

In this issue:

IPA Announces Mary Ellen Yarossi's Retirement	2
Don Vardeman & Graham Cattell Join IPA's Board of Directors	3
IPA North America Regional Director Keynotes 2016 Global Construction Summit	4
Upcoming IPA Events & Presentations	4
IPA Institute Public Course Schedule	5
IPA Regional Updates – North America – Latin America – Europe, Middle East, & Africa – Asia-Pacific	6
IPA Expands Benchmarking Capability to Include Wind Power Projects	12
Global IPA Staff Contribute to Community Services	14



In this issue, IPA's four regional directors offer a few insights into the current state of the capital project market in their part of the world. They provide a snapshot of the market conditions that may drive project activity in the next year.

Today, IPA is assisting many companies in reshaping their organizations to fit a more directed portfolio. Clients are asking more questions about how their project groups can better assess contracting and execution risks, collect reliable cost benchmarks, and identify "gold-plating" versus "fit-for-purpose" project designs.

In addition, owner companies are reaching out to IPA to support organizational design and staffing

reviews, which became an area of concentration in the wake of the fall in commodity prices. A related area of increasing interest to our clients is portfolio management/planning.

Companies are seeing real benefits that come with having a lean portfolio of projects that reduces strain on project resources. Rationalizing resources—both financial and human resources—while maintaining capability and expertise is a key concern.

As a whole, the regional directors report that companies are keenly focused on the careful selection of the right projects with the best organizational structure to successfully execute those projects. The updates begin on page 6.

IPA EMEA Director and Long-Serving Employee Retires

Independent Project Analysis (IPA) is bidding farewell to Mary Ellen Yarossi, one of the company’s very first employees and the co-creator of core IPA programs for improving capital project outcomes.

Yarossi will retire at the end of 2016 as the regional director of IPA operations in Europe, the Middle East, Russia, and North Africa. In this role since 2010, she grew IPA business in three continents and oversaw an increase in the size of IPA’s EMEA regional staff. In addition to sustaining existing IPA relationships with oil and gas and processes owner companies, Yarossi introduced IPA’s suite of capital project benchmarking, evaluation, and research capabilities to many new clients, including independent oil operators, power companies, and groups investing in infrastructure projects. Under her direction, owner companies have convened annually at the EMEA Industry Benchmarking Consortium (IBC) to find out about the cost and schedule competitiveness of their capital projects and to learn about Best Practices for the development and execution of projects.

Prior to taking the reins of IPA’s EMEA operations, Yarossi spent more than two decades alongside of IPA Founder and President Edward Merrow building a company that today is recognized globally for its commitment to helping owner companies improve the effectiveness of their capital projects. “Mary Ellen was IPA employee number three and was essential in guiding the development of the company from her earliest days in the company,” Merrow said in an email to IPA staff announcing Yarossi’s decision to retire.

Yarossi and Merrow collaborated to create IPA’s Project Evaluation System (PES®*), the foundation for how IPA performs capital project risk and benchmarking evaluations at every stage in the project life cycle. Yarossi was the principal architect of the IBC, which Merrow described in his note to staff as “the most important bond between IPA and our customers.” In addition to serving as the company’s first chief operating officer, she also is the founding director of the IPA Institute, the company’s education and training arm. Yarossi has said she considers her role in establishing the IPA Institute one of her proudest accomplishments at IPA. The IPA Institute continues to serve as an important part of IPA’s operations today. “Mary Ellen has been enormously influential in the development of the company, and I am thankful for her unequalled service,” Merrow said.

Aside from Merrow and his wife, Loretta, IPA’s Corporate Secretary, Yarossi has been the most tenured member of the IPA Board of Directors, having a seat on the board since 1998. Yarossi has decided to also step down from the board in retiring.

Rising to the role of EMEA Regional Director is Nekkhlil Mishra, who has been serving as IPA’s Deputy Director of Exploration and Production, with responsibility for overseeing IPA’s upstream work in EMEA. Mishra has worked with key IPA clients and is a frequent presenter at industry conferences on developing and executing capital projects. He has been an IPA employee since 2007.

* PES is a registered trademark of IPA.

Edward Merrow
 Founder and President

Elizabeth Sanborn
 Chief Operating Officer

Phyllis Kulkarni
 Regional Director,
 North America

Carlos Flesch
 Regional Director,
 Latin America

Mary Ellen Yarossi
 Regional Director,
 Europe

Rolando Gächter
 Regional Director,
 Asia Pacific

Geoff Emeigh, Managing Editor **Jessica Morales, CAP, Development Coordinator**

Leigh Ann Hopkins, Editor

Pam Emons, Graphic Designer

Independent Project Analysis Newsletter is published and copyrighted © 2016 by Independent Project Analysis, Inc. Reproduction of material that appears in Independent Project Analysis Newsletter is prohibited without prior written permission from IPA.



IPA improves the competitiveness of our customers through enabling more effective use of capital in their businesses. It is our mission and unique competence to conduct research into the functioning of capital projects and project systems and to apply the results of that research to help our customers create and use capital assets more efficiently.



The IPA Institute’s mission is aligned with the overall IPA mission to improve the capital productivity of its clients. The programs offered provide a forum for in-depth understanding of key elements of the capital project process and how to apply these learnings to effect positive changes and improvements, resulting in the more effective use of capital.

Robert ‘Don’ Vardeman, Graham Cattell Join IPA’s Board of Directors



Don Vardeman



Graham Cattell

Independent Project Analysis (IPA), Inc., the preeminent consultancy in capital project evaluation and project system benchmarking, is pleased to announce the addition of two capital projects industry leaders to its Board of Directors.

Robert “Don” Vardeman is the board’s newest member. Vardeman recently retired from Anadarko Petroleum as Vice President of Worldwide Project Management. Graham S. Cattell is a returning board member. Cattell served as the Head of Discipline for Capability and Projects at BP prior to his retirement.

“During his career, Don Vardeman has been one of the most respected members of the E&P Industry. His pioneering work on production spar technology and his leadership of one of the Industry’s most successful capital project systems are reason enough. But his reputation for fairness and his support of project teams have really set him apart. Graham Cattell has been a tireless advocate for sound project practices everywhere he has served. He understands the drivers of project system excellence and has helped IPA connect with the business leaders in our client companies. We welcome Don and embrace Graham’s return to the board,” IPA President and CEO Ed Merrow said.

