procurement practices, coordination and scheduling effectiveness, and

[38] SoCalGas and SDG&E's PSEP was originally filed in R.11-02-019.
[39] Lines are only abandoned after a thorough review of the ability of adjoining lines to meet current and future load requirements and to verify there will be no customer impact or system constraints.
[40] Mileage figures do not include accelerated or incidental miles as defined in Chapter III (Phillips).
[41] As directed in D.14-06-007, a reconciliation of the mileage contained in the original PSEP application to the mileage of the projects included in this Application is contained in Chapter III (Phillips).

construction execution. Procurement of services (*e.g.*, construction contractors, engineering providers, inspectors, surveyors, etc.) and materials is generally the largest individual category of PSEP expenditures. Approximately 75% of PSEP costs are for purchased services and materials. As such, an important aspect of PSEP implementation is retaining capable vendors and contractors at reasonable rates. To promote the reasonableness of these costs, PSEP relies heavily on proven supply management techniques and strategies to acquire materials and services. To provide safety enhancement to customers at reasonable and market-based costs, SoCalGas and SDG&E use established selection processes, create incentives for contractors, and impose cost controls. PSEP maintains guidelines for the preparation, solicitation, evaluation, award, and administration of contracts and subcontracts that supply PSEP with qualified and best-value contractors, subcontractors, and vendors.

SoCalGas and SDG&E's sourcing objective is to utilize competition to achieve market-based rates. As such, the majority of PSEP agreements entered into for materials and services have been either competitively bid or were set at market-based rates stemming from previous competitive solicitations. In other words, in addition to individual bidding events, as appropriate, SoCalGas and SDG&E execute PSEP agreements by leveraging terms and conditions and rates from existing agreements. This avoids administrative costs, uses previously negotiated rates, and furthers the goal of completing the work as soon as practicable. The above typically occurs through releases from a Master Service Agreement (MSA). Releases from an MSA are used to authorize services and memorialize any commercial and technical terms for a specific scope of work, compensation schedule, and delivery/performance schedule in accordance with the terms and conditions of the MSA. For tracking purposes, these MSAs and releases are considered single-sourced because a separate individual bidding event did not occur.

Although tracked as single-source, releases from MSAs that were implemented using market-based rates further promote cost reduction by avoiding logistical costs associated with separate bidding events. In these instances, SoCalGas and SDG&E are capitalizing on previous efforts to competitively bid, vet, and negotiate contracts, thus promoting market-based rates, leveraging earlier efforts to competitively source vendors and contractors, and achieving cost-effective and expeditious execution of PSEP.

Approximately 98% of PSEP agreements with contractors and suppliers are either competitively bid or are through agreements that use market-based rates based on a recent competitive sourcing event per the companies' Procurement Policy.[42] This includes costs incurred to directly execute a PSEP project and project support costs incurred to support PSEP execution more generally, as discussed in Chapters V (Mejia) and VI (Tran).

C. The Performance Partnership Program Further Enhances Construction Contractor Cost-Effectiveness

The Performance Partnership Program allows Performance Partners to enter into competitive bidding for batches of projects as opposed to one at a time. This provides numerous benefits for customers: providing competitive market prices, avoiding administrative costs for successive individual bids, engaging construction contractors in longer-term agreements for numerous projects (which lowers costs by hiring a sustained workforce with less downtime and allowing contractors to work with the same internal engineering teams for a more collaborative effort),[43] and providing contractors an incentive to competitively bid for the work and agree to additional cost-control mechanisms (since the winning bidder is awarded more than just one

[42] This figure was calculated through a review of PSEP agreements executed up to January of 2017.
[43] These efforts also mitigate the risk of insufficient trade labor and supervisory resources (leading to direct cost savings through efficient dispersal and logistics of regional work) and better enable construction personnel to provide valuable engineering and design recommendations.

project). Although SoCalGas and SDG&E have implemented the Performance Partnership Program to execute PSEP, the PSEP organization retains the discretion to conduct competitive solicitations or to single-source work to acquire contractors for any PSEP project where it is determined that it may beneficial to customers to do so.[44]

Under the Performance Partnership Program, each project constructed by a Performance Partner is subject to a target price risk/reward mechanism. This mechanism is based on establishing a target price agreed to by SoCalGas/SDG&E and the Performance Partner. The target price provides the Performance Partner with a cost incentive to efficiently perform the project because it stands to share both reduced and excess costs.[45] The Performance Partner is not, however, entitled to any profits when costs exceed 20% of the target price.

By virtue of this sharing mechanism, SoCalGas and SDG&E realize cost savings, for the benefit of customers, that would not exist under traditional competitively bid contracts. For the pipeline projects included for cost recovery in this filing that were awarded to a construction contractor under the Performance Partnership Program, approximately $20 million in cost avoidance was realized when taking into account the difference between the negotiated target price and the final actual cost to SoCalGas and SDG&E. The complete results of the sharing mechanism for the Performance Partner projects included in this Application are included in Attachment A.

[44] For example: (1) in order to diversify the assignment of work (instead of limiting it to four construction partners); (2) as a separate tool to validate costs incurred by the performance partners (providing yet another rate by which to compare Performance Partner performance); and (3) allow other construction contractors who were not selected as Performance Partners the opportunity to bid on projects, which helps sustain their viability in the SoCalGas and SDG&E service territory.

[45] *See* Performance Partner Cost Avoidance Summary (Attachment A) for demonstration of cost savings.

In addition to the risk-reward mechanism, SoCalGas and SDG&E were also able to negotiate other incentive mechanisms to reduce costs to customers. These include: (1) overall caps on Performance Partner overheads; (2) individual project profit caps under the sharing mechanism; (3) negotiated annual profit caps based on total work completed (this resulted in an approximate $2,930,000 rebate through 2017); (4) caps on the mark-up from third-party subcontractors used by the Performance Partner; and (5) the ability to audit Performance Partner costs.

SoCalGas and SDG&E engaged KPMG in 2015 to evaluate the results of the Performance Partnership Program and compare the profit paid to a pipeline contractor using lump sum contracts awarded by competitive solicitation with the profit paid to the same contractor under the Performance Partnership Program.[46] SoCalGas and SDG&E asked that this analysis be performed to determine if there were verifiable cost savings and whether to continue this approach. KPMG validated that the Performance Partnership Program can result in greater customer benefits through reduced costs.

D. Through Prudent Procurement of Materials SoCalGas and SDG&E Achieve Reasonable and Market-Based Costs for Customers

PSEP materials are acquired in a manner designed to minimize costs and maximize timely delivery. Materials and equipment are procured according to PSEP standards and practices. In an effort to provide the lowest reasonable cost, each specific project may have different execution strategies. Generally, materials and equipment are purchased by an agent for SoCalGas or SDG&E, with payment made through the existing SoCalGas or SDG&E systems.

[46] *See* PSEP Pipeline Construction Contractor Profit Analysis (Attachment B).

Further, to take advantage of previous efforts to vet and engage vendors, SoCalGas and SDG&E utilize their Approved Manufacturers List (AML).[47]

Where possible, SoCalGas and SDG&E acquire materials for PSEP projects by aggregating material needs from multiple projects and making periodic buys for larger quantities of materials. These efforts better enable SoCalGas and SDG&E to obtain favorable pricing. Project-specific buys are also done to account for specific design parameters. Generally, project-specific buys are executed at each major design phase to address time constraints and reduce costs. For example, long-lead-time items are identified early for sourcing. As appropriate, items may be transferred between projects to reduce last-minute buys and shipping costs. Regardless of the type of order, material bids are designed to obtain multiple quotes for the best pricing options, promote work with select firms for efficiency of process, and encourage the development of local resources and sourcing.

Due to the sheer volume of projects, execution of PSEP requires a high amount of warehouse space to store materials. Two separate material yards were established in Fontana and Bakersfield.[48] These locations provide centralized hubs to serve as receipt points for material shipments and staging areas for project materials. SoCalGas and SDG&E's Supply Management team accumulates individual project material requirements and, where possible, executes bulk purchases through a competitive solicitation process. This provides better pricing through economies of scale and avoids multiple purchases with duplicative administrative steps. Once received, the bulk material is staged by project for delivery to the job site.

[47] Sourcing new suppliers is considered when the current AML providers cannot support the project needs or it is determined that additional competition would be cost advantageous.
[48] The Fontana location was closed in March of 2016 as PSEP work has become more concentrated in the Northern portion of the SoCalGas Service Territory.

E. Through Cost Tracking, Controls, and Management Practices, SoCalGas and SDG&E Prudently Manage PSEP Project Costs

As part of the cost management effort, it is important to track and categorize the PSEP costs that have been incurred. Generally, project-specific costs are charged to their respective project accounts. Costs that cannot be attributed to a specific PSEP project are charged to a non-project specific account, based on the related activity and support function.[49] Through cost tracking and categorization, SoCalGas and SDG&E document that costs are appropriately categorized and that the recorded costs were incurred to directly contribute to PSEP implementation and execution.

SoCalGas and SDG&E track costs by Work Order Authorizations (WOA). The general function of a WOA is to track costs associated with planning and execution of a specific project. To properly track costs to the appropriate category and project, projects and cost categories are assigned unique internal order numbers that are used to track costs associated with that project or activity to a WOA. Additionally, SoCalGas and SDG&E implemented procedures to verify the accuracy of costs. This includes verifying that billing rates are correct, reviewing time sheets for hours worked, and reviewing other supporting documentation for accuracy. Once the information on invoices is verified, the invoice reviewer forwards the invoices to the project managers to confirm that the correct labor hours for the project, billed labor rates, and any additional expenses are within the terms of the contract.

[49] See Chapter VI (Tran).

VI. PSEP HAS BEEN MANAGED REASONABLY AND PRUDENTLY AND COSTS SHOULD BE APPROVED BASED ON SOCALGAS AND SDG&E'S ACTIONS AND RESULTS

As discussed herein, PSEP projects may experience numerous unknowns: permit approval times; land acquisition times; permit approval conditions; material delays; and subsurface facilities or conditions that cannot be estimated or known until after construction is underway. As a result of these and other conditions discussed in detail in the workpaper narratives for each project, submitted concurrently with this testimony, SoCalGas and SDG&E encounter cost variances during construction of PSEP projects.

The cost variances encountered in the execution of PSEP are in line with other public and private global organizations that manage large construction projects. The 2015 KPMG Global Construction Survey (Attachment C) interviewed executives from over 100 organizations on a wide range of project-related topics, including planning and financial forecasting, risk and project management, and contractor management. The survey indicated:

- "Looking back over the past 3 years, fewer than one-third of all respondents' projects managed to come within 10 percent of the planned budget, with the energy and natural resources, and especially the public sector, performing considerably worse than other industries."[50]
- "… just a quarter of construction projects come within 10% of their original deadlines…"[51]
- "… owners are heavily dependent upon capable project management teams that understand engineering and construction, project management principles and practices…."[52]

[50] KPMG Global Construction Survey 2015 at 17 (Attachment C).
[51] KPMG Global Construction Survey, 2015 at 18 (Attachment C).
[52] KPMG Global Construction Survey 2015 at 8 (Attachment C).

- "44% of respondents struggle to attract qualified craft labor and 45% cite a lack of planners and project managers."[53]

Consistent with our peers and other reasonable managers, SoCalGas and SDG&E have experienced similar variances and constraints in executing PSEP.

The purpose of our preliminary estimates was to guide decision making and to implement PSEP as soon as practicable. That being noted, SoCalGas and SDG&E have implemented enhancements to the cost estimating tool used to calculate cost estimates for PSEP projects, which has enabled SoCalGas and SDG&E to improve the accuracy of our PSEP project cost estimates over time. SoCalGas and SDG&E established a dedicated cost estimating team and hired experienced cost estimating professionals. While these process improvements have yielded more accurate estimates, scope changes beyond its control will continue to result in cost variances. As such, the Commission should look to the reasonableness of SoCalGas and SDG&E's efforts to avoid and control costs, while enhancing system safety, rather than the accuracy of preliminary estimates, to evaluate whether SoCalGas and SDG&E have prudently managed PSEP projects.

VII. CONCLUSION

SoCalGas and SDG&E should be authorized to fully recover the costs presented in this Application excluding disallowances acknowledged in Chapter III (Phillips). The costs presented for review in this Application were incurred to complete work that was mandated by the Commission and State law, SoCalGas and SDG&E activities comply with Commission decisions and guidance, and SoCalGas and SDG&E acted as reasonable managers in executing

[53] KPMG Global Construction Survey 2015 at 9 (Attachment C).

PSEP work. In so doing, SoCalGas and SDG&E have been executing PSEP consistent with our overarching objectives:

- Enhance public safety: PSEP projects have been completed consistent with applicable rules, regulations, laws, and SoCalGas and SDG&E's internal policies and procedures.
- Comply with the Commission's directives: PSEP efforts have been consistent with Commission instructions to proceed "as soon as practicable" and have worked with Safety and Enforcement Division (SED) in their oversight role.
- Minimize customer impacts: Projects were completed while maintaining service to core customers and with minimal planned outages for commercial and industrial customers.
- Maximize the cost-effectiveness of safety investment: SoCalGas and SDG&E reasonably avoid costs, obtain market-based contractor and material rates, use the necessary amount of internal and external resources, and prudently design, engineer, and execute PSEP projects.

The Commission should find that SoCalGas and SDG&E have executed PSEP prudently and have implemented and executed PSEP consistent with the requirements of D.14-06-007. The costs presented for review and recovery in this Application are reasonable and the associated revenue requirements submitted for recovery should be recovered in rates.

This concludes my prepared Direct Testimony.

VIII. WITNESS QUALIFICATIONS

My name is Richard D. Phillips. I have been employed by SoCalGas since 1978. I have held Director level positions in Engineering, Supply Management, Gas Distribution, Electric Distribution, Customer Services, IT, and Storage as well as a manager position in gas transmission pipeline services.

My current position is Senior Director, Pipeline Safety Enhancement Program.

I have a Bachelor's degree in Engineering from University of California, Irvine, cum laude. I am a registered Professional Engineer in California. I have a certificate in Executive Management from the University of Michigan and a certificate in Finance for Executives from the University of Chicago. I was a member of the Pipeline Research Council International.

I have previously testified before this Commission.

Attachment A

Performance Partner Cost Avoidance Summary

Chapter II
Testimony of Rick Phillips

ATTACHMENT A
PERFORMACE PARTNER COST AVOIDANCE SUMMARY

The Final Total Cost (Cost Under Performamce Partner Program) was less than the Final Target Price (Cost Under Performance Partner Program). The difference (Cost Avoidance) signifies what the cost would have been absent the Performance Partner Program for the PSEP projects listed below.

Pipeline Projects:	Cost without Performance Partner Program	Cost Under Performance Partner Program	Cost Avoidance
30-18 Section 1 Replacement Project	$ 12,357,287	$ 11,261,065	$ (1,096,222)
31-09 Hydrotest Project	$ 922,445	$ 916,184	$ (6,261)
32-21 Section 1 Hydrotest Project	$ 2,422,720	$ 2,327,161	$ (95,559)
32-21 Section 2 Hydrotest Project	$ 2,013,965	$ 1,941,392	$ (72,573)
33-120 Section 3 Replacement Project	$ 2,903,600	$ 2,224,822	$ (678,778)
36-1002 Replacement Project	$ 773,692	$ 630,426	$ (143,266)
36-9-09 JJ Abandonment Project	$ 484,209	$ 452,039	$ (32,170)
36-9-09 North Section 1 Replacement Project	$ 26,366,003	$ 25,914,831	$ (451,172)
36-9-09 North Section 3 Replacement Project	$ 13,760,234	$ 13,675,473	$ (84,761)
36-9-09 North Section 4B Replacement Project	$ 3,584,948	$ 3,583,966	$ (982)
36-9-09 North Section 7A and 7B Replacement Project	$ 21,186,799	$ 20,176,873	$ (1,009,926)
37-07 Replacement Project	$ 17,766,274	$ 15,333,360	$ (2,432,915)
37-18 Replacement Project - Section 1, 2, 3, 4	$ 26,518,816	$ 24,846,104	$ (1,672,712)
37-18-F Hydrotest Project	$ 2,175,001	$ 1,986,087	$ (188,914)
38-200 Replacement Project	$ 3,029,627	$ 2,745,015	$ (284,612)
38-501 Replacement Project	$ 9,995,593	$ 9,544,472	$ (451,121)
38-504 Replacement Project	$ 2,015,744	$ 1,943,629	$ (72,115)
38-512 Replacement Project - Section 3	$ 519,900	$ 302,272	$ (217,628)
38-514 Replacement Project	$ 8,228,267	$ 7,865,113	$ (363,155)
44-687 Replacement Project - Phase 1	$ 2,088,976	$ 1,875,879	$ (213,097)
44-720 Replacement Project	$ 4,676,913	$ 4,403,893	$ (273,020)
49-11 Hydrotest Project	$ 2,077,784	$ 2,066,923	$ (10,861)
49-13 Replacement and Hydrotest Project	$ 11,295,374	$ 10,342,508	$ (952,867)
49-15 Replacement Project - Section 2, 3, 4	$ 12,790,097	$ 12,358,430	$ (431,667)
49-28 Replacement Project	$ 22,642,041	$ 20,530,804	$ (2,111,237)
85 South Newhall Avenue Replacement Project - Section 2	$ 3,405,694	$ 3,393,227	$ (12,467)
404 Replacement and Hydrotest Projects:			
404 Hydrotest Project - Section 1	$ 1,194,415	$ 1,107,043	$ (87,372)
404 Replacement Project - Section 2A	$ 974,820	$ 957,070	$ (17,751)
404 Hydrotest Project - Section 3	$ 1,050,109	$ 906,738	$ (143,371)
404 Replacement Project - Section 3A	$ 2,235,591	$ 2,027,383	$ (208,208)
404 Hydrotest Projects - Section 3 and 9	$ 1,347,216	$ 1,215,671	$ (131,545)
Line 1004 Hydrotest and Replacement Project	$ 3,051,526	$ 2,824,362	$ (227,164)
Line 2001 West- B Hydrotest Project	$ 950,008	$ 887,071	$ (62,937)
Line 2003 Section 2 Hydrotest	$ 1,049,146	$ 996,778	$ (52,368)
Kern Wildlife Bundle Abandonment Project	$ 717,050	$ 563,657	$ (153,393)
Valve Projects:			
Alhambra Station Valve Enhancement Project	$ 1,007,222	$ 849,895	$ (157,328)
Haynes Station Valve Enhancement Project	$ 288,494	$ 274,280	$ (14,214)
Indio Valve Enhancement Project Bundle	$ 427,440	$ 382,940	$ (44,500)
Lampson Station Valve Enhancement Project Bundle - Pine	$ 1,859,966	$ 1,795,918	$ (64,048)
Line 1014 Brea Valve Enhancement Project Bundle	$ 2,779,418	$ 2,460,774	$ (318,644)
Line 1018 Dana Point Valve Enhancement Project	$ 224,669	$ 170,472	$ (54,198)
Line 1020 Valve Enhancement Project	$ 281,543	$ 252,572	$ (28,971)
Line 2000 Beaumont Riverside Valve Enhancement Project Bundle	$ 231,617	$ 189,711	$ (41,906)
Line 2001 Riverside Valve Enhancement Project Bundle	$ 341,292	$ 238,804	$ (102,487)
Line 2001 West Valve Enhancement Project	$ 345,605	$ 309,883	$ (35,723)
Line 2003 East Valve Enhancement Project Bundle - Slauson & Industry, Southern & Alameda	$ 590,132	$ 425,730	$ (164,401)
Line 2003 West Valve Enhancement Project Bundle	$ 782,015	$ 724,800	$ (57,215)
Line 225 Valve Enhancement Project Bundle	$ 646,529	$ 586,038	$ (60,490)
Valve - Line 235-335 Valve Enhancement Project Bundle	$ 770,940	$ 734,724	$ (36,216)
Line 3600 Valve Enhancement Project Bundle	$ 1,815,949	$ 1,594,633	$ (221,316)
Line 4000 Benson and 7th Valve Enhancement Project	$ 454,886	$ 432,968	$ (21,919)
Line 4002 Fontana Valve Enhancement Project	$ 305,785	$ 277,814	$ (27,971)
Line 404 Ventura Valve Enhancement Project Bundle	$ 249,711	$ 171,562	$ (78,149)
Line 406 Ventura Valve Enhancement Project Bundle	$ 520,803	$ 464,941	$ (55,862)
Line 5000 Banning Valve Enhancement Bundle	$ 710,188	$ 687,916	$ (22,271)
Line 4000 MP 45.36 Valve Enhancement Project	$ 367,021	$ 237,956	$ (129,065)
Line 4000 MP 53.00 Valve Enhancement Project	$ 1,558,830	$ 1,544,572	$ (14,258)
Line 6916 Valve Enhancement Project Bundle - Morongo Station	$ 966,675	$ 607,539	$ (359,136)
Line 7000 Valve Enhancement Project Bundle	$ 413,860	$ 315,919	$ (97,941)
Newhall Valve Enhancement Project Bundle - Castaic	$ 2,540,363	$ 2,437,806	$ (102,558)
Questar Valve Enhancement Project	$ 2,699,214	$ 2,541,520	$ (157,694)
Rainbow Valve Enhancement Project Bundle - Los Alamos & Briggs	$ 1,229,481	$ 1,033,665	$ (195,816)
Sepulveda Station Valve Enhancement Project	$ 184,290	$ 143,145	$ (41,145)
TOTAL	**$ 94,051,722**	**$ 86,470,054**	**$ (17,149,608)**