Until his recent retirement, Vardeman had been serving as an officer at Anadarko since December 2011. He had facilities execution responsibility for Anadarko’s major projects in Algeria, Ghana, Mozambique, and the Gulf of Mexico. Vardeman was Vice President of Marine Facilities Engineering at the Kerr-McGee Corporation prior to the company’s August 2007 merger with Anadarko. Earlier in his career, he held project management, drilling, and facilities positions with the Oryx Energy Company, Sun Exploration and Production Company, and Amoco Corporation.

Vardeman is the 2016 recipient of the Offshore Technology Conference’s Distinguished Achievement Award for Individuals. He has been recognized by many other professional groups for his leadership and contributions to the Industry. In November 2005, the President of Finland presented Vardeman with the Citation of Commander of the Order of the Lion of Finland for meritorious service to the country’s maritime industry. Vardeman is an alumnus of Texas A&M University. He serves on the Engineering Advisory Council at Texas A&M.

Cattell, the returning IPA board member and former BP senior leader, was the Director of Design and Construction at The Dow Chemical Company before he moved to BP. He previously served as Vice President of Engineering at the Union Carbide Corporation. Earlier in his career, he was Vice President and General Manager of Engineering for the Industrial Gases and Equipment Group of Air Products & Chemicals, Inc.

Cattell has been a strong advocate of increasing awareness among business executives of the value of capital project and project system effectiveness and how IPA helps its clients improve their capital project outcomes. “The addition of Don and Graham bolsters an already strong board. Our board has but one goal: strengthen capital stewardship for IPA clients around the world,” Merrow said.

Stay up to speed on the latest IPA updates on capital projects benchmarking, evaluation, and research offerings, events and presentation, and announcements by signing up to receive this free quarterly newsletter, plus *IPA News* (e-newsletter), and IPA Institute training updates. Sign up at: <http://www.ipaglobal.com/knowledge-ideas/>. Also follow IPA's company page on LinkedIn.

IPA North America Regional Director Kulkarni Keynotes ENR 2016 Global Construction Summit

IPA North America Regional Director Phyllis Kulkarni gave the opening keynote address at the ENR 2016 Global Construction Summit on October 11, 2016, in New York City. During her presentation, titled "Succeeding with Capital Projects in Uncertain Times," Kulkarni said with owner companies reducing capital expenditures by as much as 30 percent, it is imperative for them to set projects up for success early on in order to avoid costly mistakes during construction. She also mentioned the importance of getting business executives more engaged with project teams in delivering capital assets, citing IPA's latest book, *Capital Projects: What Every Executive Needs to Know to Avoid Costly Mistakes and Make Major Investments Pay Off*, by IPA Capital Solutions Director Paul Barshop. Kulkarni's remarks at this event and Breakbulk Americas 2016 were reported in several trade publications.



Photo Credit: Steve Hill Photography, 2016 Global Construction Summit

Upcoming IPA Events & Presentations

December 6-7

IPA's Manoj Prabhakar to Present at ABG Project Forum

IPA's business development lead for India, Manoj Prabhakar, will speak about project readiness assessments from Front-End Loading (FEL) 2 to FEL 3 and project cost benchmarking at the ABG Project Forum organized by Group Projects of Aditya Birla Group. The event will take place at the L&T Institute of Project Management in Vadodara, India.

March 20-23

Industry Benchmarking Consortium (IBC) 2017

Facilitated by IPA, the IBC is a voluntary association of owner firms in the chemical, petroleum, minerals processing, food and consumer products, pharmaceutical and biotech, and forest products industries that have employed IPA's quantitative benchmarking approach. The members have agreed to support the continuous improvement of capital processes through measuring and comparing performance metrics to improve the effectiveness of their project systems. IBC member companies meet annually in Leesburg, Virginia. For more information, contact IBC Director Andrew Griffith at agriffith@ipaglobal.com.

September 26-27

Cost Engineering Committee (CEC) 2017

The Cost Engineering Committee (CEC) is a working subcommittee under the Industry Benchmarking Consortium (IBC) that assists cost engineers by providing metrics and tools that offer an unbiased snapshot of Industry cost and schedule estimates and trends. The CEC focuses on all aspects of cost (or investment) engineering, including cost estimating, scheduling, and project control practices and metrics, with the goal of expanding the owner cost engineer's capabilities. The primary vehicles for accomplishing these objectives are the validation metrics, Best Practices research, and practice sharing. For more information, contact IBC Director Andrew Griffith at agriffith@ipaglobal.com.

November 13-15

Upstream Industry Benchmarking Consortium (IBC) 2017

The Upstream Industry Benchmarking Consortium (UIBC) is solely dedicated to the exploration and production (E&P) industry. It provides an independent forum for each participating company to view key metrics of its project system performance such as cost and schedule, Front-End Loading (FEL), and many others against the performance of other companies and share pointed and detailed information about their practices. The consortium highlights Best Practices, reinforcing their importance in driving improvements in asset development and capital effectiveness. Consortium attendees learn how to improve specific elements of capital project execution through presentations and other more interactive discussions. For more information, contact IBC Director Andrew Griffith at agriffith@ipaglobal.com.



2017 Public Course Schedule

- **Shorter course durations, lower registration fees introduced for 2017**
- **Additional courses on PM and small project Best Practices**

The IPA Institute has announced its full 2017 public course schedule. Out of 19 total courses scheduled for 2017, 15 are either Project Management Best Practices or Best Practices for Small Projects, to meet the need of the current capital projects environment. Based on participant feedback, the IPA Institute has reduced the durations of these courses from 3 days to just 2 days, resulting in lower registration fees and less time required out of the office. Below is a look at the public courses planned for early 2017.

Visit www.ipaglobal.com/public-courses to view the full schedule.

Project Management Best Practices (16 PDUs)

February 28 - March 1: Mumbai, India

Best Practices for Small Projects (16 PDUs)

March 28-29: Santiago, Chile

April 11-12: Las Vegas, Nevada

April 11-12: Marseille, France

April 18-19: Singapore

Establishing Effective Capital Cost and Schedule Processes (16 PDUs)

March 28-29: Houston, Texas

Webinars

Free webinars on topics on coping with limited resources, turnaround projects, and more at: <http://www.ipaglobal.com/knowledge-ideas/webinars>.