ATTACHMENT A
PERFORMACE PARTNER COST AVOIDANCE SUMMARY

*The Final Total Cost exceeded the Final Target Price for the PSEP projects listed below. The Cost Avoidance is the amount of risk payment paid by the contractor and represents their share of the overage and is shown as a cost avoidance. **

Pipeline Projects:	Cost Avoidance
36-9-09 North Section 5A Hydrotest and Replacement Project	$ (312,327)
37-18 Replacement Project - Section 5	$ (112,310)
38-512 Replacement Project - Section 1	$ (53,265)
38-512 Replacement Project - Section 2	$ (114,409)
38-931 Replacement Project	$ (68,579)
43-121 South Replacement Project	$ (30,239)
49-15 Replacement Project - Transmission	$ (98,997)
49-15 Replacement Project - Section 1	$ (1,092,198)
Line 85 South Newhall Avenue Replacement Project - Section 1	$ (123,293)
404 Replacement and Hydrotest Projects - Section 2	$ (131,632)
404 Replacement and Hydrotest Projects - Section 4&5	$ (105,422)
Valve Projects:	
Line 404 Ventura Valve Enhancement Project Bundle - Simi Tap	$ (11,131)
Line 49-28 Valve Enhancement Project	$ (92,632)
Line 2003 East Valve Enhancement Project Bundle - Salt Lake Station	$ (16,140)
Line 4000 MP 80.08 Valve Enhancement Project	$ (20,014)
El Segundo Valve Enhancement Project	$ (199,479)
Lampson Station Valve Enhancement Project Bundle - Topaz	$ (2,715)
Newhall Valve Enhancement Project Bundle - Newhall Ave	$ (276,125)
Orange Valve Enhancement Project Bundle	$ (92,453)
TOTAL RISK PAYMENTS	**$ (2,953,362)**
GRAND TOTAL COST AVOIDANCE FOR PERFORMANCE PARTNER PROJECTS INCLUDED IN THIS FILING	**$ (20,102,970)**
Additional Cost Avoidance - Rebate paid by Contractor based on total spend*	$ 2,930,000

**Note the rebate amount is based on all Contractor executed projects in 2015, 2016 and 2017.*

Attachment B

PSEP Pipeline Construction Contractor Profit Analysis

Chapter II
Testimony of Rick Phillips

KPMG

cutting through complexity

Southern California Gas Company

PSEP Pipeline Construction Contractor Profit Analysis

August 11, 2015

Contents

1. Executive Summary

KPMG LLP (KPMG, we, or our) was retained by Southern California Gas Company (SoCalGas) to perform a Pipeline Safetey Enhancement Program (PSEP) Pipeline Contractor Profit Analysis in order to assist SoCalGas' counsel with the assessment and comparison of profit paid to a pipeline contractor using lump sum (LS) contracts and cost based PSEP Performance Partnership Construction Services Agreement (Performance Partner) contracts. SoCalGas judgementally selected a PSEP contractor to be assessed.

KPMG performed project profit analysis at the selected contrator's office from June 22, 2015 through June 25, 2015.

Based on the terms and conditions of the PSEP cost based Performance Partner contracts and our analysis of profit paid to the selected contractor (Contractor) for lump sum contracts, it appears that the Contractor's lump sum projects are more profitable on average than PSEP cost based Performance Partner contracts. The contractor provided KPMG a list of 54 lump sum projects that were either completed & closed or were 95% percent complete for our analysis. KPMG judgmentally selected a sample of six lump sum projects including both gas transmission and distribution projects. Table 1 below summarizes the six projects assessed and reflects the Contractor's profit for each.

Table 1: Summary of six 2013-2014 Lump Sum Projects

Selection #	Final Contract Price	Final Job Cost Amount	Contractor's Profit Calculation	Adjusted Profit Calculation[1]
1	$ 22,983,351	$ 17,003,705	26.0%	21.9%
2	$ 1,091,680	$ 1,027,698	5.9%	1.3%
3	$ 9,953,474	$ 8,815,077	11.4%	6.1%
4	$ 2,723,002	$ 1,228,844	54.9%	52.6%
5	$ 7,049,162	$ 6,379,647	9.5%	5.6%
6	$ 2,776,522	$ 1,782,555	35.8%	32.7%
Total	**$46,577,191**	**$36,237,526**	**23.9%**	**20.0%**

[1]The adjusted profit calculation column includes project costs that were either increased or decreased in order to align with actual labor burden or overhead costs from the Contractor's PSEP cost based Performance Partner contract.

KPMG then adjusted the profit calculations for all six samples and applied the results to all 54 projects to obtain an adjusted average profit. Upon applying the adjusted profit calculation to all 54 projects, the average profit calculated was 23.3%. The results of the profit analysis are displayed below in Table 2.

Table 2: Average Profit Analysis Results

Based on 54 Projects	Contractor Average Profit Calculation	Adjusted Average Profit Calculation	PSEP Max Profit	LS Profit Greater PSEP Profit?
Average	**27.2%**	**23.3%**	**7%**	**Yes**

Based on our review and comparison of job cost accounting for the Contractor's lump sum and cost based Performance Partner contracts, we did not find any material differences between the

cost tracking reports. We were also able to verify that all six lump sum projects were competitively bid and accounted for in a similar manner to the PSEP projects.

2. Scope of Work

KPMG is currently under contract with SoCalGas to perform routine contract cost compliance assessments on their PSEP cost based Performance Partner contracts with each of their vendors and has also been retained by SoCalGas to perform this analysis which includes an assessment and comparison of the selected contractor's profit on a sample of lump sum projects. The following is a summary of the approach for our analysis:

I. Judgmentally select a sample of 6 lump sum projects (out of 54 lump sum projects delivered by the Contractor). Request project cost reports, final payment application and payment ledger from the Contractor.

II. Reconcile the cost reports to the terms of the PSEP cost based Performance Partner contracts.

III. After reconciling adjustments are made to the job costs, calculate the realized profit on the sampled projects.

IV. Using the reconciling adjustment factors for the sampled projects, apply the applicable adjustments to the remaining 48 projects. Calculate the average profit for the 54 projects.

V. Summarize work performed, reconciling adjustments, and comparison of profitability of PSEP cost based Performance Partner contracts to lump sum contracts.

3. Summary of Analysis

3.1 Lump Sum (LS) vs PSEP Cost Tracking

LS project costs were tracked identically to PSEP project costs. The six sampled projects had the same cost types as the PSEP cost based Performance Partner projects tracked in their job cost reports. Table 3 below summarizes the definition of each cost type.

Table 3: Contractor's Cost Type Definitions

Cost Type	General Description	Detailed Description	Rolls Up
1	Labor	Labor Wages (Includes Admin paid time off) and craft subsistence)	Labor
2	Burden	Burden Labor (Craft fringes benefits plus burdens on Contractor's taxable labor costs)	Labor
3	Per Diem	Non-collective bargaining agreement allowances paid to craft employees or Admin employees through expense checks.	Labor
4	Subcontracts	Subcontracts that run through Contracts Administration group.	Subs
5	Contract Labor, Continuing Services Agreement, and Operated Equipment	Contract labor is labor performed on a project by a third party, CSA allows for third parties to perform labor not considered to be part of the permanent work. Operated equipment is any third party that provides Owner/Operated labor and equipment on site.	Subs
6	Materials	Permanent Plant Materials purchased for the project.	Materials
7	Sales Tax	Sales or Use Tax on materials or rental equipment purchased for the project. Does not include sales tax on receipts included in expense reports.	Materials
8	Miscellaneous	Consumables or materials that will not remain at site.	Other
9	Rented Equipment	Third party rented equipment that requires fuel.	Equipment
10	Rented Equipment (Non-Fueled)	Third party rented equipment that does not require fuel.	Equipment
11	Contractor Equipment	Contractor Owned Equipment.	Equipment

3.2 Lump Sum (LS), PSEP and KPMG Calculated Burdens & Overhead

Upon review of burden in the LS job costs, the percentages utilized to obtain the burden costs were 41% for both Union and Non-Union labor; however these burden costs were not the Contractor's actual burden. Similar to the PSEP contracts, the burden percentages comprised of payroll taxes, insurance, consumables, supervision and miscellaneous. KPMG calculated the Contractor's actual burden based on a 2013 program and obtained 28.71% direct union burden,

20.55% indirect non-union burden. The actual calculated burden percentages have been utilized to adjust the Contractor's job costs for the six samples selected. Since the calculated actual burden rates are lower than the burdens utilized by the Contractor in the job costs, the adjusted job cost amounts are lower.

The Final Job Cost Amount for the 54 projects the Contractor provided do not include overhead costs. KPMG calculated the Contractor's actual overhead based on a 2013 program and obtained an 8.99% overhead percentage. KPMG utilized the actual overhead percentage of 8.99% in its calculations.

3.3 Lump Sum Job Costs Reconciliations

To reconcile the costs of the sampled reports to the PSEP cost based Performance Partner contracts (KPMG's calculated actual burden and overhead percentage), KPMG isolated Labor Cost and discounted Burden amounts from Burden Cost. Next, KPMG calculated the 28.71% direct union burden and 20.55% indirect non-union burden from the Labor Cost amounts, accordingly. Lastly, the 8.99% overhead was added to the subtotal job cost amount to then obtain the adjusted profit for the project. Once these steps were completed for all six projects independently, the profit percentages were averaged and compared to the Contractor's profit calculation [Table 4]. The difference of 3.88% was then applied to all 54 projects to obtain their adjusted profit calculation and then averaged once more to obtain the adjusted average profit calculation.

Table 4: Profit Calculations from Sampled six Lump Sum Contractor's Projects

Selection #	Final Contract Price	Final Job Cost Amount	Contractor Profit Calculation	Adjusted Profit Calculation
1	$ 22,983,351	$ 17,003,705	26.0%	21.9%
2	$ 1,091,680	$ 1,027,698	5.9%	1.3%
3	$ 9,953,474	$ 8,815,077	11.4%	6.1%
4	$ 2,723,002	$ 1,228,844	54.9%	52.6%
5	$ 7,049,162	$ 6,379,647	9.5%	5.6%
6	$ 2,776,522	$ 1,782,555	35.8%	32.7%
Total	**$46,577,191**	**$36,237,526**	**23.9%**	**20.0%**
Profit Difference between the Contractor and KPMG			0%	3.88%

3.4 Summary of Results

Upon applying the adjusted profit calculation to all 54 projects, the average profit calculated was 23.3%. This average profit of 23.3% is greater than the maximum 7% profit permitted to the Contractor per year from the PSEP Schedule A; hence it appears that lump sum projects result in greater construction contractor profits, on average, than PSEP cost based Performance Partner contracts. The results of the profit analysis are displayed below in Table 5.

Table 5: Average Profit Analysis Results

Based on 54 Projects	Contractor Average Profit Calculation	Adjusted Average Profit Calculation	PSEP Max Profit	LS Profit Greater PSEP Profit?
Average	**27.2%**	**23.3%**	**7%**	**Yes**