In-House Solutions

Whether you are looking for a tailored or off-the-shelf seminar, IPA Institute in-house training solutions provide a company-focused, cost-effective vehicle to educate large groups within an organization or project team. Improve your company's existing internal training program(s) by incorporating the IPA Institute's extensive experience in capital project research, training, and instructional design.

PMI Registered Education Provider

The IPA Institute is a Registered Education Provider (REP) of the Project Management Institute (PMI). All IPA Institute seminars align with current PMBOK standards, enabling PMI credential holders (PMP, PgMP, PMI-SP, PfMP, etc.) to claim Professional Development Units (PDUs) upon completion of each IPA Institute course.





NORTH AMERICA UPDATE

After CAPEX Cutbacks, Capital Project Activity Is Expected to Remain Stable Across the Region

By Phyllis Kulkarni, IPA Regional Director, North America



North America, and IPA's work in the region, reflects a changed capital project landscape that few could have predicted 5 or 10 years ago. Capital expenditure in oil and gas exploration and production and refining projects has declined considerably since 2014 when oil prices declined sharply—preceded by declines in mining and mineral prices. On average, companies reduced their capital expenditure by 30 percent from 2014 to 2015. Similar cuts have been made in 2016. As a result of these cuts to capital expenditure, capital project activity has been curtailed across Canada, the United States, and Mexico. The surprise election of Donald Trump to become the next U.S. president has heightened the uncertainty for owner companies investing or planning to invest in capital projects in the United States, but, for now, oil prices and other commodity prices have mostly remained stable. We are now catching a glimpse of the light at the end of the tunnel as it is IPA's perspective that capital expenditure cuts in the United States have bottomed out.

In the fourth quarter of 2016, we are starting to see some major new E&P projects in the early development phases. With many E&P and refining companies already operating significant capital assets in North America, IPA remains busy benchmarking a steady stream of small integrity- and regulatory-driven projects that must proceed to keep assets running, even in the economic downturn. Further, in contrast to the oil sector, the chemicals sector in North America is quite robust, driven by a return of capital to the United States to take advantage of low-cost feedstock. IPA has been privileged to evaluate a number of groundbreaking megaprojects in the United States, many representing firsts for the companies involved. In particular, IPA recently evaluated a client's first project developed in North America and another client's first megaproject. Clients are reaching out to IPA to evaluate project risk and help ensure projects

are optimally defined before a final investment decision is made. We are also providing regional construction labor wage rate and productivity forecasts for clients and benchmarking team staffing levels, team interactions, and dynamics to ensure projects are organized for success. We expect this work to continue in 2017.

Our work in the pharmaceutical and power sectors has also been growing, both with long-term customers and companies new to benchmarking. As the power sector faces some de-regulation, it is critical for power companies to ensure the competitiveness of their capital projects. Further, increased investments in natural gas and renewables are driving capital investment. And recent mergers and acquisitions in the pharmaceutical and power sectors are resulting in the need to evaluate new assets and compare, merge, and streamline work processes from the merging companies.

IPA is also serving the infrastructure capital project market, as these projects face similar challenges as projects in the process industries and benefit from the same Best Practices.

Regardless of industrial sector, the current market climate

In Focus: U.S. Gulf Coast

Following a wave of project deferrals and cancellations, average planned downstream capital investment expected along the U.S. Gulf Coast is \$48 billion for the next 3 years. Megaproject activity is expected to be sustained. IPA's *EPC Market Forecast* projects that all-in construction labor wage rates will increase modestly into 2017.



presents key common challenges. Businesses across sectors have an unrelenting focus on justifying and minimizing their capital costs. Consequently, companies are seeking help from IPA in innovative ways. Today, companies are turning to us to conduct early cost benchmarks of projects still in the “idea” phase and to weed out design options that are not economical. Companies are also turning to us to perform organizational reviews to ensure core competencies for delivering projects are maintained and to determine which competencies can be outsourced. IPA is also being asked to overhaul existing work processes to ensure they are fit-for-purpose for the lower capital spend companies anticipate in the years to come.

While capital project markets are down from peak years when commodity prices were higher, North America continues to represent an attractive location for capital investment, and we anticipate stable levels of capital investment in the region in the near future. In October, I delivered a keynote at the *Engineering News Record* (ENR) 2016 Global Construction Summit, where I had the opportunity to speak with and listen to executives at the world’s leading engineering, procurement, and construction (EPC) firms. The perspectives shared during this industry gathering align closely with the insights from the owner companies with whom we work; they agree that the United States, in particular, is likely to remain one of the few robust areas for capital investment across the globe in the years to come. From unconventional shale development and “reshoring” of consumer product and pharmaceutical spend to meeting the latest environmental requirements for refineries and the power sector’s move away from coal to low-cost natural gas, capital investment will continue in North America, along with the continuing need to improve project management processes and demonstrate competitive cost and schedule performance.

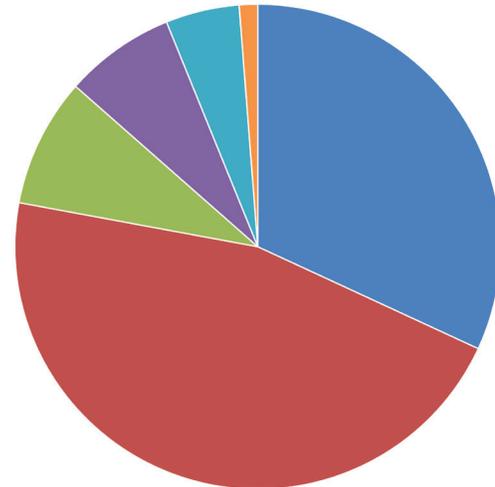
The economic climate remains challenging, but these challenges bring opportunity. Now is the time to hire the best talent, for business and engineering to align early on the best opportunities to develop, and for owners and contractors to collaborate closely on approaches such as standardization and lean scoping. It is also the perfect time for leading companies to demonstrate the significant value strong work processes and Best Practices can bring to their balance sheets. To make the best of what looks to be a favorable landscape for delivering capital projects across the region, owner companies need to be prepared to deliver improved project performance and lower capital costs.

For more information about IPA capital project benchmarking services in North America and to learn how IPA helps owner companies improve project outcomes, contact Phyllis Kulkarni at pkulkarni@ipaglobal.com.

IPA NORTH AMERICA

A Look at Our Work in 2016

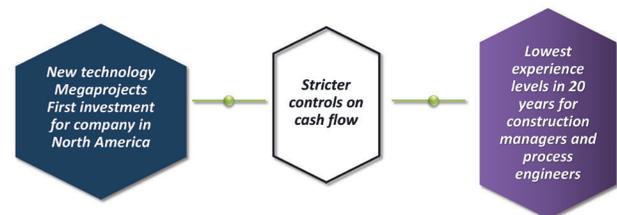
Overview of Engagements by Industrial Sector



- Chemicals Life Sciences & Nutrition
- Hydrocarbon Processing & Transportation
- Oil & Gas Exploration & Production
- Power
- Mining & Minerals
- Pulp & Paper

Chemicals: Major investments in Gulf Coast and Midwest to take advantage of low cost feedstock
 Refining: Integrity/regulatory projects in US and Canada

Even in the Economic Downturn, Projects Are More and More Complex



Our Research Focuses on Tangible Practices to Lower Cost and Improve Project Success

LEAN STAFFING > LEAN SCOPING > COST BENCHMARKING

Start Your Capital Project Improvement Journey Today!



LATIN AMERICA UPDATE

A Lull in Regional Project Investment

By Carlos Flesch, IPA Regional Director, Latin America



Over the past 2 years, the project landscape in South America has changed dramatically. The number of megaprojects announced or in development has dwindled as commodity prices declined. Gone are the days when higher commodity prices spurred investments in large plants and asset capacity increases. Today, rather than allocate capital toward large greenfield projects, limited capital is being authorized to execute much smaller sustaining capital projects at existing plants.

In more recent months the region's capital projects landscape has shown at least some small signs of improvement, but economic and political turmoil linger. Brazil, seen by many as a bellwether economy for the region, for a short time looked to be recovering from a prolonged period of political instability. After the August 2016 impeachment of former Brazilian President Dilma Rousseff, it seemed as though some government and economic stability was in store under Michel Temer, who replaced Rousseff as president. The success of the 2016 Summer Olympic Games added to the sense of optimism. But as of early December, a controversial pension reform plan and allegations of campaign donation improprieties are already rattling Temer's presidency. Meanwhile, Brazil's economy has contracted, although at a somewhat slower rate than anticipated at the beginning of the year. Year-on-year, the GDP shrank 3.8 percent.

Likewise, other South American countries are dealing with their own political and economic difficulties. State-socialist economic policies and lower oil prices have caused the economy to collapse in Venezuela, resulting even in the short supply of many basic goods. Protectionist trade policies, loose central bank policies, and high levels of government spending have contributed to weak economic conditions in Argentina. According to the IMF's October 2016 Regional Economic Outlook Update, depressed economic conditions throughout the entire Latin America

region may be close to bottoming out. Only time will tell.

But for now, during IPA's discussions with project teams across the region, we hear that the lack of investment across the region is a pressing concern. Notably, IPA has seen a lot of project management organizations (PMOs) dismantled. Without PMOs, project teams have less support and fewer resources with which to deliver cost-effective projects. The shift in portfolios to smaller projects means project managers carry a greater number of projects at the same time. In addition, familiar team dynamics are being disrupted as project personnel are reassigned to plants or other groups in the organization. IPA has observed that some owner companies are focusing on preserving functional competencies by holding on to key project organization staff.

Owner companies in the region are turning to IPA for support in understanding the needs and functional weaknesses of their organizations. They want to know about team and organizational Best Practices and how organizational structures can be better aligned to deliver projects in their portfolios. With so many companies having slashed their capital expenditure budgets, they need to understand the requirements for the organization and staffing of projects that remain in the portfolio.

Additionally, there is a renewed sense of urgency about Best Practices for delivering capital projects. IPA has helped clients re-examine existing work processes and in some cases develop new work processes—project development, estimating, procurement, project controls—to fit the current portfolio and set the organization up for the future.

They recognize the need to revisit existing procedures and manuals as well to make sure appropriate resources are available and aligned with the needs of business units.

Across Latin America, companies are trying to find ways to deliver more efficient projects. To find out how your company can improve the capital effectiveness of projects planned, developed, and executed in this region, send an email to aluft@ipaglobal.com.



EUROPE, MIDDLE EAST, RUSSIA & NORTH AFRICA UPDATE

Learning to Cope With Slow Project Activity

By Mary Ellen Yarossi,* IPA Regional Director, Europe, Middle East, Russia, & North Africa



There are two main changes in the region that affect the projects landscape. The first obvious one is the price of oil. The drop in oil prices has reduced the number of projects in places such as the North Sea and Russia. It has also meant a reduction in refining projects in the Middle East as revenues from exploration and production are reduced. For projects in much of the region, a lower oil price makes return on projects more challenging. In other words, companies are struggling to make investment decisions. Even independent producers, who may only have one field to develop, are delaying that development.

The other issue in the region is the political uncertainty leading to economic uncertainty in the Eurozone. The Eurozone is still struggling economically, slowing the need for new chemicals production and thus new projects. This summer's Brexit vote has increased the uncertainty and, with it, the caution for moving forward on investments.

We would expect this trend to continue in the next couple of years because there is no expectation of a quick rise in oil prices. Meanwhile, it will take at least another 2 years for the United Kingdom's exit from the European Union to be negotiated.

External political and economic uncertainties are causing owner company engineering directors to lose sleep at night. Further exacerbating their sleeplessness is that these uncertainties are outside of their control and not likely to go away anytime soon. Companies have reduced their capital expenditures over the last couple of years and, in some cases, are continuing to rein in capital project investment spending. Making matters worse for engineering directors is that companies are having a difficult time deciding on investments with the limited capital expenditure funds. Engineering directors are under increased pressure to make sure their businesses are sanctioning the right projects that will achieve the best business returns. Companies are coming to IPA to resolve

project selection challenges. IPA is also regularly being asked by clients to support project cost and target setting functions and to help make sure the right projects are in their portfolio. They also want IPA to delve deeper into cost issues to determine what is driving project costs. These requests reflect ongoing concerns owners are facing as a result of economic uncertainties and sluggish economic growth across the region.