Attachment C

KPMG Global Construction Survey 2015

Chapter II
Testimony of Rick Phillips

KPMG

cutting through complexity

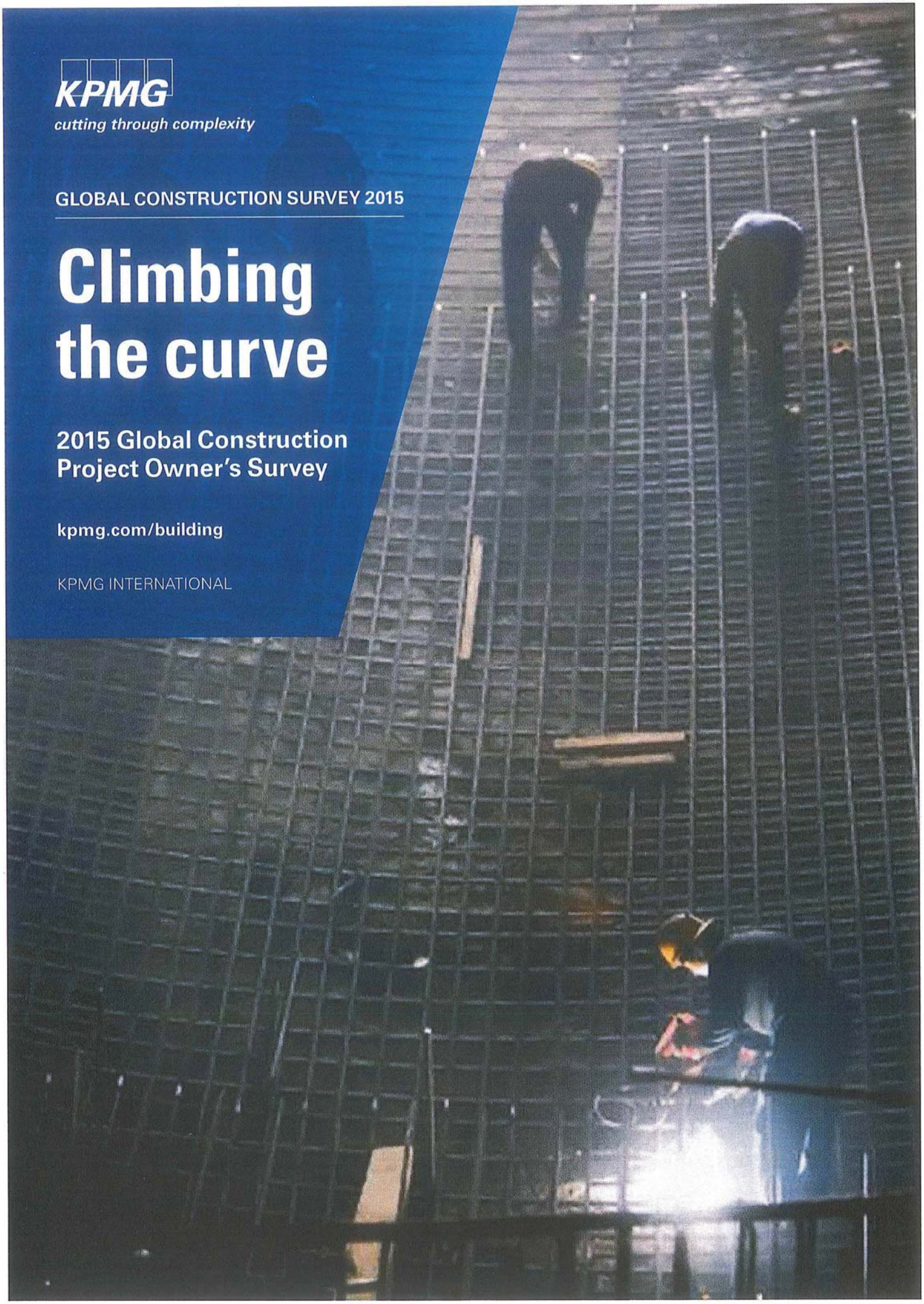
GLOBAL CONSTRUCTION SURVEY 2015

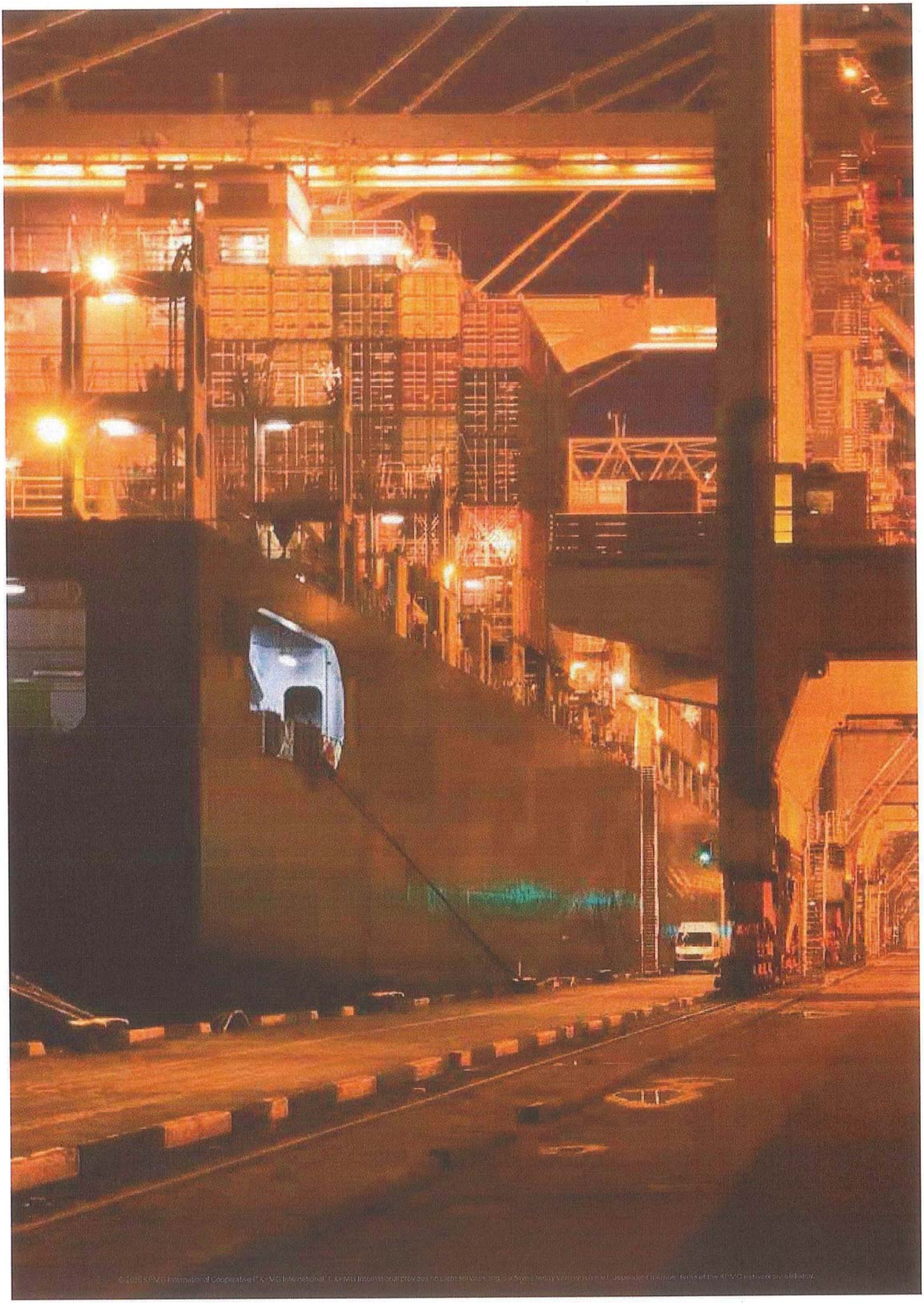
Climbing the curve

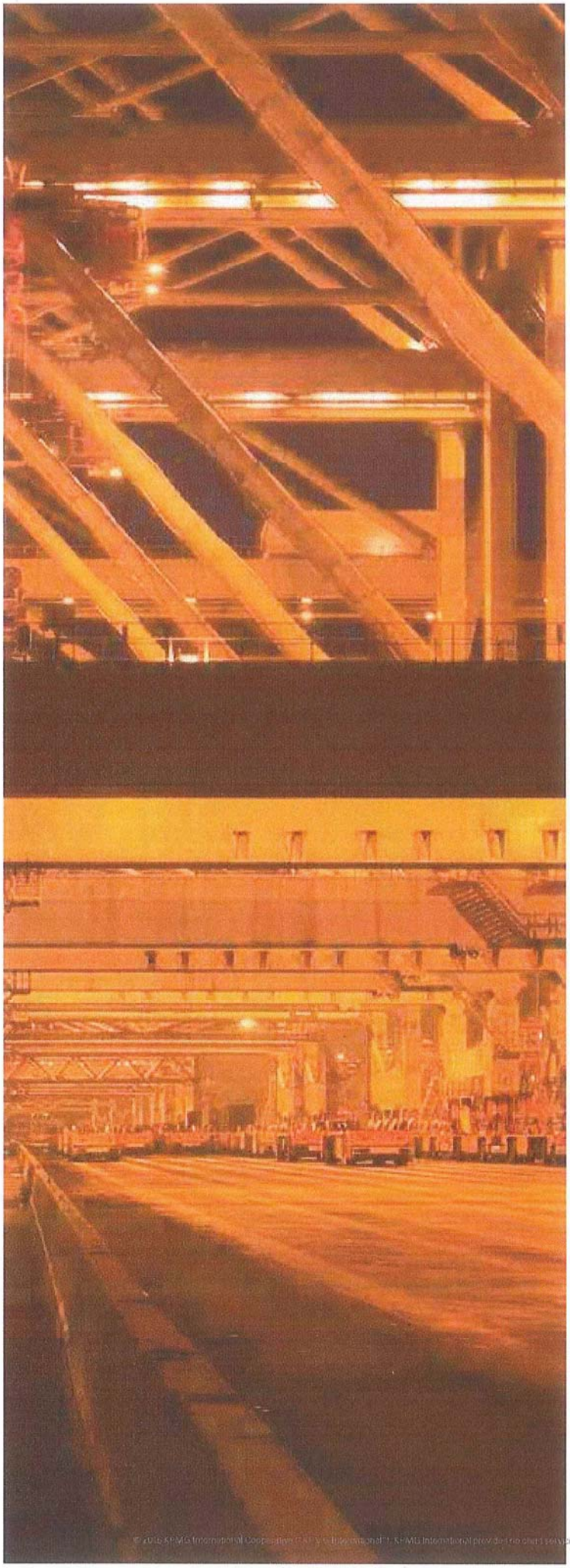
2015 Global Construction Project Owner's Survey

kpmg.com/building

KPMG INTERNATIONAL







Introduction

As construction projects continue to evolve, grow larger and more complex, have organizations gained more confidence in their ability to hit schedule, budget and quality targets?

Project owners are continually striving for a balance between power, responsibility and control. They have the power that comes from control over the budget, yet are ultimately responsible to their corporate Boards and Chief Executive Officers. They bear the responsibility for huge projects worth billions of dollars, along with the associated commercial and reputational costs of failure. Yet, project owners have to cede much of the project execution risk and control to industry experienced engineers and contractors.

Managing these dynamics requires maturity. Maturity in planning and financial forecasting; maturity in hiring and developing the right talent; maturity in ongoing risk and project management; maturity in contingency management to cope with the inevitable setbacks that accompany major construction projects; and maturity to build positive and effective working relationships with contractors that bring out the best in all parties.

In the ninth edition of KPMG's Global Construction Survey we focus on the challenges facing owners as they seek to climb the maturity curve and feature the views of over 100 senior executives from both private and public organizations whose annual capital expenditure ranges from a few million US dollars (US$) to well over 5 billion US dollars.

The results, augmented with commentary from KPMG's Major Projects Advisory specialists and external industry experts, should enable project owners globally to chart their own levels of project delivery maturity.

I would like to thank all survey participants who gave their valuable time to participate in the report.

Geno Armstrong
International Sector Leader
Engineering & Construction
KPMG in the US

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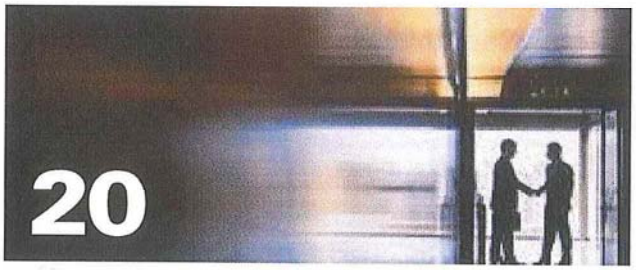


» Executive summary

How are project owners performing on the maturity curve?

In late 2014, KPMG interviewed executives from over 100 private and public organizations around the world that carry out significant capital construction activity. The respondents' annual revenue varied in size from US$250 million to more than US$5 billion, covering a wide range of sectors including energy and natural resources, technology and healthcare. More than a quarter of the respondents worked for government agencies.

Maturity in preparation

Planning and prioritizing appear to be rigorous

- 30% of respondents say their organization uses the design-bid-build approach and 32% favor engineer-procure-construct (EPC)
- 74% complete a formal project delivery and contract strategy analysis, prior to approval
- 84% utilize financial and risk analysis to screen projects
- 80% say the majority of capital projects are planned

Talent shortages remain a challenge

- 44% struggle to attract qualified craft labor and 45% lack planners and project managers
- Organizations with fewer full-time project staff spend more on capital expenditures per employee
- 69% hire external resources equivalent to more than 5% of the total workforce on a per project basis

Maturity in risk, controls and governance

Owners express confidence in their project controls

- 64% say their management controls are either 'optimized' or 'monitored'
- 55% are 'satisfied' or 'mostly satisfied' with their investment in project management
- 74% feel investment in controls and governance has reduced costs
- 73% are comfortable with the accuracy and timeliness of project level reports

Project management information systems (PMIS) not yet ubiquitous

- 50% use PMIS; of those that don't, 41% plan to introduce this within 2 years
- 32% of those that use PMIS have yet to integrate it with their accounting and procurement software

Maturity in performance

Owners continue to experience project failures

- 53% suffered one or more underperforming projects in the previous year. For energy and natural resources and public sector respondents the figures were 71% and 90% respectively.
- Only 31% of all respondents' projects came within 10% of budget in the past 3 years
- Just 25% of projects came within 10% of their original deadlines in the past 3 years

A mixed approach to contingency planning

- 30% perform quantitative risk analysis to calculate contingencies
- 49% use both a project-level contingency *and* a management reserve
- 30% draw down from a single pool of contingency based upon project risks

Maturity in relationships

The push towards contractor collaboration may need more impetus

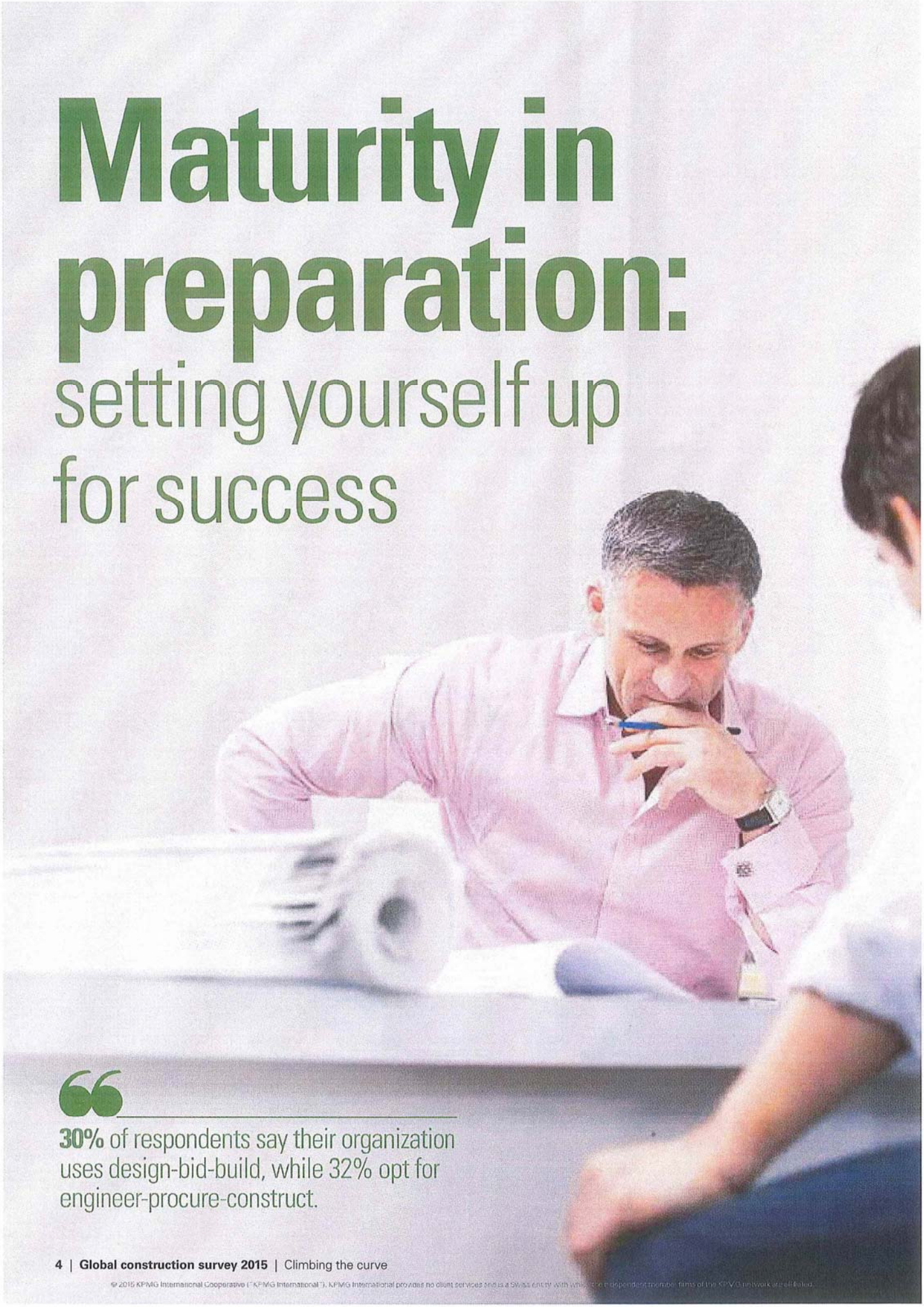
- 82% expect greater owner/contractor collaboration over the next 5 years
- Just 32% have a high level of trust in their contractors
- 69% say poor contractor performance is the single biggest reason for project underperformance

Contracts continue to emphasize the divide between contractors and owners

- 58% are lump sum (fixed price) contracts
- 72% hold full competitive tenders when awarding contracts
- 48% expect to have more negotiating strength vis-à-vis contractors

Maturity in preparation:

setting yourself up for success



30% of respondents say their organization uses design-bid-build, while 32% opt for engineer-procure-construct.

Most of the owners in the survey use formal screening, prioritizing and approval processes for projects, including financial and risk analysis

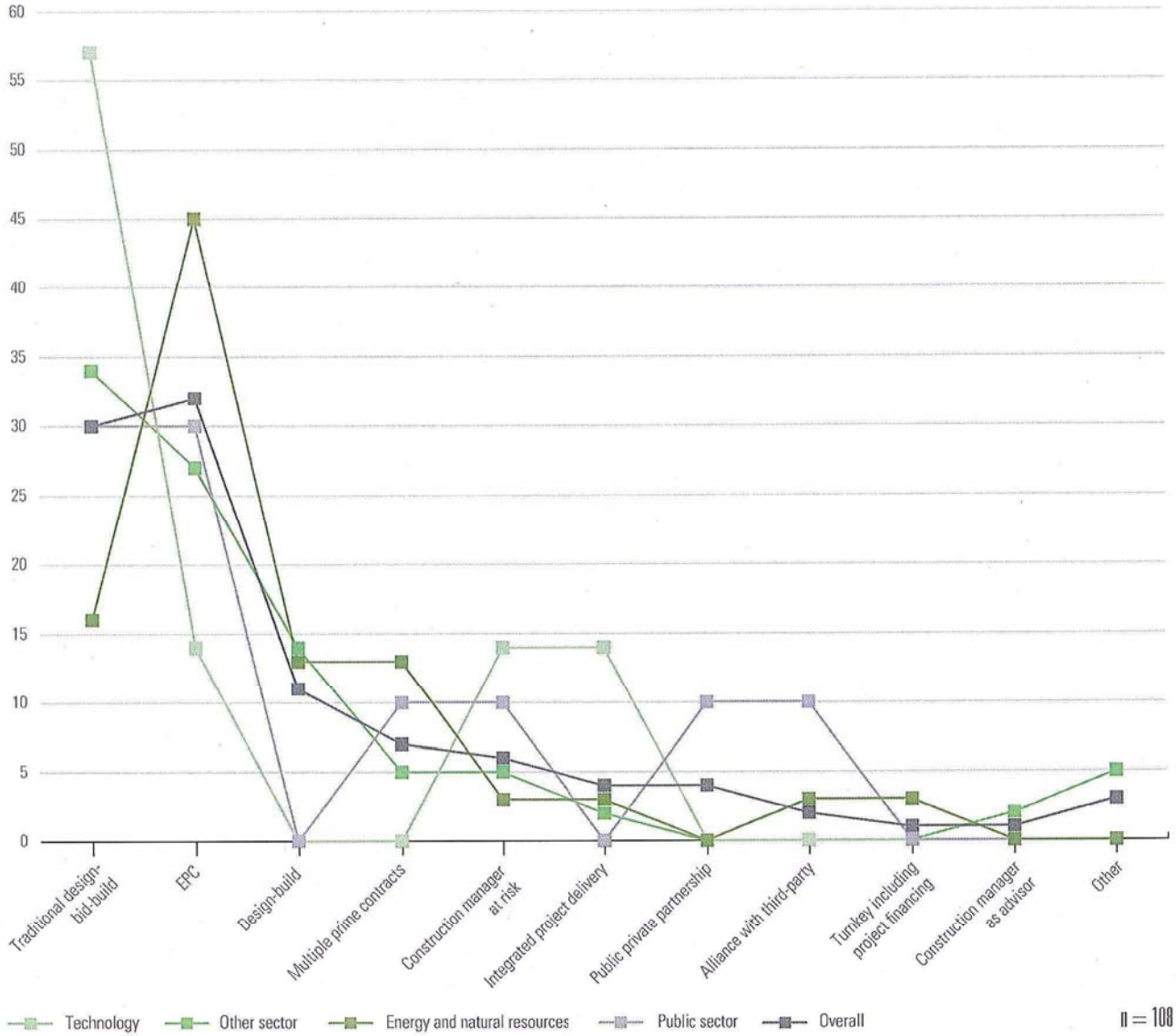
Despite some concerns about a lack of flexibility, the traditional design-bid-build approach remains one of the two most popular project delivery strategies, enabling the owner to work with various suppliers for different aspects of the project. Sharing the top spot is engineer, procure, construct (EPC), which leaves the contractor in control of design, procurement and construction, giving the owner a single point of contact from start to finish. Both these delivery strategies shift the project risk firmly into the hands of the contractor and suggest either a high level of trust in contractors – or a desire by construction owners to defer the risk and responsibility of project execution to contractors.

Almost half of the respondents are concerned about the lack of key skills in-house and augment their teams with external specialists

Respondents from companies in the energy and natural resources sector are the most likely to favor EPC, while technology businesses, and organizations with a turnover of US$1 billion to US$5 billion, are more likely to favor design-build.