On the positive side, the uncertainty is causing more organizations to look at their capital effectiveness more intensively. This is bringing new attention to cost performance, and companies are looking at metrics much more seriously. This is also bringing to IPA new companies who want to understand their project performance or even to help establish project systems.

Companies in the region still seem to be depending on contractors to supply knowledge/talent gaps. They still want to understand how to leverage fewer owner resources and how best to organize. Some are working towards centralizing or in some cases re-centralizing their resources. This issue is far more difficult to address for state-owned companies that have to manage in siloed organization structures. In these organizations, sharing resources from a central source is difficult. In some cases, we have heard where companies have increased staff assuming an increase in projects. When the projects did not materialize, these organizations had teams with too many people without clear accountability. These organizations are now looking to optimize their staffing and keep needed skills.

For more information about IPA's capital project benchmarking, evaluation, and research services in this region, please contact Nekkhlil Mishra at nmishra@ipaglobal.com.

**Yarossi, who has been with IPA since its founding in 1987, will retire as IPA's Regional Director for this region in December 2016 (See page 2). Nekkhlil Mishra will assume the role of IPA EMERA director upon Yarossi's retirement.*



ASIA-PACIFIC UPDATE

MMM Industry Shows Early Signs of Improvement In Australia, Project Market Trends Shifting in Asia

By Rolando Gächter, IPA Regional Director, Asia-Pacific



Given the diversity of this part of the world, the following update provides a snapshot of capital project activity and market updates for three countries in the Asia-Pacific region—Australia, China, and India. IPA has an established track record of working

with various process and manufacturing industry clients throughout the entire region, especially in Australia and China. IPA has recently begun increasing its presence in India and is currently conducting project market research in the country.

Australia

Stability in commodities prices—namely iron ore, copper, gold, and coal—is driving increased confidence in the mining, minerals, and metals (MMM) market in Australia. Notably, iron ore supply remains steady, and gold producers in Australia have been doing well. Meanwhile, copper producers are gearing up for an expected market under-supply in 2018 through 2020. However, we are still some time away from renewed large growth capital investment.



While global exploration spend declined 26 percent in 2014, some MMM companies are now positioning themselves for growth, bringing forward studies and trials on key opportunities to benefit from the slowdown.

IPA data indicate that equipment costs have fallen. Wage deflation of about 20-30 percent has been reported in the MMM Industry. In addition, mining companies continue to tweak their operating models to reduce costs. Meanwhile, technology and integration of operations remain a strong focus for larger miners and a means of streamlining processes and expenses.

In addition, indications earlier in 2016 that China would curb coal output is expected to inject life in the coal industry. Prices have already significantly increased over the last few months. Recent coking coal spot contracts have been signed at US\$200/tonne compared with US\$81/tonne earlier this year.

China

China used to be the land of bulk production of commodity product for export. This would then be value-added processed (addition of UV resistance, flame retardation, and hardening or softening) in other areas of the Asia-Pacific region such as Japan, Taiwan, and Korea. In more recent years, China has found it to be increasingly difficult to remain cost-competitive in global commodities. Therefore, China is diversifying.

Most projects in China in the 2017-2020 timeframe will be focused on specialty and consumer products. This may be in the form of moving the value-added processing from Japan, Taiwan, and Korea to China; expanding capabilities of existing facilities; or in the delivery of new products geared specifically to the domestic China market.

As China shifts from an export and low-end, low-cost manufacturing base to a domestic-demand and service-based economy, there are other issues for the processing industries. Once the backbone of China, low-

wage construction labor has become unreliable as workers choose to pursue jobs in the services sectors in the largest, wealthiest cities over field work.

Engineering talent, once focused on the industrialization in China, is turning to IT, leaving a shrinking pool of talented engineers for the oil, gas, mining, and chemicals industries. This is leading to increases in costs for engineering construction management. Project management costs are increasing as well, such as for procurement and QA/QC activities. Moreover, added expenditure is necessary for expediting and monitoring vendors who are rapidly losing engineering capabilities.

IPA works with clients in China to accommodate a wide range of business models and strategies for plant operations. While clients that are just beginning to invest in China are concerned with understanding the best structures for contracting, owners with more experience with capital projects in the country are seeking detailed data, such as construction labor productivity and wage rate disparity region by region.

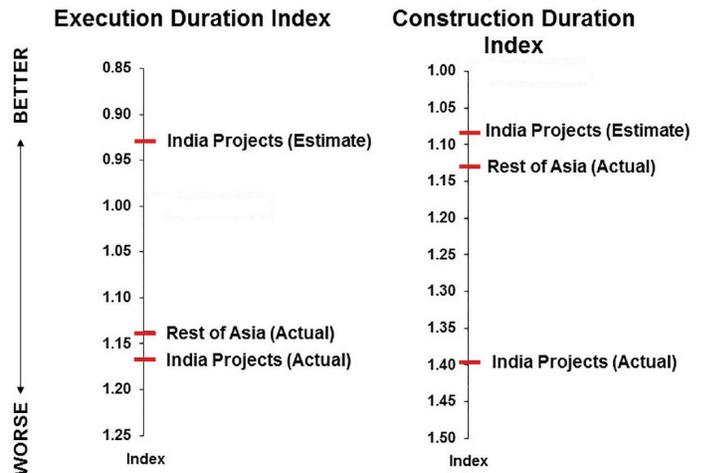
New and experienced owner companies alike are focusing on organizational structure issues. Key organizational structure questions clients are asking IPA for the answers to are: What is the proper size and expertise for the owner project organization? What are the key activities that must be kept in-house on projects in China? What sort of engineering organization best fits the current China environment—central or local?

India

Capital project activity is expected to increase in India, driven by continued economic gains, lower oil prices, and tax reforms. Thanks to the nation’s continued economic growth, a number of infrastructure projects supported by the Indian government are underway. Billions of dollars are expected to be spent on projects in various industrial sectors, including the oil and gas, refineries and petrochemicals, and power sectors. Reducing the likelihood of performance and operability problems necessitates a better understanding of Best Practices for capital project delivery in India today.

Of the global companies that have announced plans to start or increase capital investments in India, many can expect challenges in delivering their projects effectively. Initial IPA research indicates that construction management is an area of weakness in India. Construction delays regularly lead to execution slip. More than half of projects in India miss their schedule target. Part of the problem is that project managers are often willing to risk schedule slip due to the availability of inexpensive labor. Permitting and procurement issues, undue stakeholder influences,

Project Performance In India



Actual: Outcome at end of project; Estimate: Plan at project authorization
 Execution Duration: Period between start of detailed engineering to mechanical completion

and logistics are among other challenges owners face in delivering projects in India.

Capital projects in India clearly present new and unique challenges to companies with regard to the planning and development of capital projects. From the opportunity assessment phase to Front-End Loading to execution, project teams want to know what practices they should follow to execute cost- and schedule-efficient projects in India.

IPA is now taking a more in depth look at how companies can increase the effectiveness of their capital spending in India. IPA is studying the performance of recent projects, investigating India-specific practices that affect performance, and identifying key success factors for projects in environments similar to India and then determining the applicability of these factors to projects in India. IPA has already made some general observations: Like many projects located around the world, owner company project teams working on projects in India are having difficulties framing capital projects. In addition, costly construction challenges are arising because not enough front-end planning is being done before funds are authorized for execution.

This regional update was prepared in collaboration with IPA analysts and regional experts Tas Hellis (Australia), Greg Ray (China), and Manoj Prabhakar (India).

To learn more about IPA project evaluation and research services in the region, please contact Rolando Gächter at rgachter@ipaglobal.com.

IPA Expands Benchmarking Capability to Include Wind Power Projects

By Dean Findley
Business Area Manager, IPA
Power Sector



Power companies are boosting investments in renewable energy capacity, including capital spending on wind power generation projects. Several factors are driving the uptick

in power industry investments in renewable energy sources—industry tax incentives, clean energy policies, and the demands of a growing number of companies to run their operations on renewable power sources. In some countries, the potential for greater energy independence is responsible for increased wind power investments.

Opportunities to build or acquire renewable wind power assets are offset by cost risk. The costs associated with purchasing turbines and building the infrastructure to connect these assets to the main grids can be high, especially in a regulated environment. Demand for renewable energy, such as wind power, is growing and incentives for building onshore and offshore wind farms are making these projects more economical, but put simply, these projects have to be cost competitive for their owner companies. Power companies must be well-attuned to the capital effectiveness of their projects.

Building on its experience helping power companies improve the cost performance of their capital systems and projects, Independent Project Analysis (IPA) Inc., is expanding its capital project benchmarking capability to include benchmarking wind power projects. Out of a database of more than 500 power projects, IPA maintains a separate database of more than 100 onshore and offshore wind projects combined with costs ranging from \$10 million to over \$3.0 billion. Located globally, the average capacity of these projects is 187 megawatts for onshore wind projects and 180 megawatts for offshore projects. Summaries of IPA’s onshore and offshore wind datasets appear in **Figures 1 and 2**. The wide range of projects enables IPA to benchmark many different wind farm projects.

Take, for example, a wind farm in the North Sea, near Denmark. The project team wants to compare their project with

Onshore Wind Farm Database Summary

Characteristic	Dataset Sample Size (n = 38)
Cost (2015 US\$ million)	Mean: \$375 (Range: \$27 to \$2,175)
Total Capacity (MW)	Mean: 187 MW (Range: 12 to 845 MW)
Number of Turbines	Mean: 100 (Range: 9 to 627)
Average Turbine Capacity	Mean: 2 (Range: 0.7 to 3.0 MW)
Location	US: 24% UK: 19% Germany: 21% Australia: 8% Sweden: 8% Romania: 8% South Africa: 5% Norway: 5% Mexico: 2%
Year of Completion	Mean: 2006 (2001 to 2015)

Figure 1

Offshore Wind Farm Database Summary

Characteristic	Dataset Sample Size (n = 65)
Cost (2015 US\$ million)	Mean: \$930 (\$10 to \$3,651)
Total Capacity (MW)	Mean: 180 MW (3 to 630 MW)
Number of Turbines	Mean: 53 (Range: 2 to 175)
Average Turbine Capacity	Mean: 3.4 (Range: 0.6 to 6.2)
Location	North Sea: 61% Irish Sea: 15% Baltic Sea: 10% East China Sea: 8% Other: 6%
Year Construction Year	Mean: 2009 (1996 to 2014)

Figure 2

other similar projects. The process begins with IPA meeting with the project team to clearly understand the scope of the project, the challenges the team faced, and the planned and actual cost and schedule results. The face-to-face meeting is necessary to ensure understanding of the project, alignment of definitions, units of measure, and common project milestones, etc. In this example, the project has a capacity of 200 MW. The wind farm site—turbines, electrical substations, and supporting structures—is built in 20 feet of water. The estimated total project cost was \$900 million and the actual project cost was \$939 million, reflecting an overrun of only 4 percent.

From a project cost perspective, the extensive database and statistical tools provide the method for making meaningful comparisons. **Figure 3** summarizes the cost performance of the project compared to other similar projects. The figure reflects a frequency distribution of project costs. As shown, 50 percent of projects of similar size and scope would cost between \$675 and \$988 million and 80 percent of projects would cost between \$570 and \$1,169 million. The industry average cost for a similar project is \$846 million. The project was estimated to cost \$900 million, which was 6 percent more expensive than the industry average

cost of \$846 million. Unexpected weather conditions extended the aggressive project schedule and contributed to a 4 percent cost overrun. The project's final cost was \$939 million, which was 11 percent more expensive than industry average. This example demonstrates for one metric (cost performance) how benchmarking helps teams understand their competitive position and areas where they may need to improve.

Figure 4 summarizes the typical metrics IPA uses in comparing or benchmarking capital projects.

For further information about IPA’s benchmarking capability, please contract Dean Findley at dfindley@IPAGlobal.com or phone at +1 703 729-8300.