There is significant evidence of a mature and structured approach to planning, prioritizing and approving projects. Three-quarters of the executives taking part in the survey say that their organization completes a formal project delivery and contract strategy analysis prior to senior management's authorization of projects. Construction activity is also carefully vetted in advance, with a large majority (84 percent) reporting the use of financial and risk analysis to screen projects.

Most popular project delivery strategy



Source: KPMG International, 2015

Most owners appear to have a formal ranking process for prioritizing potential projects using pre-established criteria such as operational safety, environmental, legal and regulatory factors, and overall return on investment. A substantial proportion also augments this with more ad hoc analyses.

Much as one would expect, more than 80 percent of owners state that the majority of their capital projects are planned (i.e. are within the annual capital plan), and a similar percentage claims that planned and unplanned initiatives must go through the same rigorous approval process.

Although over half of those taking part in the 2015 survey plan projects at least 5 years ahead, executives from the larger companies are more likely to have a shorter timeframe. Fifty percent of those from organizations with annual turnover greater than US$5 billion say that they only plan ahead for 3 or fewer years. This could reflect the need to respond quickly to changes in demand, backed by a more sophisticated forecasting capability and an internal project development and management team that can mobilize at short notice.

Number of years into the future organizations plan capital construction projects

Source: KPMG International, 2015

84% of owners surveyed utilize financial and risk analysis to screen projects.

Prioritizing projects: Optimizing your portfolio

Jeff Shaw
Director, KPMG in South Africa, discusses the processes and considerations needed to help optimize project portfolios.

Whether project owners are operating in buoyant capital project markets or in those still emerging from the economic slowdown there is intense competition internally for funding and people, and externally for scarce contractor resources. Consequently, organizations need to manage their capital efficiently and effectively across a wide range of projects, to ensure they are aligned with strategic goals.

Core capital allocation components include capital budgeting and planning policies and procedures, a cross-functional capital review committee, and a robust system for tracking and reporting across the portfolio. All potential projects should be systematically identified, classified, screened, prioritized, evaluated and selected. This process must be supported by an appropriate budget allocation and monitoring process. Throughout the capital allocation process, alignment between strategic objectives and the capital project portfolio must be tested.

Of course, this is not the only way to optimize the portfolio; however, this and other approaches should always have established guidelines, to keep projects in line with growth and profitability targets.

With a seemingly endless pool of possible projects, and the need to balance competing interests within ever changing capital and capacity constraints, organizations can struggle to choose the most appropriate mix. Some lack basic guidelines, and may cast the net too wide, which leads to a time-consuming review process that overloads decision-makers with excess information, and causes unwanted internal conflict. Others employ unnecessarily narrow parameters that fail to allow for innovative suggestions that could bring great value.

Once a project is selected, it is easy to neglect the process of evaluating performance against the original business case, to clarify any learnings and document financial data. Given the huge amounts spent on construction projects, the relative success or failure of capital allocation and portfolio optimization could ultimately determine the organization's entire survival.

Keeping the talent conveyor belt running

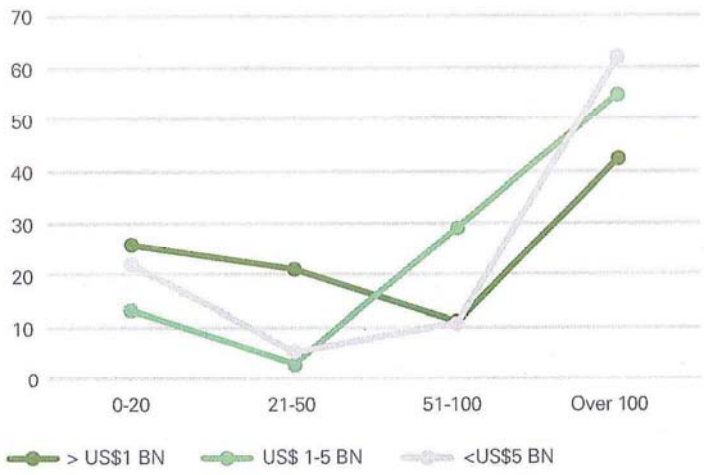
In order to successfully manage the enormous responsibility of a multi-billion dollar project, owners are heavily dependent upon capable project management teams that understand engineering and construction, project management principles and practices and, not least, the increasingly sophisticated technology that controls every step.

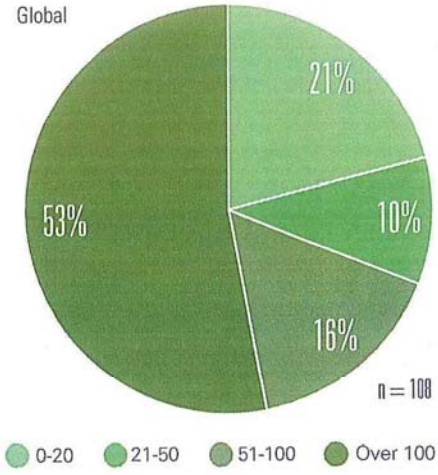
The talent gap is a much-discussed phenomenon in the industry, and owners face the same challenges that contractors have been grappling with for years – to attract, train and retain the best people in the face of severe competition from other sectors. Forty-four percent of respondents say that they struggle to attract qualified craft labor to projects, and a similar percentage claims that a lack of available planners and project management professionals is hampering their project progress.

One respondent feels that one of the organization's most pressing needs is: "making sure we have well trained project managers with good tools to complete projects on time and within budget."

Not surprisingly, there is a strong correlation between organizational size and number of full-time employees specifically assigned to projects. Almost half of respondents from smaller organizations (less than US$1 billion turnover) have 50 or fewer staff, while for the largest entities (turnover greater than US$5 billion), three-quarters have teams of over 50 and 62 percent have more than 100 employees.

Number of full-time employees (FTE) planning and managing capital construction projects





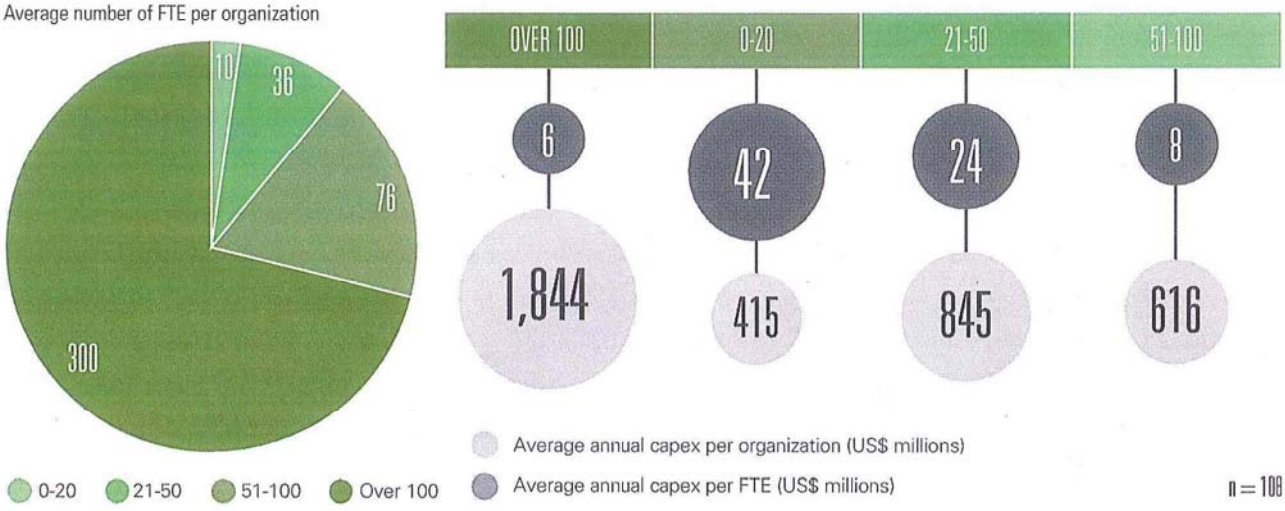
Source: KPMG International, 2015

Those organizations with fewer full-time project staff tend to have a higher annual average capital expenditure per employee. Fears that this could stretch their resources are not borne out by the findings, which show that the smaller institutions in the survey also report a lower rate of underperforming projects. This suggests that it is not the quantity of employees that makes the difference, but the quality of employees.

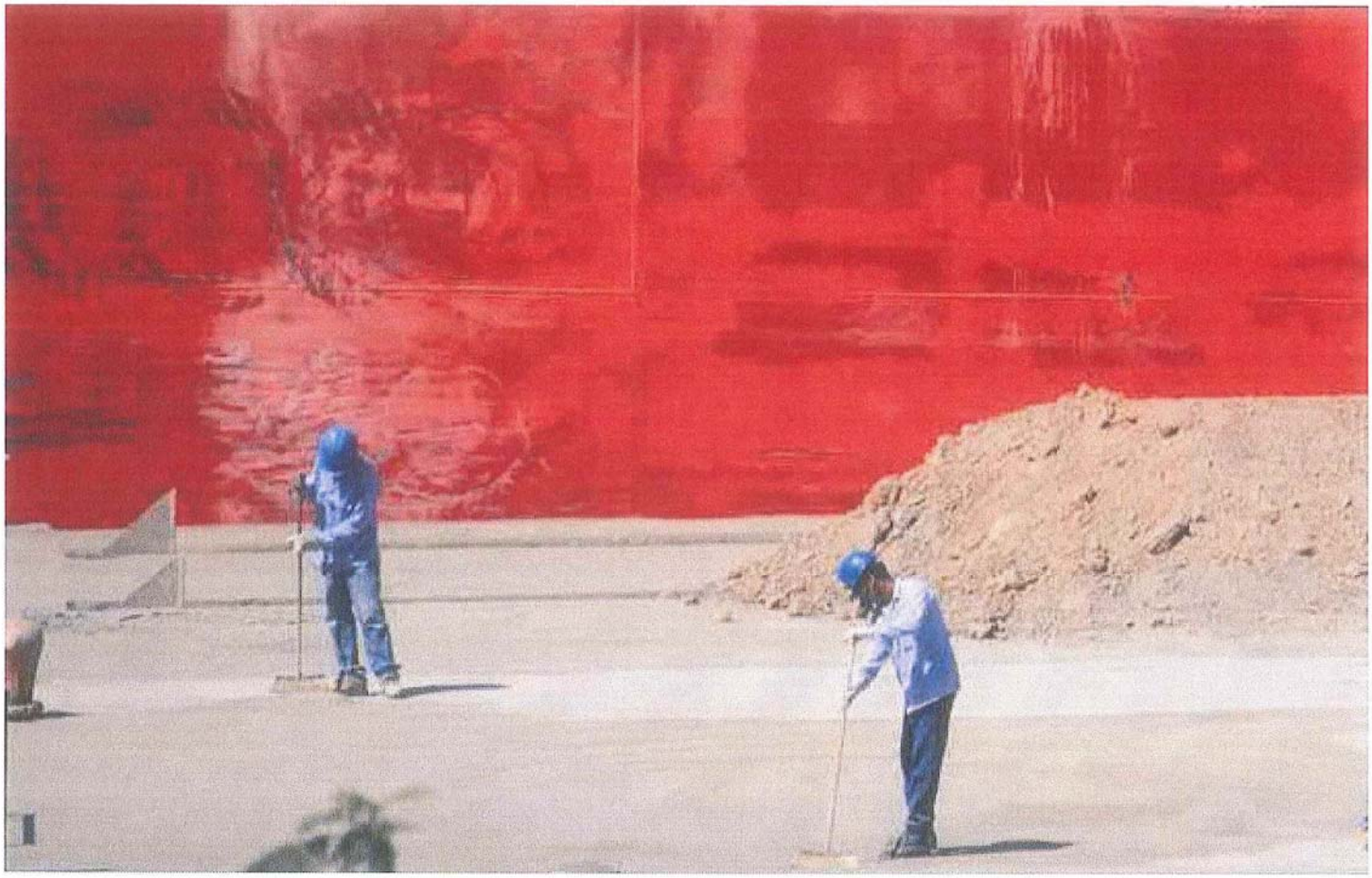
The larger the organization, the more likely it is to have a significant pool of tried and tested project workers. Twenty-nine percent of respondents from larger entities say that they select their teams based upon past performance, compared to just 11 percent for the smaller organizations. Nevertheless, most project workers are chosen on a case-by-case basis.

> **44%** of respondents struggle to attract qualified craft labor and 45% cite a lack of planners and project managers.

Number of FTE planning and managing capital construction projects



Source: KPMG International, 2015



A need for outside assistance

Despite investment in recruitment and training, owners routinely bolster their project teams with additional, temporary personnel, particularly in the aforementioned areas of craft labor and planners and project management specialists. Over two-thirds of the executives in the survey note the need to hire a significant number (more than 5 percent of the total workforce) of external project or program management experts to supplement existing staff. And, the larger the organization, the greater the need: 87 percent of the larger institutions report the necessity to bring in outside people.

The energy and natural resources sector has been hit hard by the recent plummeting price of oil, and most players, if not all, will have to reduce staff numbers, which can stretch resources when carrying out major construction projects.

Organizations hiring more than 5% of external project or program management personnel to supplement FTE

Source: KPMG International, 2015

> **87%** of the larger organizations in the survey need to augment project teams with external resources.

Thinking differently: a strategic approach to talent management?

Angela Gildea
Principal, KPMG in the US, argues that project owners in traditional sectors should look to new industries for inspiration.

The art of managing mega projects is declining, while the projects themselves are becoming ever more complex. With many organizations outsourcing increasing numbers of tasks to engineering and construction firms, the required skills of internal staff change from 'executing' projects to managing schedules and contractors. And all of this is happening at a time when many traditional owners are seeing graduates enticed by different, often better rewarded positions in new industries. Companies can reap great benefits by taking a fresh approach to talent management.

Be more strategic
Research has found a distinct correlation between strong talent practices and greater shareholder return. For high performing companies, talent management is more than just a Human Resource issue – it's a strategic imperative and should therefore be closely aligned with wider business objectives and accountability shared across all levels of leadership. This means integrating talent considerations into the following areas:

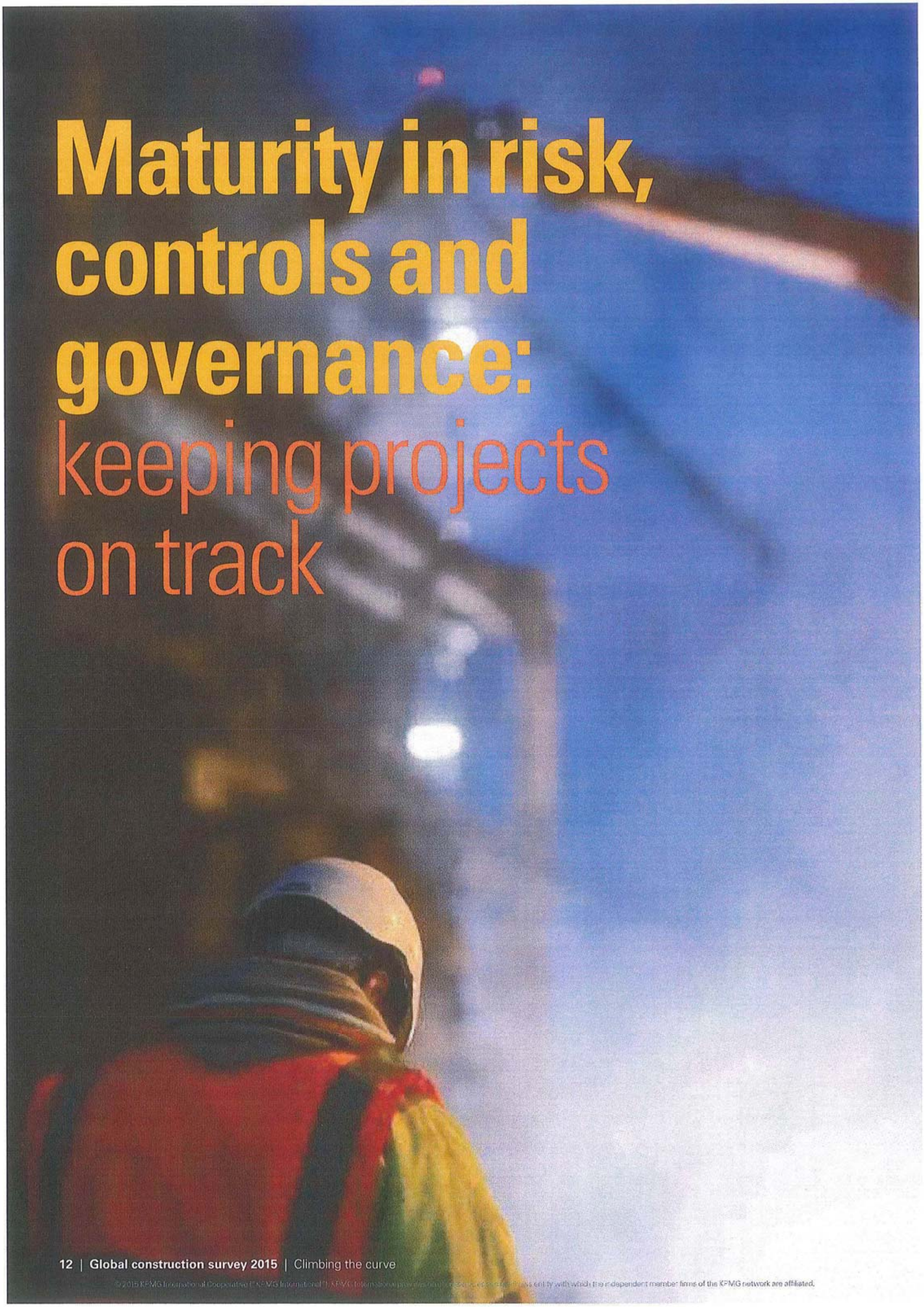
- **business strategy:** to determine the people and processes to help achieve your goals
- **risk management:** ensuring availability of key resources and planning successors
- **investment and measurement:** measuring the return on investment in talent
- **governance and infrastructure:** ensuring clear ownership of talent management, with appropriate data and systems support.