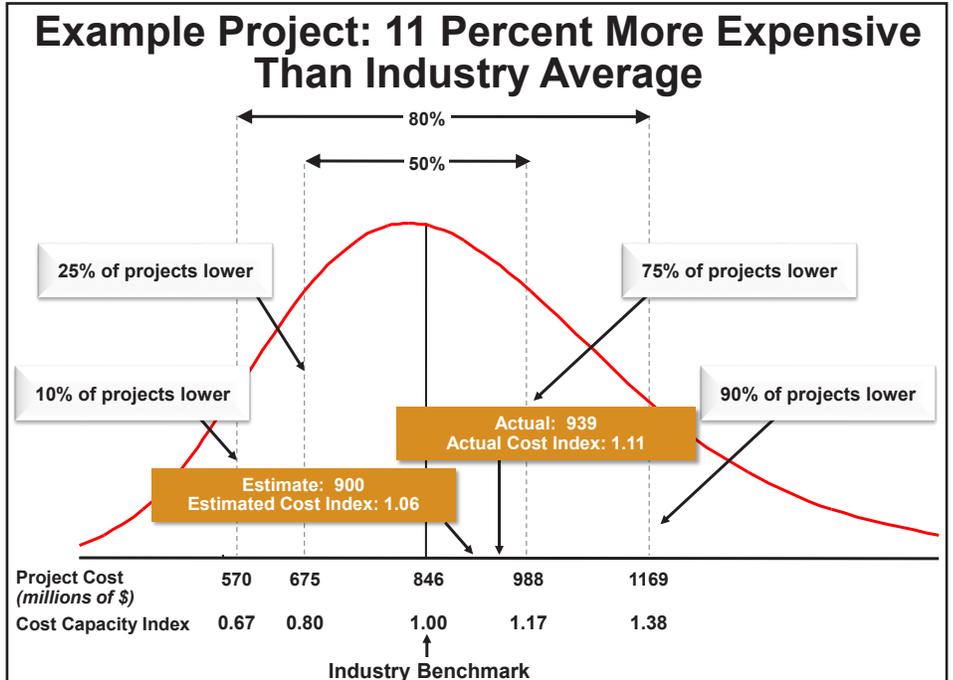


Figure 3

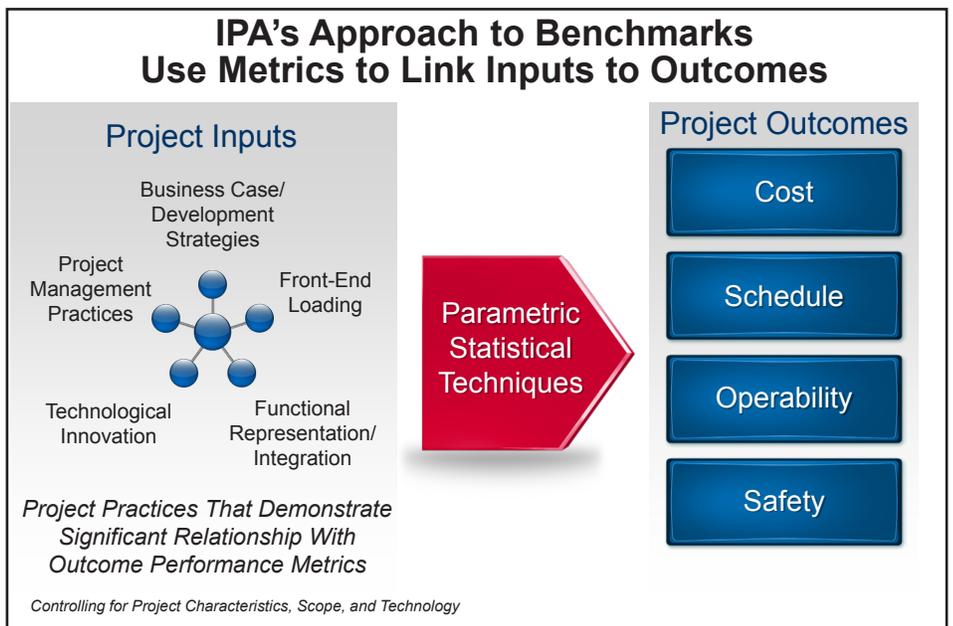


Figure 4



Pitching In to Help Out Others

One of IPA's main Principles of Operation is social and ethical responsibility to our customers and our community. IPA staff around the world recognize the importance of giving to our communities, especially helping those who are less fortunate.

Global IPA Staff Contribute to Community Services in 2016

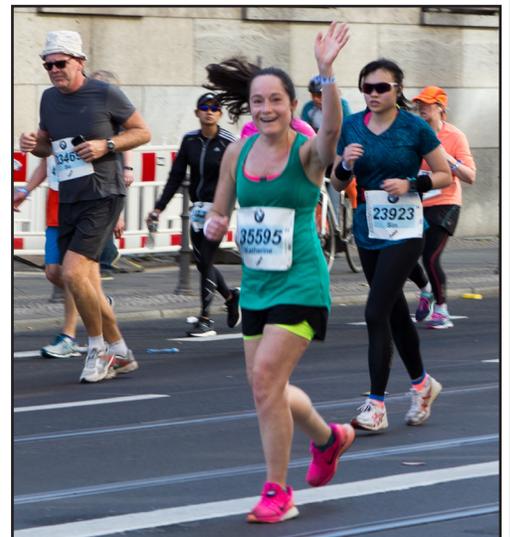
Every year IPA employees donate money and energy in support of groups whose mission it is to help out individuals of all ages going through a difficult time and in need of community support. IPA's 2016 Community Service Project theme was the fight against hunger.

In 2016, staff at IPA's office in Reading, United Kingdom, collectively donated nearly US\$1,000 to fill the shelves at community food pantries. During the holiday season, employees will be collecting donations and putting together boxes of groceries and basic supplies for a nearby food pantry. They also donated almost US\$1,000 for a colleague who ran her first marathon to raise money to fight child hunger (See sidebar).

At IPA's office in Curitiba, Paraná, Brazil, employees donated food goods and toys for their designated charity group, FEAPAES (Federation of Association of Parents and Friends of Exceptional)/PR.

In Ashburn, Virginia, IPA employees supported a few pancake breakfasts throughout the year and a chili cook-off to raise money for neighbors in need of a little extra help. North America-based employees also purchased nearly 400 toys for the Marine Toys for Tots Foundation. Staff at IPA's offices in the Asia-Pacific region have supported charities as well, including volunteering time supporting U.N. Women's Project Inspire (See *IPA Newsletter*, Volume 7, Issue 4, Page 8, December 2015).

Throughout the year, Community Service Program coordinators at each of IPA's regional offices volunteer their personal time to organize in-office events designed to raise funds for charitable groups. For 2016, we thank Kelly Mitchell, Charlotte Kirkpatrick, Elaine Tu, Jessica Morales, Jessica Walker, Swati Bhat, Franceca Cascalheira, Vikki Webber, Thuy Le, and Christianne Salomon for their efforts in facilitating a core principle of operation at IPA—giving back to our neighbors and supporting our communities.



Running to Eliminate Child Hunger:

IPA Senior Analyst Katya Petrochenkov ran in and completed the 2016 BMW BERLIN MARATHON on September 25, 2016, and in doing so raised more than US\$1,400 for Action Against Hunger, a United Kingdom-based humanitarian organization committed to ending child hunger. IPA's Europe, Middle East, Russia, and Africa office staff, based in Reading, UK, made a significant contribution to Action Against Hunger in support of Katya's 26.2-mile run through the streets of Berlin.



Giving Back: Staff at IPA's Latin America office, located in Curitiba, Paraná, Brazil, earlier in the year collected food goods and purchased toys for FEAPAES/PR.

IPA Supported the Following Charity Groups in 2016

**No Kid Hungry – Share Our Strength • Marine Toys for Tots Foundation
Loudoun Hunger Relief • Northern Virginia Family Service Backpack Project
American Red Cross – Louisiana Flood Relief • UN Women's Project Inspire
FEAPAES (Federation of Association of Parents and Friends of Exceptional)/PR
Action Against Hunger • ReadFood Food Bank • Trussell Trust**



A REAL-WORLD FRAMEWORK FOR DRIVING CAPITAL PROJECT SUCCESS

Executives often start out with high hopes for their capital projects, only to have them fall short of expectations. Only 60 percent of projects actually meet all their objectives after they are completed and the asset is put into service. The success rate is not much better than a coin-flip.

Executives responsible for delivering capital projects do not have to accept these results. Success or failure is not random. Although most of the work to develop and deliver a project is done by others, executives must provide the leadership, guidance, and support necessary to produce a successful business result from the project. *Capital Projects* explains the essential concepts executives need to know to increase the probability of a successful project and, critically, reduce the chances of disaster projects—ones that lose all the capital investment and get executives fired.

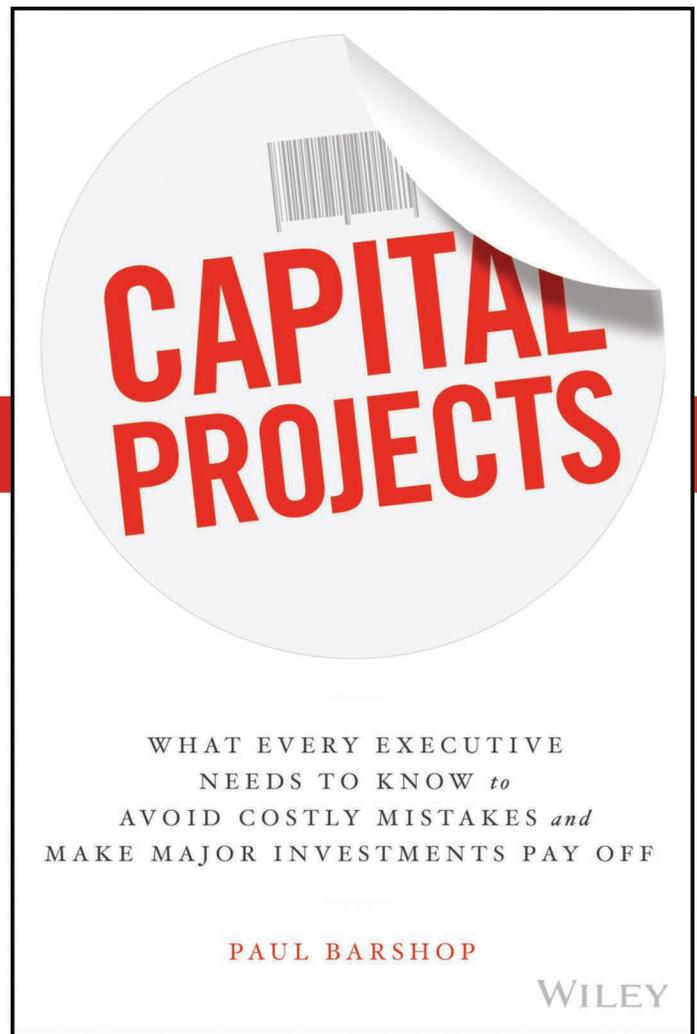
The information in *Capital Projects* is derived from the histories of over 20,000 capital projects ranging from \$50,000 to \$40 billion contained in the detailed, carefully normalized database at preeminent project consultancy Independent Project Analysis, Inc. This book presents a framework that is applicable to all types of capital investment projects, large and small, in any sector of commerce, including technology, life sciences, petroleum, consumer products, and more.

Although grounded in empirical research and rigorous data analysis, this book is not an academic discussion or a conceptual dissertation; it's a practical, actionable, on-the-ground guide to making capital projects succeed.

- Learn the specific practices that drive project success
- Avoid the missteps that make capital projects fail
- Understand the role of executives in making a project a success

PAUL BARSHOP is a Director of IPA Capital Solutions, a new IPA business initiative to provide hands-on support to clients implementing changes to their capital project development and delivery systems to improve performance.

IPA evaluates capital intensive projects of national and international oil, chemical, pharmaceutical, and major mineral companies, benchmarking their cost, schedules, safety, startup and operational performance. With 5 offices in different regions, IPA interacts with clients all over the world on a daily basis.



978-1-119-11921-0

* Hardcover

Available September 2016 wherever books and eBooks are sold

 Available wherever books and e-books are sold.

Wiley is a registered trademark of John Wiley & Sons, Inc.

WILEY