Analytics: using data to drive talent decisions
Although data analytics is a mainstay in business operations, organizations have been slower to embrace this approach for managing talent, where uses include:

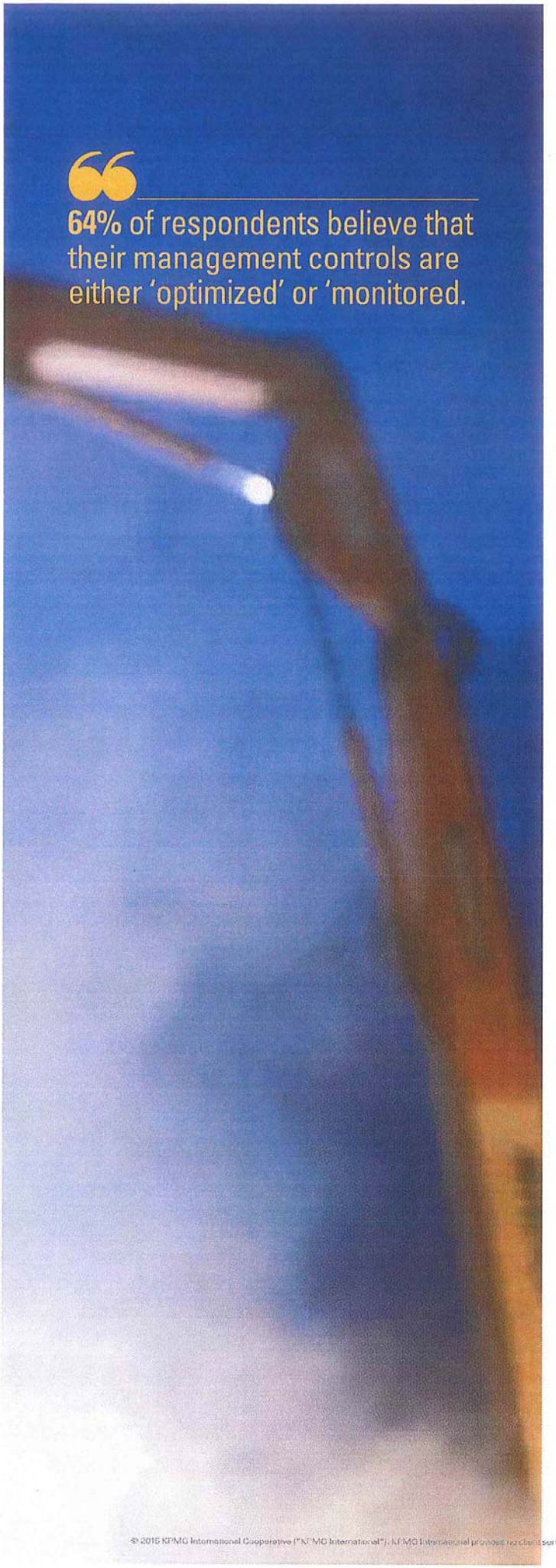
- **predictive modeling:** to more accurately forecast future people needs
- **retention algorithms:** to predict which employees are most likely to leave or retire
- **valuing top performers:** calculating the (potentially significant) difference between average and exceptional employees, to justify recruitment strategies and acknowledge individual contributions.

Embrace diversity...of cognitive thought
Most organizations now routinely consider diversity in their hiring practices, but this typically covers gender, race and culture. More enlightened employers are also seeking diversity of a different kind: of cognitive thought, using the following practices:

- **learning and training:** by incorporating courses into formal learning curriculum to build and encourage cognitive diversity
- **hiring the unconventional candidate:** looking beyond the traditional resumé for different skill sets. For instance, data scientists and mathematicians are being hired for operational roles, to introduce innovation and "out of the box" thinking.
- **looking beyond established employees:** to gain additional, external insight from suppliers, independent contractors, customers and recent experienced hires, utilizing emerging technologies such as crowdsourcing and gamification.



Maturity in risk, controls and governance: keeping projects on track



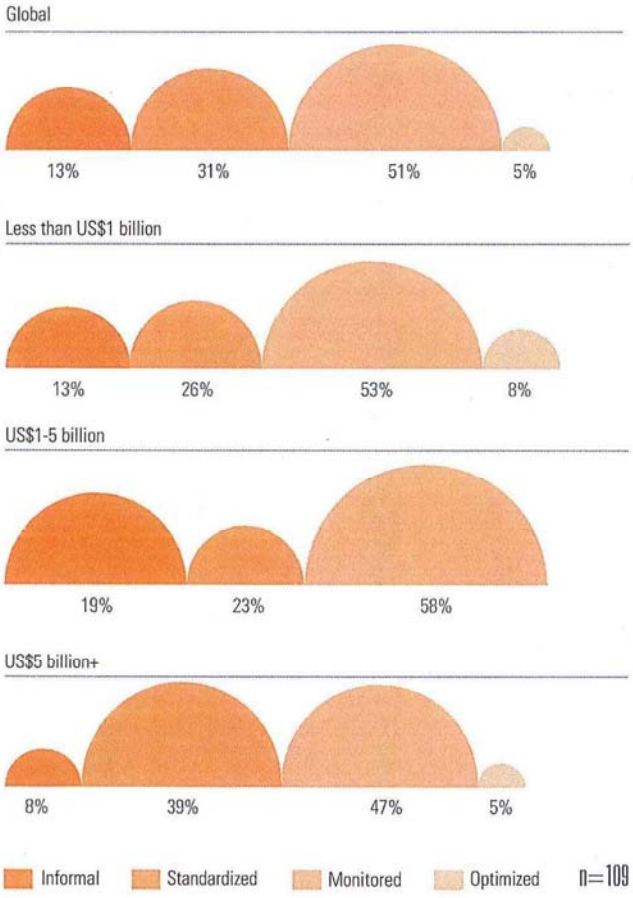
64% of respondents believe that their management controls are either 'optimized' or 'monitored.

- **Owners appear confident that their investments in project controls have paid off**
- **Half of the respondents say their organization has yet to introduce an integrated project management information system (PMIS)**

A strong sense of optimism pervades the responses to this year's survey. Sixty-four percent believe that their management controls are either 'optimized' or 'monitored,' meaning that they are documented and integrated, with either real-time or periodic testing and reporting, and frequent or occasional training.

However, almost a third of respondents feel their controls are merely 'standardized,' with no testing or reporting to management and only limited training of staff. These organizations may need to consider how they can upgrade this approach to introduce a best practice. The technology companies taking part in the survey are the least likely to have optimized or monitored controls.

Level of sophistication of project management controls



Source: KPMG International, 2015

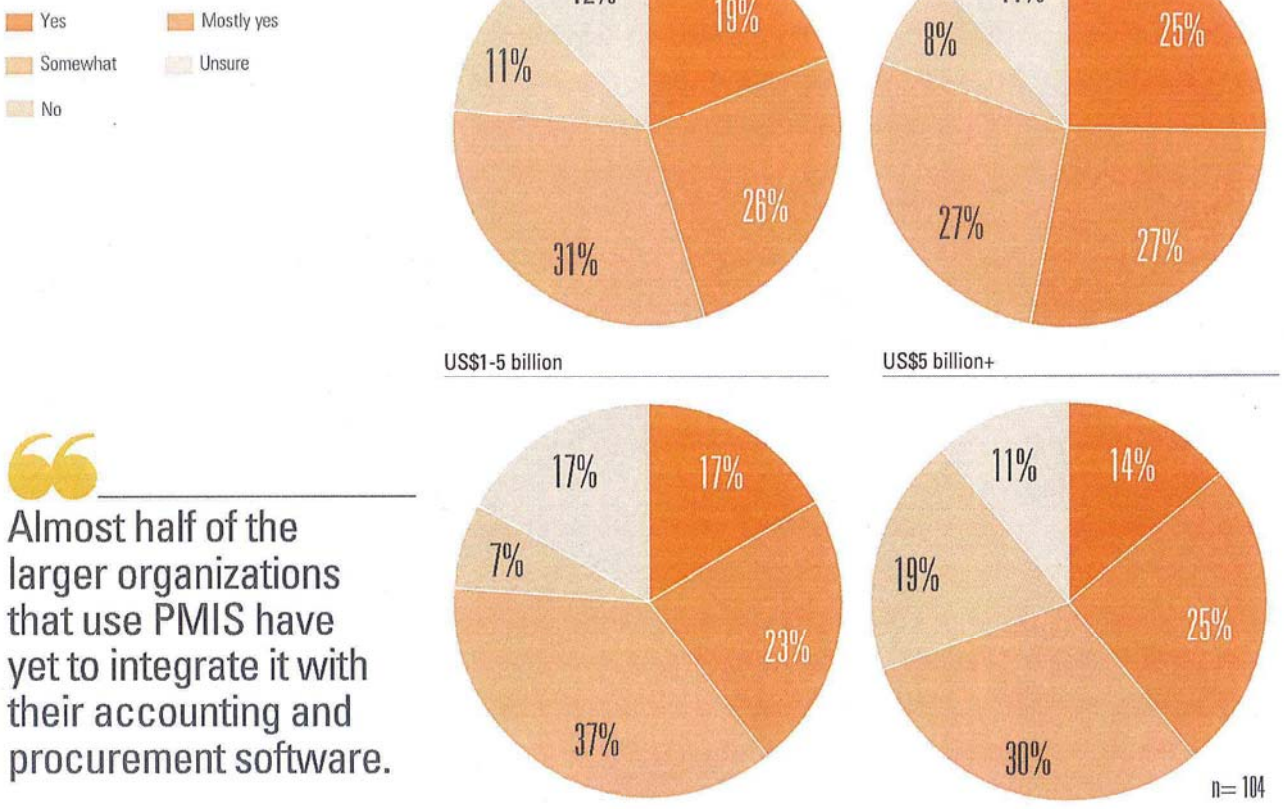
Over the past decade, owners have paid considerable attention to introducing cutting-edge software to improve their project controls. This appears to have brought positive results. When asked about the return on investment in project management tools and training, 55 percent indicate that they are either 'satisfied' or 'mostly satisfied,' while just a handful (13 percent) say they are not satisfied. It is a similar story when it comes to assessing the benefits of investment in risk management tools and project cost reduction.

The respondents also believe that the money spent on project governance and controls has paid off. Over three-quarters say that they have 'definitely', 'mostly' or 'somewhat' reduced costs. However, a significant minority of executives (30 percent) from larger organizations in the survey believe that these investments have either not resulted in lower costs, or are unsure of their benefits. It is possible that the scale and complexity of the organization, along with disparate systems, have restricted the impact of new software, which may not be fully integrated.

The optimism continues when the subject of reporting is raised. A large majority of 73 percent are confident about the accuracy and timeliness of the project level reports they get from their project managers and contractors. Once again, however, respondents from the bigger companies or institutions are slightly more cautious, with a third not convinced of the quality of reports, which could reflect the dearth of skilled personnel among their substantial project management workforces.

Most respondents (86 percent) say that their capital construction projects are tracked and reported on a portfolio basis.

Have investments in project governance and controls reduced project costs?



Source: KPMG International, 2015

> Almost half of the larger organizations that use PMIS have yet to integrate it with their accounting and procurement software.

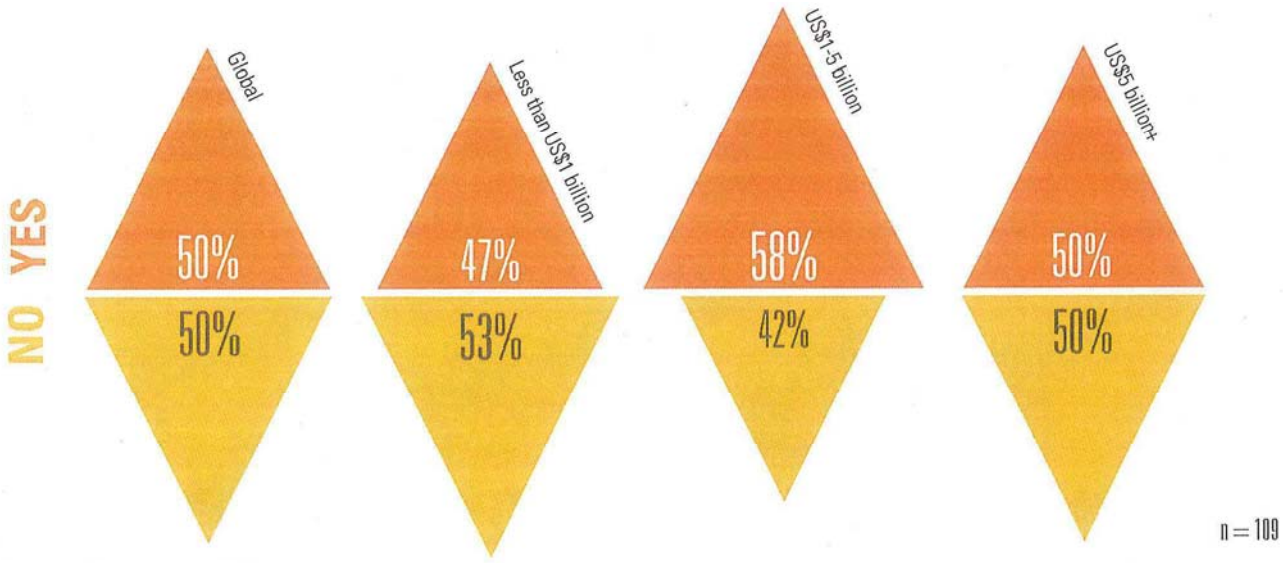
Project management information system use still not widespread

A PMIS is designed to improve project planning, scheduling, monitoring and controlling, in order to raise the quality of decision-making in each phase of the project life cycle. It enables engineers and project managers to communicate project status swiftly and accurately with functional departments, while also keeping senior management up to speed on all the projects in the organization's portfolio.

The respondents to this year's survey are divided exactly 50:50 in their use of such systems, suggesting there is considerable room for improvement – although 41 percent of those without a PMIS say that they plan to acquire one within 2 years.

Of those who have embraced PMIS, a third have yet to integrate it with their accounting and procurement software, and are consequently failing to realize the full benefits of this technology. This figure leaps to 47 percent among the bigger organizations where, arguably, the potential upside is even greater given the scale of their engineering and construction projects.

Is your organization using PMIS to plan and control capital construction projects?



Source: KPMG International, 2015

The perils of confidence: realities of benchmarking

Clay Gilge
Partner Advisory, KPMG in the US, explains how benchmarking the effectiveness of project management processes can provide a much-needed reality check.

Is the confidence in project controls expressed by the survey participants warranted or misplaced? Our global clients ask the same question continuously, as they strive to avoid the kind of setbacks that can cost millions, damage reputations and hold back business.

In response, we have come up with an ongoing benchmarking analysis that evaluates the maturity of clients' processes and controls over time against peers, as well as internally by region and business unit. Ranking these controls at four levels, from the lowest tier 'informal,' through 'standardized,' 'monitored' and, finally, 'optimized,' we find that organizations are consistently over-optimistic in their self-ratings, which typically are a whole tier above our rigorous benchmarked findings.

In this year's survey, for example, 51 percent of owners indicated they are 'monitored,' when our data indicates that only 28 percent have reached this level, with a majority still merely 'standardized.' An inappropriate rating could generate a degree of over-confidence that could potentially lead to problems.

Our tried-and-tested approach requires the verification of actual project management process and control maturity, through document review and project testing. This gives the benchmarking far more depth and enables clients – many of whom are Fortune 500 companies or public infrastructure organizations – to develop a road map toward continuous improvement. As you would expect, the cloud-based methodology is grounded in global project management standards and frameworks such as PMBOK and PRINCE2. We also quickly realized that any assessment must include additional criteria such as sustainability, fraud risk management and 'soft' controls, all of which have been integrated into the benchmarking to produce a comprehensive picture.

Tier 1 – Informal

- minimal processes or controls are designed or appear effective
- no apparent project management process/control for monitoring or improvement activity.

Tier 2 – Standardized

- project management process/control design and effectiveness appear to be moderate
- minimal project management process/control monitoring or improvement activity.

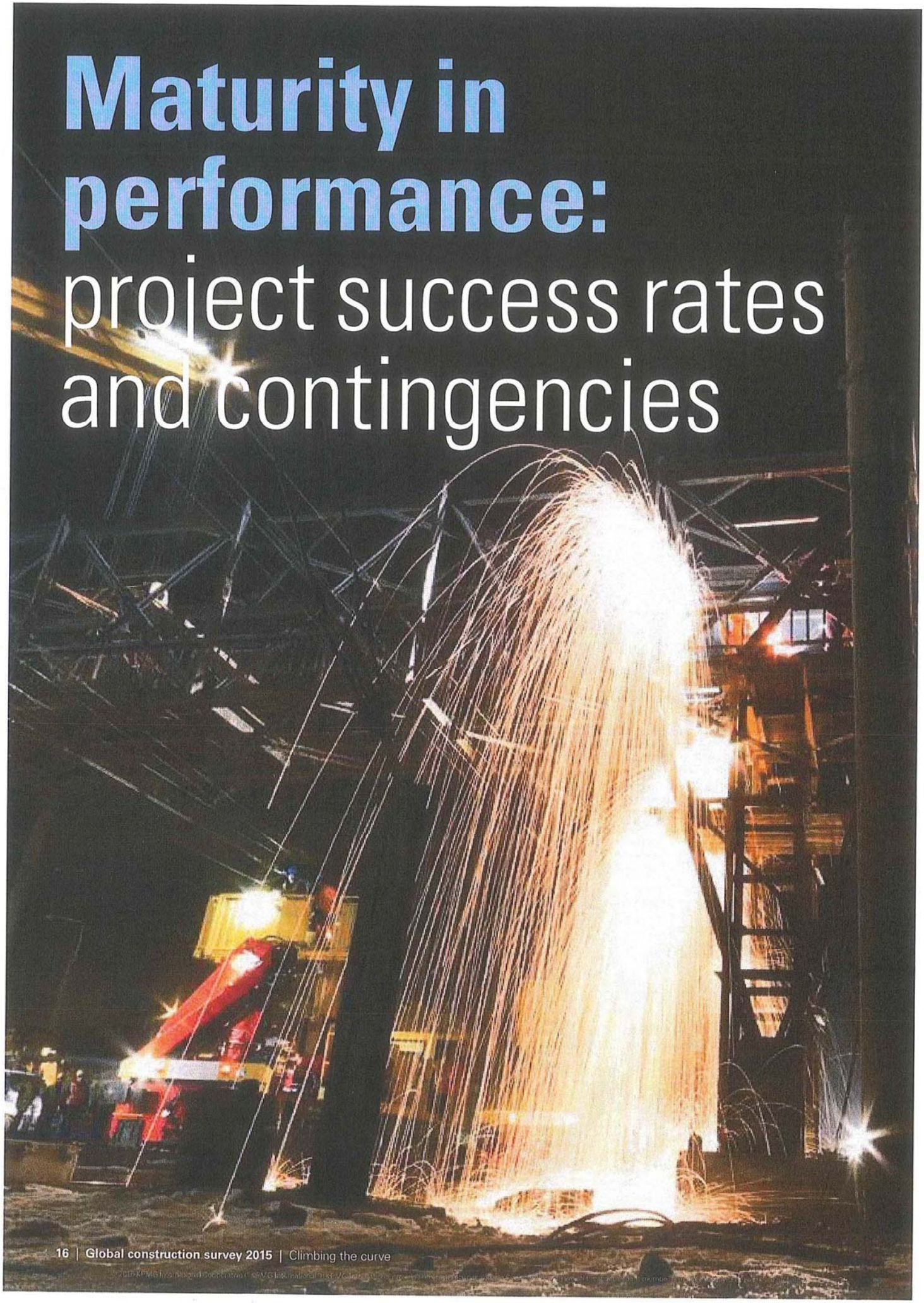
Tier 3 – Monitored

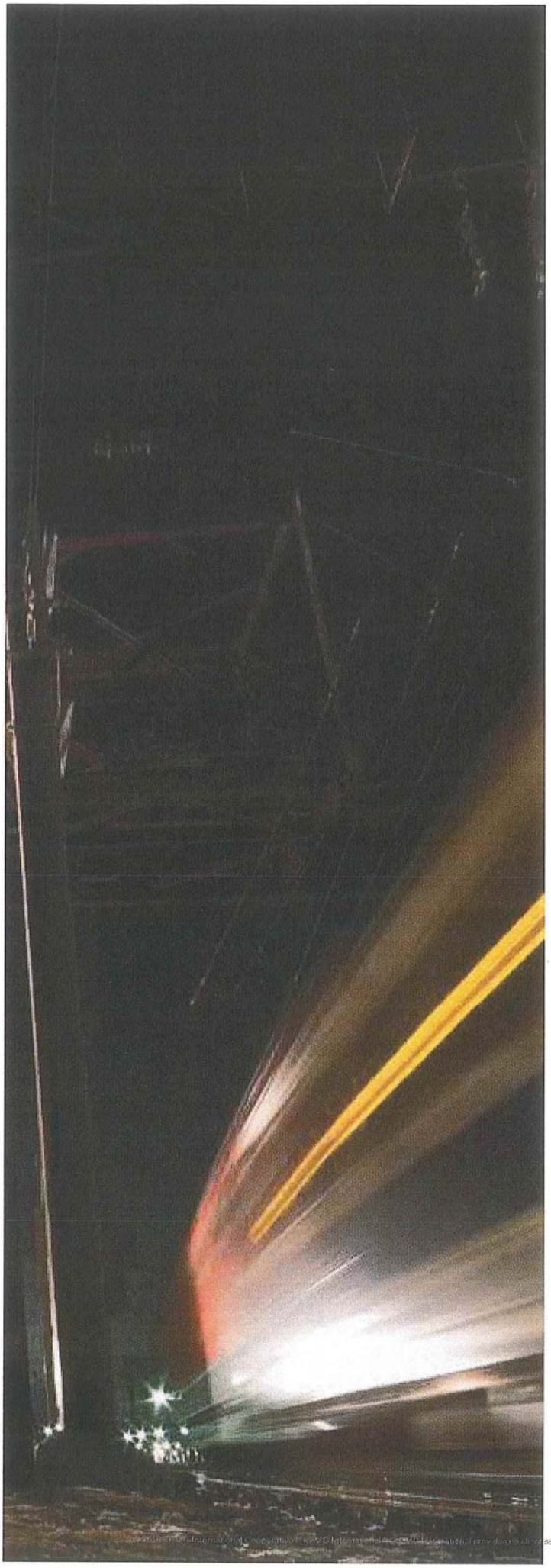
- project management process/control design and effectiveness appear adequate
- periodic project management process/control monitoring and improvement.

Tier 4 – Optimized

- comprehensive project management process/control design that appears to be effective
- continual project management process/control monitoring and improvement.

Maturity in performance: project success rates and contingencies



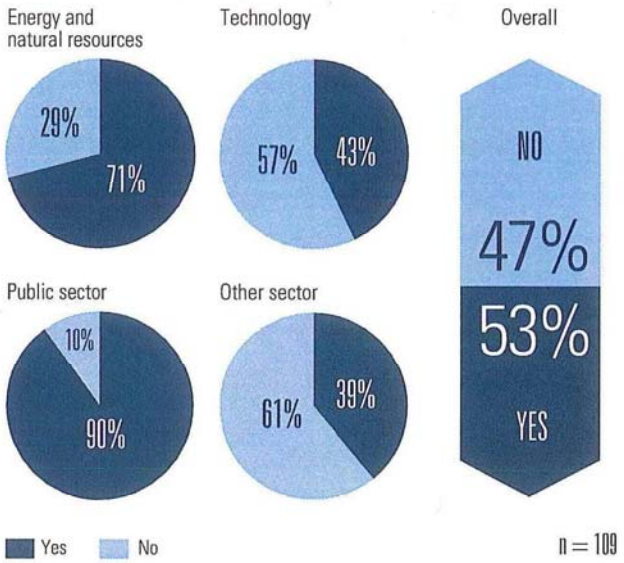


> Realism eats optimism for breakfast – owners should demand practical targets from contractors based upon realistic expectations of what can go wrong.

- **Owners are still failing to bring projects in on time and on budget – especially those in the energy and natural resources and public sectors**
- **Half of respondents do not use a management reserve, which could lead to an over-optimistic view**

The significant investment in project controls – and the high levels of confidence that many owners have in these controls – have not halted the run of underperforming projects. Over half of all the respondents state that they suffered one or more underperforming projects in the previous financial year. For larger organizations, this rose to 61 percent, while executives from the energy and natural resources and public sectors experienced even higher levels of project failure, at 71 percent and 90 percent respectively.

Underperforming projects during the last financial year



Source: KPMG International, 2015

Looking back over the past 3 years, fewer than one-third of all respondents' projects managed to come within 10 percent of the planned budget, with the energy and natural resources, and especially the public sector, performing considerably worse than other industries.

Percentage of projects meeting planned budgets

Source: KPMG International, 2015

And, in the same time period, just a quarter of construction projects came within 10 percent of their original deadlines; only one in ten public sector organizations managed to hit this target.

One interesting observation is that businesses with turnover between US$1 billion and US$5 billion report the best results. Forty-five percent say they met, or were very close to meeting, their budget, and 34 percent managed to achieve similar high standards for delivery times.

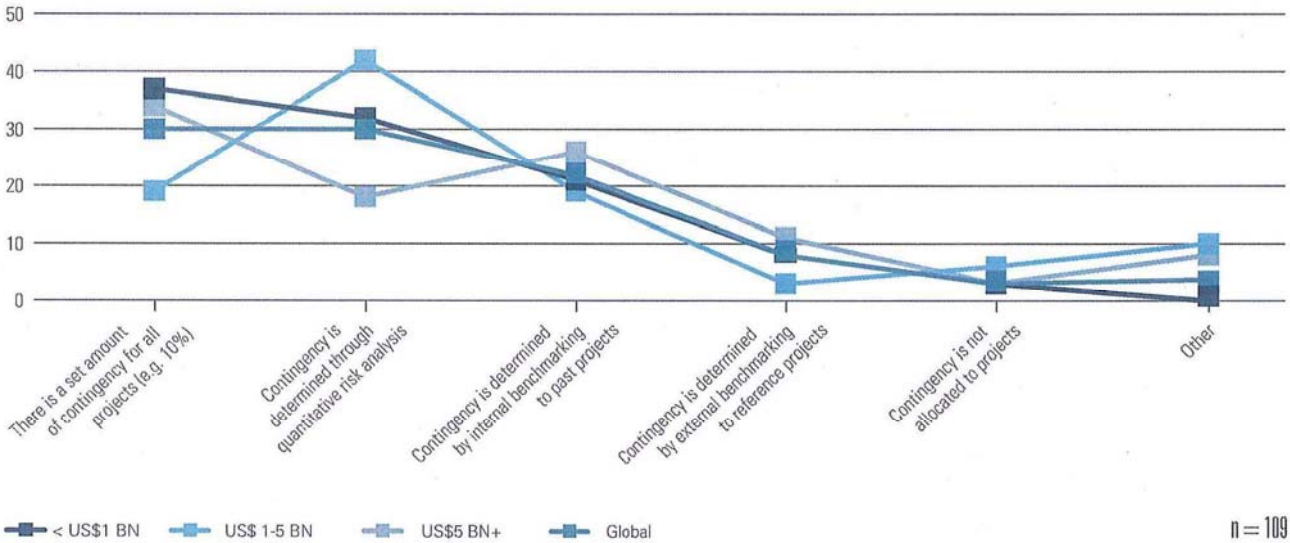
These findings suggest that, while controls may bring many benefits, they have yet to be fully and effectively embedded. The results also raise questions on the skills of those working with the various controls, either within PMIS or otherwise.

Planning for delays and cost overruns

According to one of the survey participants, one of the biggest concerns is "Accurate estimating of anticipated costs prior to committing to the project. Projects are moving so fast they have limited time to develop the scope and accurately estimate costs. This results in issues where the standard contingency used (10 percent) is not enough to cover the project risks."

Contingency planning typically involves downside risk estimates for budget and delivery times throughout the project life cycle. According to the senior executives participating in this year's survey, a range of methods is used to calculate contingency levels. The two most popular approaches are: 1) a set percentage, and 2) quantitative risk analysis, with 30 percent respectively opting for these choices. The relative sophistication of the latter suggests that owners are trying to become more accurate in their forecasting, with respondents from companies of US$1 billion to US$5 billion turnover more likely to adopt quantitative risk analysis.

Main method for determining project contingency



Source: KPMG International, 2015

The survey findings indicate that bigger organizations (which tend to have larger and more complex projects) are more likely to take a conservative view of contingency levels. Over half of the respondents from this segment report that the typical range of contingency is greater than 10 percent of the total estimated cost. Arguably, the size and scale of their project portfolios have led to a cautious attitude, tempered by past project cost overruns.

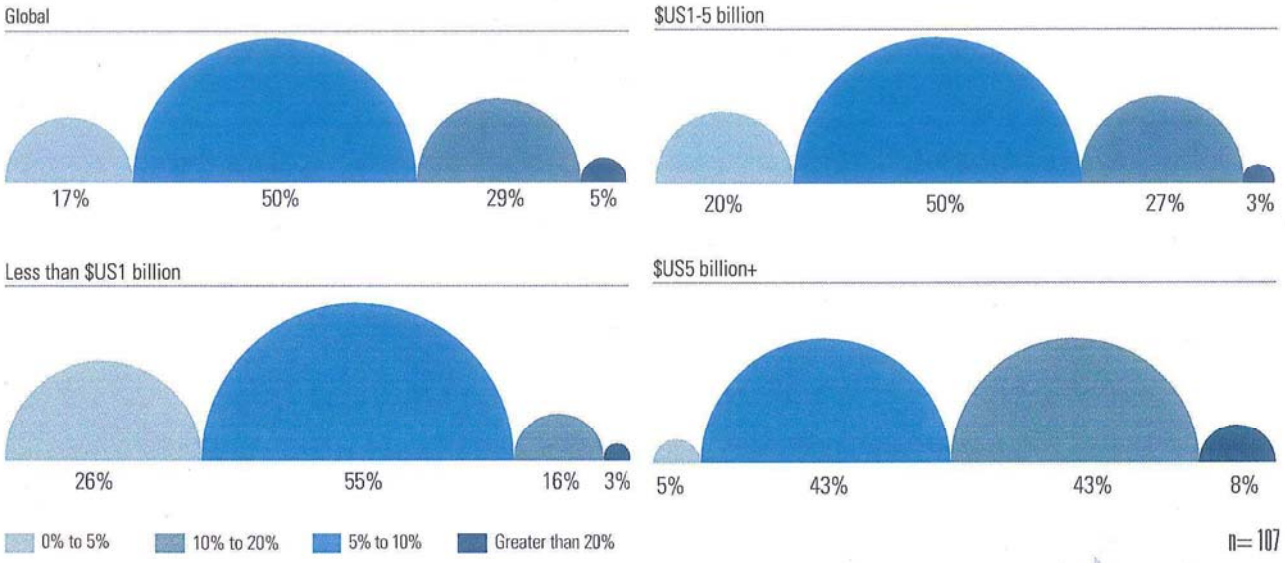
Only half of the respondents state that their organizations use both a project level contingency *and* a management reserve. Management reserves recognize the potential for risks that are outside of the project team's ability to control, which reflects a more realistic and pragmatic view.

In terms of managing contingencies, the single most common method (used by a third of respondents) is to allocate and, if necessary, reallocate contingency funds directly to control accounts based on ongoing project risk assessments. While the use of ongoing risk assessments is a leading practice, allocation of contingency directly to control accounts does not give the project manager good visibility into how the contingency is being used.

Thirty percent (and 34 percent of executives from larger organizations) say that they choose to draw down from a single pool of contingency based upon project risks, which shows a more mature and sophisticated approach.

A further 23 percent operate contingency as a single "balancing account" with transfers to and from other control accounts as needed. This only tracks contingency in and out of the project and is not a preferred means of managing contingency in the context of risk.

Range of project contingency (as a percentage of estimated costs)



Source: KPMG International, 2015

Less optimism, more logic: the art of scheduling

Gerald Long
Manager Advisory, KPMG in the US, explains some of the lessons he's learned from over 30 years in construction management.

Scheduling is one of the most difficult and least understood aspects of a project. As well as helping to plan ahead and model outcomes, it can track progress and provide realistic expectations.

With tens of thousands of activities to manage, too many project teams get bogged down in intense detail at earlier stages, rather than viewing activities at a summary level. And most scheduling is far too optimistic, based upon tight estimates with little leeway for delays. It's little surprise that, as this survey shows, only a small proportion of projects meet their delivery and cost goals.

We prefer to apply logic built upon knowledge and experience of what actually happens during the construction life cycle – and what can go wrong. Unfortunately, contractors are nervous about doing this, for fear of scaring the owner, so persist with unachievable targets. Scheduling is not a 'dark art,' but it is a complex one, and practitioners must be intimate with the many sequences within a project, and know what questions to ask subject matter experts. They also need to be able to link the cash flow with the work flow, to evaluate the financial impact of any delays.

The biggest project failures are caused by poor scope management and inadequate communication. A good scheduler stays on top of the workflow and keeps the client informed of realistic progress and projected outcomes.

Maturity in relationships: the new dynamics of collaboration

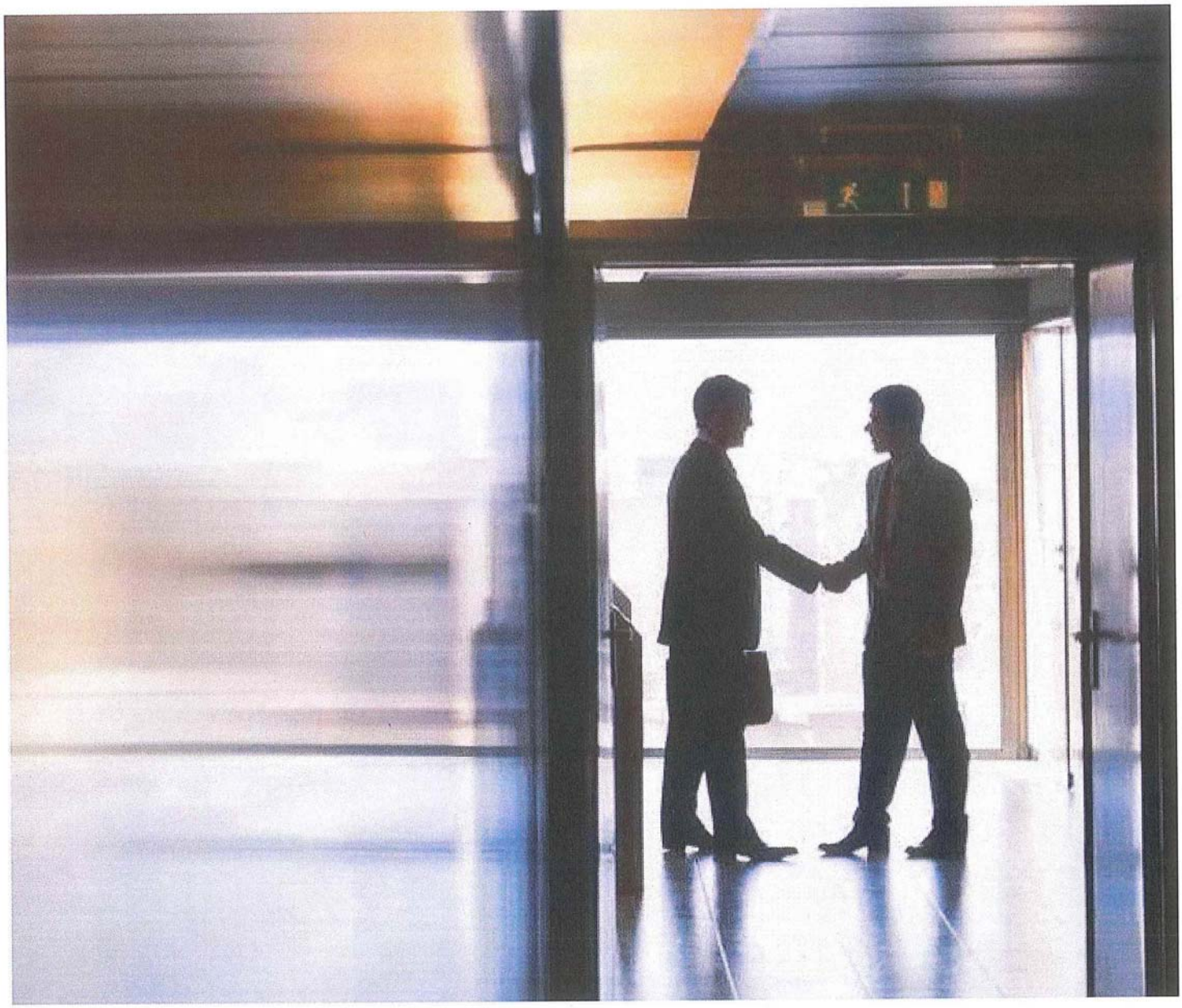
82% of respondents expect greater owner/contractor collaboration over the next 5 years.

- **Project owners seek closer ties with contractors, but have yet to build truly trusting partnerships**
- **Lump sum/fixed price contracts remain the norm**

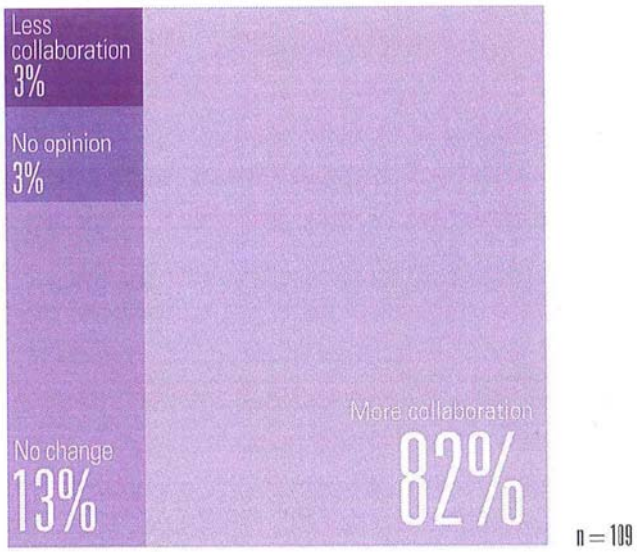
Successful projects are dependent upon strong teamwork, and owners are constantly reviewing the effectiveness of their relationships with contractors. An overwhelming majority of the respondents anticipate more collaboration over the next 5 years. One interpretation of these findings is a desire to integrate contractors into the boardroom to help streamline project delivery, drive down prices and pass on greater risk.

There is, however, another way of looking at the results. Owners may want to stay closer to contractors because they do not *fully* trust them. Only a third believe they have a 'high' level of trust in their contractors, with 60 percent describing the degree of trust as merely 'moderate.'

Indeed, poor contractor performance is cited as the single biggest reason for project underperformance, with over two-thirds (69 percent) of survey participants ticking this box.



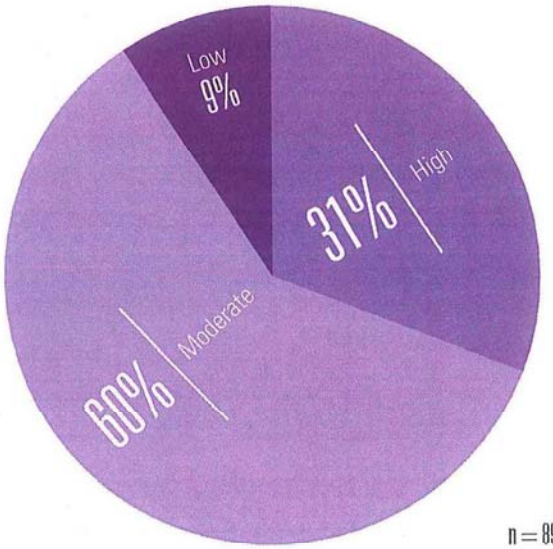
Degree of owner/contractor collaboration over next 5 years



n = 109

Source: KPMG International, 2015

Level of trust between owner and EPC contractors



n = 89

Source: KPMG International, 2015

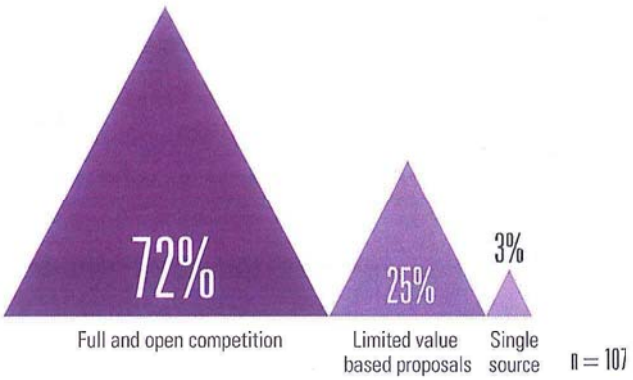
The continued dominance of lump sum (fixed price) contracts underlines the potentially fragile state of owner-contractor relationships. Only the larger organizations involved in the survey embrace other approaches: a quarter use a guaranteed maximum price, while 18 percent adopt a target price with incentives and penalties. A fixed price contract defers risk firmly into the hands of the contractors and does not necessarily foster a collaborative approach.

Seventy-two percent of respondents hold full competitive tenders when awarding contracts, which is another way to maximize risk transfer – and further reflects the lack of trust between owners and contractors. Again, the bigger companies/ institutions show a more enlightened attitude, with 34 percent favoring limited value-based proposals, which reward innovation, expertise and quality, and encourage a greater focus on energy efficiency and design excellence.

Most common contracting strategy

Source: KPMG International, 2015

Primary basis for awarding construction contracts



Source: KPMG International, 2015

Respondents believe that the balance of power is tilting towards owners. Just under half say that they expect to have more negotiating strength when delivering capital projects over the next 5 years, which again, does not imply a more open, collaborative mindset. Executives from larger organizations are more likely to believe that contractors hold the balance of power, which could make this group willing to create equitable, win-win relationships, rather than try to exploit their bargaining position.

> Only a third of respondents believe they have a high level of trust in their contractors.

Regaining control of mega projects

According to
T.G. Jayanth
Vice President Capital Projects, Suncoke Energy Inc., the scale and uncertainty of the very largest construction projects calls for a different approach and more realistic expectations.

Every engineering procurement and construction (EPC) conference I attend is replete with stories of failed mega-projects. As projects have grown larger and more complex, frequently exceeding several billion dollars in value, the capability to execute them effectively has not kept pace.

One response by owner organizations has been an attempt to "contract your way to project success" by passing risk and therefore liability onto contractors. As evidence of this trend, there are several conferences dedicated exclusively to EPC contract management, focused on various risk-sharing strategies.

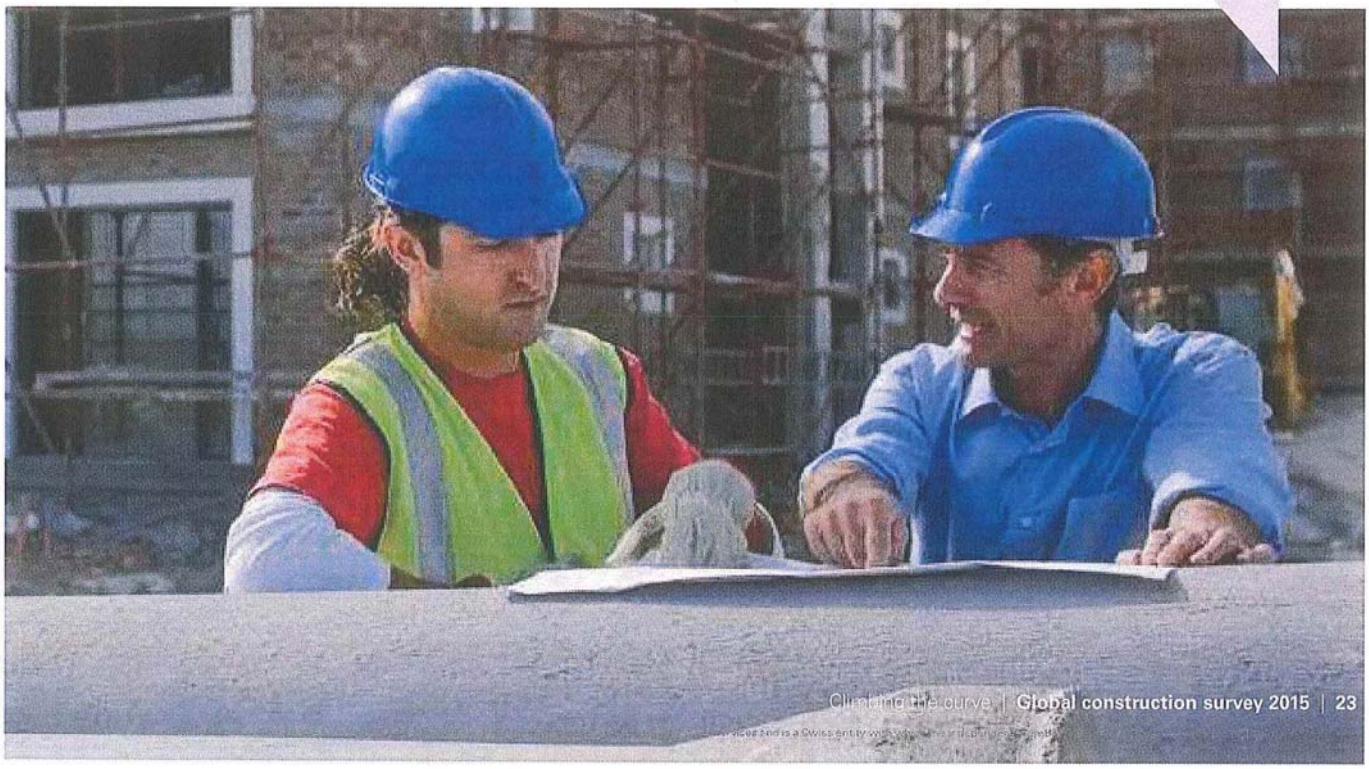
I don't believe that risk-sharing, at least the way it is currently practiced, is a viable long-term solution for mega-projects. Although contractors should be held fully accountable for carrying out their scope of work, all the risks external to the execution should be the *owner's* concern. Transferring these risks to contractors will end up either driving up the bid price (as contractors price in the risk), or potentially deterring contractors from bidding at all. In the extreme, it could drive contractors out of the project business altogether, as they struggle to fully understand and manage risks they are not equipped to deal with. The net result is that owners will end up paying to cover those risks in any case.

Owners may be better advised to fully factor in all risks during the project development phase, and use the increasingly sophisticated risk management tools that are now available, to give their management a realistic picture of the probability of different outcomes. And, with risks identified upfront, project teams have time to seek ways to mitigate them – sometimes with little or no cost impact. Projects should not be approved without a full understanding of the range – and statistical probability – of possible outcomes associated with projects spanning several years.

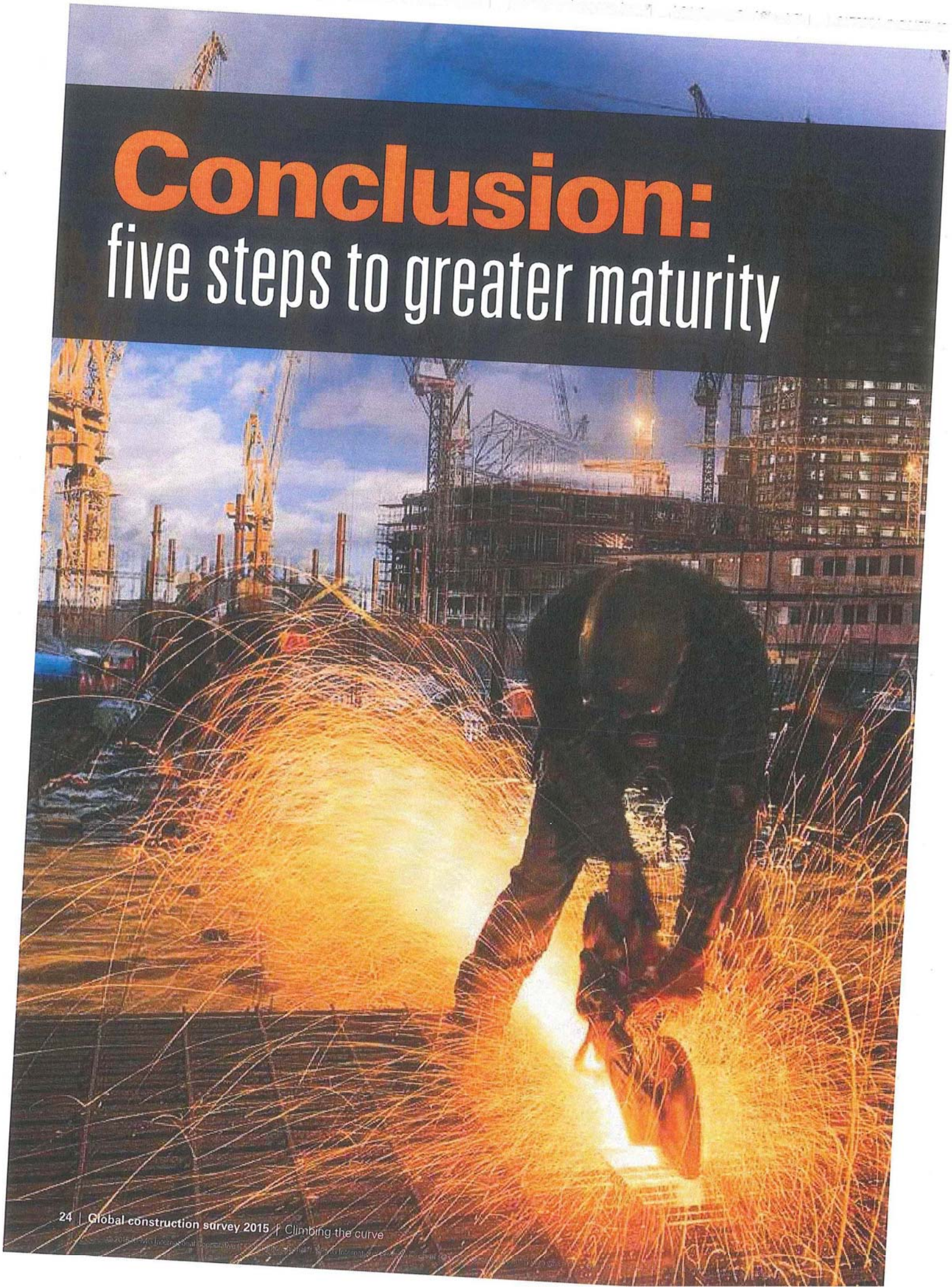
Contract management is important, but good, solid project management and fundamental engineering are arguably even more critical to project success. There is simply no substitute for the meticulous technical and business analysis that's the purpose of the development phase of a project. When this phase needs to be accelerated for business reasons, it is essential to take into account the higher associated risks when estimating return on investment, and ultimately when approving the project.

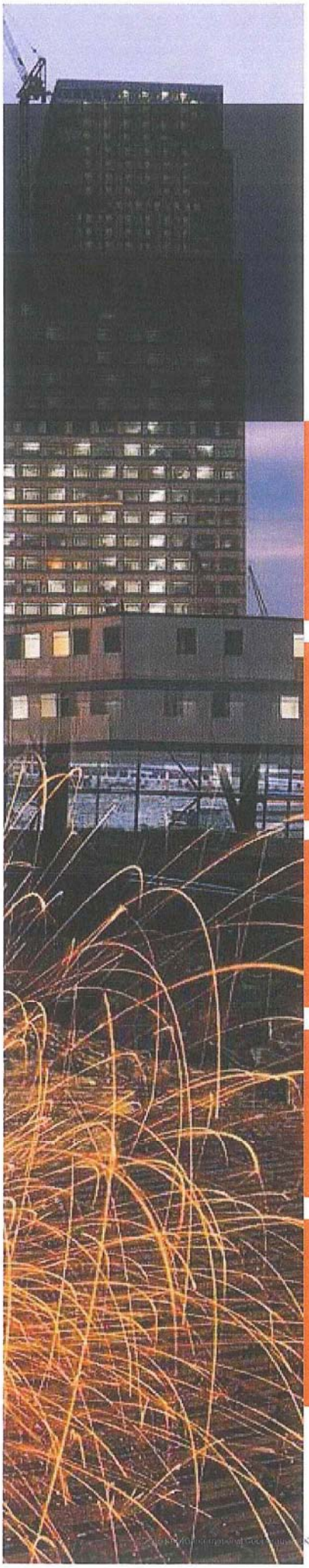
This is especially significant for the increasingly common, multi-billion dollar mega-projects, encompassing global supply chains and spanning multiple geographies. These may take as long as 5 years to complete, during which time steel and energy prices can swing enormously, essential project team members come and go, and stock markets pass through entire cycles, all of which can impact project costs and final product demand. Many of these variations are hard to predict, let alone model even with the best software. In the midst of such uncertainty, it is practically impossible to produce a static forecast of budgets and schedules.

Despite the cautionary note of this commentary, I think the outlook for projects is bright. The good news is that good project management, risk management and engineering practices are receiving growing attention from both owner and contractor companies. This focus on project execution excellence is driving the development of tools, techniques, and training methods that can only improve success rates and reassure our managements of the ability to execute on schedule and on budget.



Conclusion:
five steps to greater maturity





KPMG's 2015 Global Construction Project Owner's Survey reflects the excellent progress made by owners in planning, risk management and execution in recent years. It also highlights a few areas where owners are still striving to improve. As they climb the project management maturity curve, both private and public organizations should consider the following issues:

1

A fresh approach to talent management

An effective recruitment, development and retention strategy should encompass data analytics to help predict future talent needs. And, by widening the net of potential candidates, organizations can attract candidates with new ways of thinking who can augment the existing pool of engineers. Beyond the broadening skills set, there is ultimately no substitute for experience, and owners must find ways to tap into the skill base of older or retiring employees.

2

Integrated project management information systems

The scale and complexity of many of today's construction projects call for swift coordination and real-time reporting. A fully integrated PMIS can keep key stakeholders informed of schedule and cost status, and help enable faster decision-making to keep projects on track.

3

Realism eats optimism for breakfast

Owners should demand practical targets from contractors based upon realistic expectations of what can go wrong. Scheduling needs to balance sufficient slack with targets that stretch – but don't overwhelm. If necessary, owners may seek external scheduling expertise to ensure that they understand the workflow and the full financial impact of delays.

4

Sophistication in contingency

Contingencies should encourage prudent cost management and not be an excuse for overspending. The use of a management reserve acknowledges the potential for uncontrollable risks, while a draw-down approach enables project managers to react quickly and flexibly to situations, while keeping strong control over expenditures.

5

Building an extended team

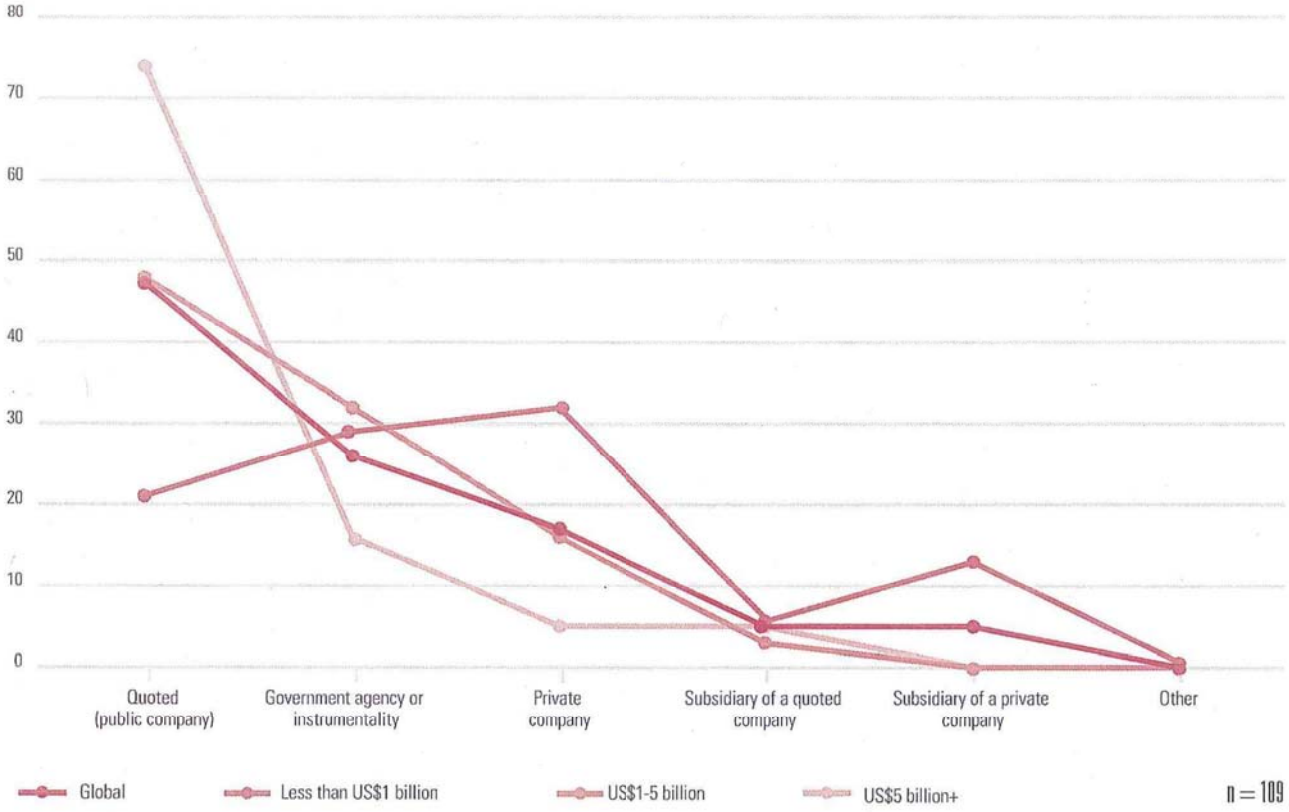
Project owners must invest in relationships with contractors to raise mutual trust and discuss problems or shortcomings. Rather than simply passing all or most of the risk to the contractor, it is preferable to create an integrated project team with common goals and rewards. Where contractors are felt to be lacking in certain skills, owners can discuss how to enhance the team with external expertise.

About the survey

All survey responses were gathered through face-to-face interviews in late 2014 with 109 senior leaders – many of them Chief Executive Officers – from organizations carrying out significant capital construction projects. The interviews were carried out by senior representatives specializing in the engineering and construction industry from KPMG member firms, with the questions reflecting current and ongoing concerns expressed by clients of KPMG member firms.

Respondent organizations' turnover/income ranged from less than US$250 million to more than US$5 billion, with a mix of operations from global through regional to purely domestic. The annual capital expenditure budget varied from around US$10 million to over US$5 billion. Twenty-six percent of the respondents' were public bodies – typically government agencies – and some of the main industries represented include energy and natural resources, technology and healthcare.

Entity type

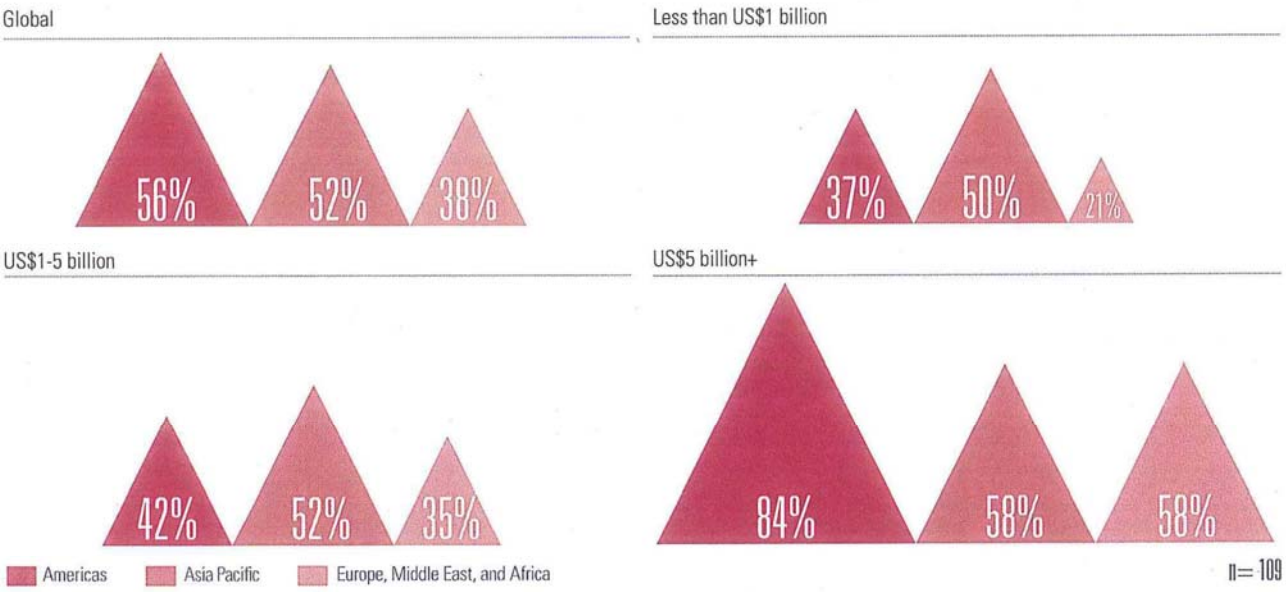


Source: KPMG International, 2015

Annual turnover

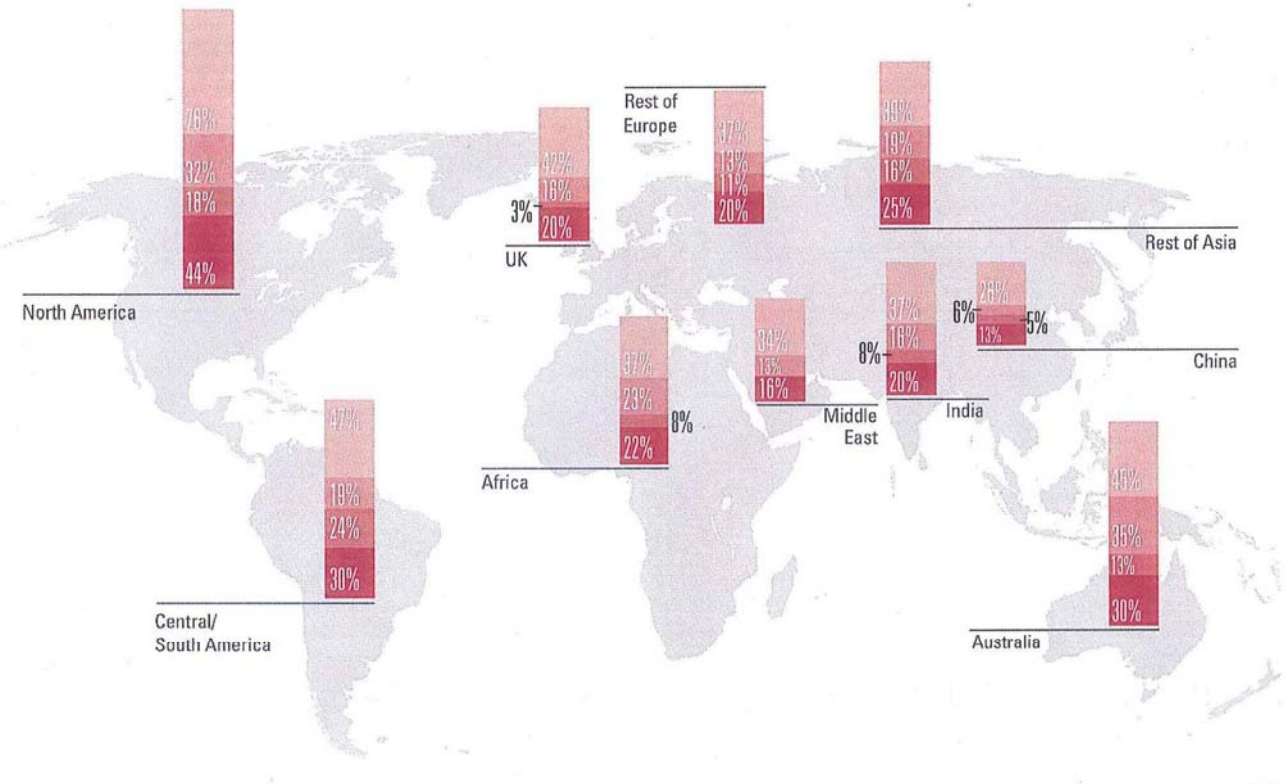
Source: KPMG International, 2015

Regions of operation

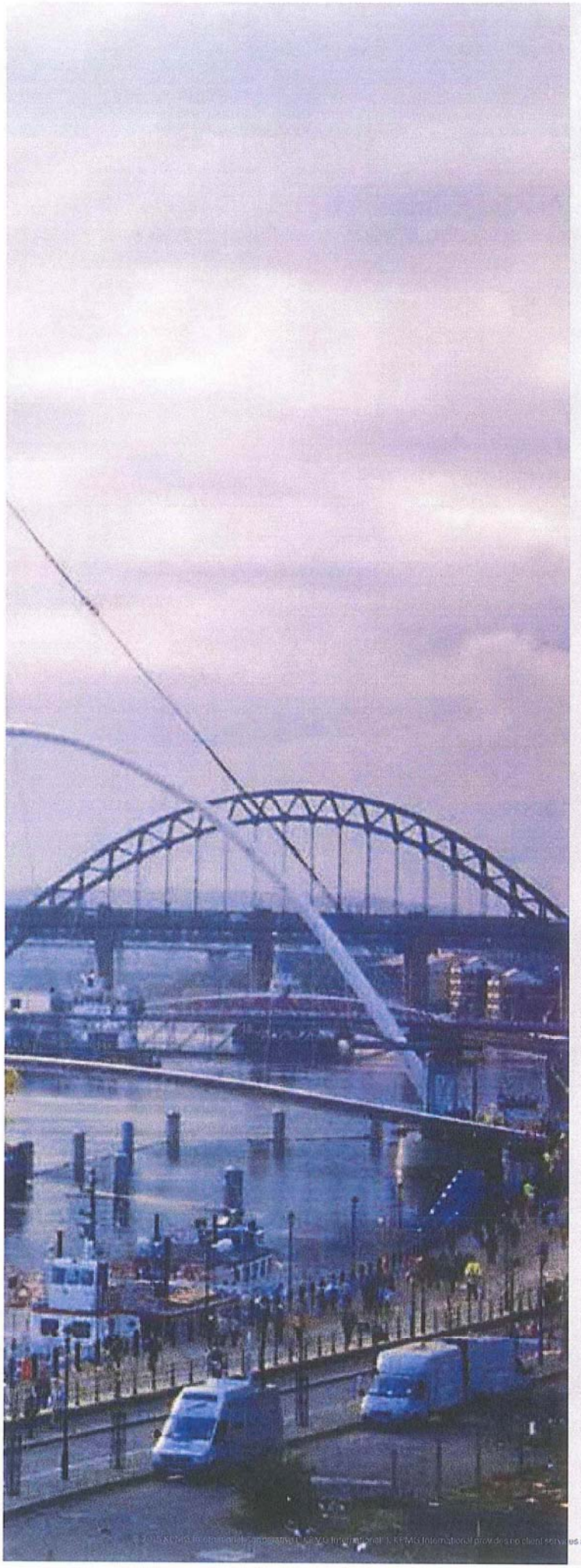


Source: KPMG International, 2015

Sub-regions of operation



Source: KPMG International, 2015



KPMG's global Engineering & Construction experience

Our Building and Construction team is fully committed to serving our clients and understanding their complex and constantly evolving needs.

Our global network enables us to mobilize teams to assist you wherever you are in the world, providing you with access to local and international experience and a tailored service that delivers informed perspectives and clear strategies that our clients and stakeholders value.

Our firms' experienced professionals in audit, tax and advisory bring together a wide range of skills and experience having advised businesses across the globe including developers, contractors, operators, investors, occupiers as well as central, regional and local government organizations on all aspects of the B&C industries.

We can help member firm clients focus on:

Increasing efficiency, through cost optimization, supply chain efficiency and other techniques.

Identifying competitive advantage, by clarifying strengths and weaknesses in your capabilities and producing programs to fill the gaps.

Improve risk management, by refining controls and fostering a culture that embraces and recognizes risk.

Bookshelf

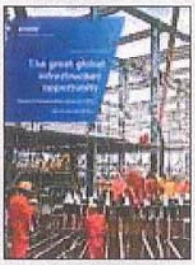
A selection of relevant KPMG reports and insights. To access these publications, please visit: **www.kpmg.com/building** or email us at: **gofmbuilding@kpmg.com**

Global Construction Surveys

KPMG conducts the Global Construction Survey to monitor Engineering & Construction issues and provide timely summaries and insights to help professionals make more informed business decisions in today's rapidly changing environment – this is the eighth edition of the KPMG Global Construction Survey.

2013 Global Construction Survey: Ready for the next big wave?

The 2013 report catches the industry in a more upbeat mood after gauging the views of 165 senior executives of leading Engineering & Construction firms from around the world to determine industry trends and opportunities for growth.

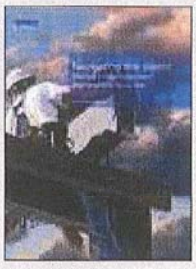


2012 KPMG Global Construction Survey: The great global infrastructure opportunity

The 2012 survey focuses on the insatiable demand for energy and infrastructure in all forms, and the resulting fundamental shifts in focus for nearly all E&C firms.

2010 KPMG Global Construction Survey: Adapting to an uncertain environment

The latest survey highlights the cautiously optimistic outlook of many E&C companies about their immediate prospects and discusses key industry issues and the measures adopted to seize the new opportunities identified.



2009 KPMG Global Construction Survey: Navigating the Storm: Charting a Path to Recovery?

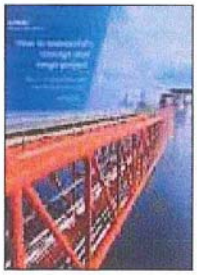
More than 100 senior executives from the Engineering & Construction industry responded to this survey, which focused on how organizations were weathering the impact of the global financial crisis.

Other Thought Leadership

KPMG's Engineering and Construction, Major Projects Advisory, and Infrastructure professionals conduct research and develop thought leadership for clients and industry leaders. This information on current issues facing contractors and owners in a rapidly changing construction environment provides key insights and tangibly contributes to their decision-making processes.

Preventing black swans: Avoiding major project failure

This paper highlights characteristics of major capital projects that can lead to catastrophic failure for owners and contractors, alternative approaches for screening projects, and red flags and triggers for early identification of troubled projects.

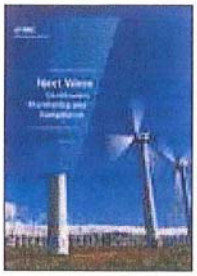


How to successfully manage your mega-project

Effective management of mega-projects relies on three key concepts: early planning and organizing, stakeholder communication and project controls integration, and continuous improvement. This three part series covers best practice for managing mega-projects.

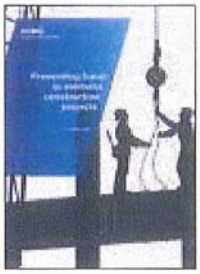
Integrated project delivery: Managing risk and making it work for all parties

This paper provides an overview of the current practices and challenges involving IPD and its evolving risk profile. It also offers guidance on how to prepare an IPD strategy and describes the tools and methodologies currently used to facilitate successful IPD.



Next wave: Continuous monitoring and compliance

This report reviews the framework for developing a continuous project monitoring and compliance program that integrates the positive features of project performance monitoring, project risk and controls monitoring, and computer aided auditing.

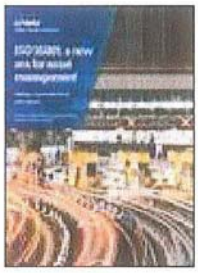


Preventing fraud in overseas construction projects

Over the last decade, construction companies have increasingly recognized the imperative of geographic diversification and international expansion and while there are many benefits to investing in emerging markets, the risk of bribery and corruption may be even greater.

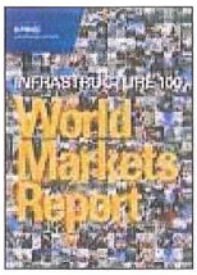
Project portfolio optimization: Do you gamble or take informed risks?

This paper addresses portfolio optimization by highlighting some of the challenges and pitfalls of inefficient capital allocation by providing example approaches and practices for identifying and managing projects throughout the life cycle.



ISO 55001: A new era for asset management

This paper discusses the benefits of an integrated holistic approach to asset management, looks at the requirements of ISO 55001 and explains how companies comply with the standard and improve asset performance.

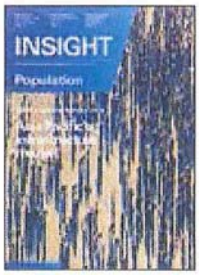


Infrastructure 100: World Markets Report

In the third Infrastructure 100, KPMG highlights key trends driving infrastructure investment around the world and a global panel of independent industry experts identify 100 of the world's most innovative, impactful infrastructure projects.

Insight – The Global Infrastructure Magazine

Insight is a semi-annual magazine that provides a broad scope of local, regional and global perspectives on many of the key issues facing today's infrastructure industry.

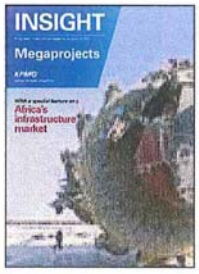


Issue No. 6 – Population

This edition of Insight takes a closer look at the link between unprecedented population changes and demographic shifts currently underway and the infrastructure needed to meet these challenges. It also includes a Special Report on Asia Pacific's infrastructure market.

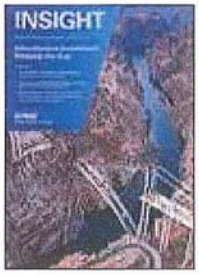
Issue No. 5 – Resilience

This edition of Insight explores some of the world's most impactful stories of resilience. It also includes an exciting Spotlight Special Report on the important changes and opportunities within Latin America's infrastructure market.



Issue No. 4 – Megaprojects

This edition of Insight magazine explores some of the key challenges and opportunities impacting megaproject deliver, and includes a Spotlight Special Report on Africa's infrastructure market, a key growth area.



Issue No. 3 – Infrastructure Investment: Bridging the Gap

This edition explores the complex world of infrastructure finance and funding, including critical topics ranging from direct investment, to innovative financing and funding models, and the evolving infrastructure fund market.

MPA Project Leadership Series

KPMG's Major Projects Advisory (MPA) Project Leadership Series is targeted toward owners with major construction programs, but its content is applicable to all entities or stakeholders involved with construction projects. This series describes a framework for managing and controlling large capital projects based on the experience of professionals from KPMG's MPA practice. They provide services to hundreds of leading construction owners, and engineering, procurement and construction contractors.

- From Concept to Project – Critical Considerations for Project Development
- Stakeholder Management and Communication
- Project Organization & Establishing a Program Management Office
- Governance and Project Controls
- Budgeting, Estimating and Contingency Management
- Monitoring Capital Projects and Addressing Signs of Trouble
- Project Risk Management (future)
- Investing in Tools & Infrastructure (future)

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