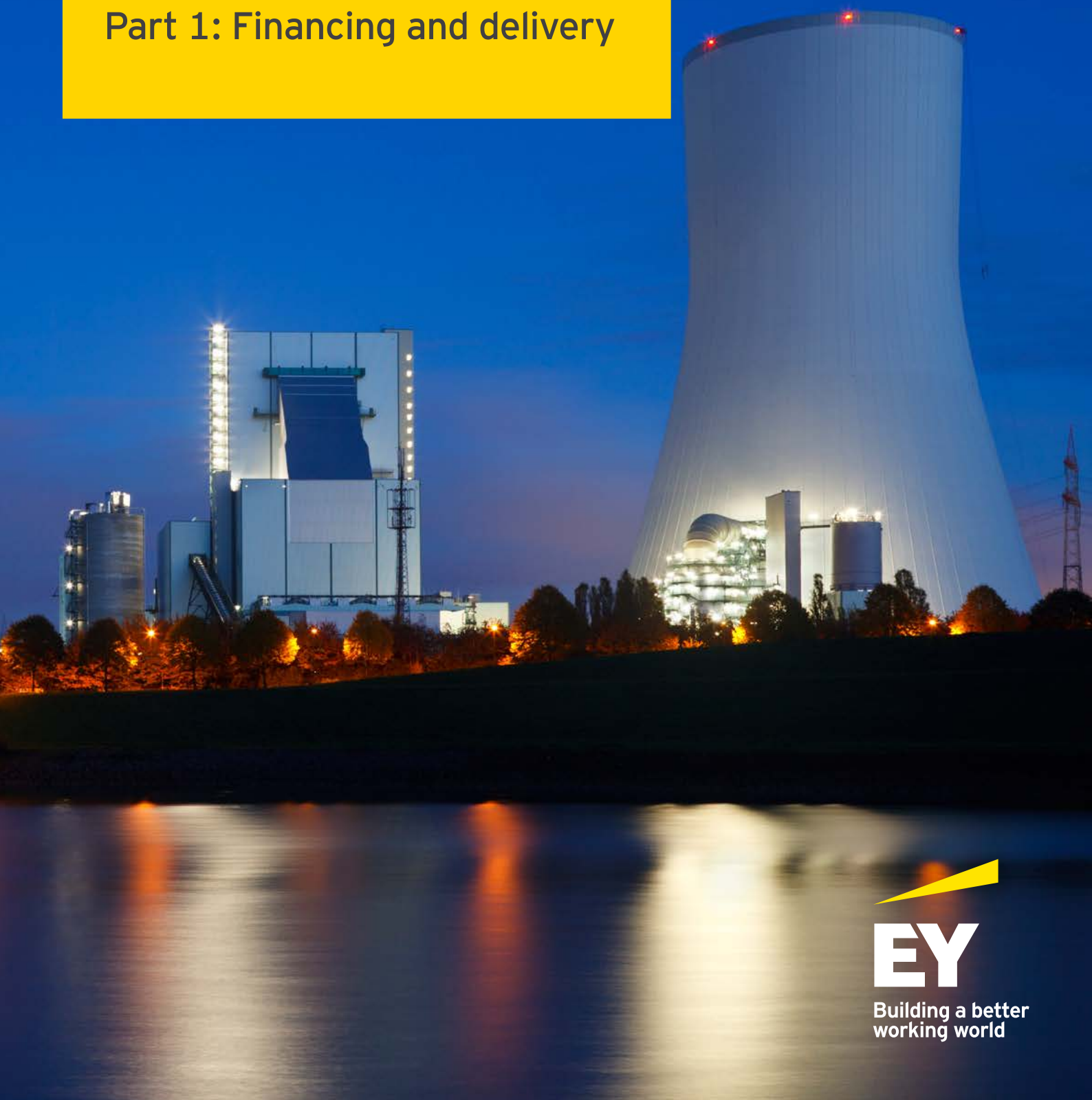


# Spotlight on power and utility megaprojects – formulas for success

Part 1: Financing and delivery



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“The new wave of investment should transform our energy future, stimulate economies, create societal benefits and support long-term growth. But these projects often run significantly over budget and over schedule – putting those energy, business and societal benefits under threat.”

**Safia Limousin**  
Global Power and Utilities Capital and Infrastructure Leader, EY

# Executive summary

Large and complex P&U infrastructure projects of all types are under massive pressure to deliver, and struggling the world over, with typical cost overruns of US\$2b and delays of two years. With electricity demand forecast to grow by nearly 70% between 2014 and 2040,<sup>1</sup> the investment in power sector infrastructure will be close to US\$20t from 2016 to 2040.<sup>2</sup> Industry leaders will need to leverage best practices and innovate to create maximum value from the forthcoming sustained period of investment.

## Three major challenges for struggling infrastructure projects

Overspending and overruns on big infrastructure projects are a worldwide phenomenon, and the gap between projections and performance can be significant. To find out where P&U executives should focus their efforts to resolve this, we researched project performance and asked executives to rate their top concerns and priorities. Our study of 100 P&U infrastructure megaprojects confirmed that they are regularly delivered behind schedule and over budget. The EY global survey of more than 200 top sector executives identified three key challenges for the sector:

-  **Financeability:** as projects increase in scale and complexity, attracting sufficient capital on competitive terms demands a much tighter focus on aligning risks with investor appetite – and this is often lacking.
-  **Deliverability:** complex projects experience average overruns in cost and schedule of 35% and two years respectively, which erodes the business case.
-  **Asset management:** delivering return on investment (ROI) through asset management is critical for infrastructure projects. Not adopting ISO 55000 asset management standards often means missing out on considerable value, reported to be as high as 20% of the total asset management spend.<sup>3</sup>

This report focuses on boosting performance in project financeability and deliverability. Asset management will be the subject of a follow-up *Spotlight* report.

The huge strides made in digital connectivity and predictive analytics can support the optimal financing and delivery potential of megaprojects.

## Rooting out hidden causes of cost and time overruns

Eight out of 10 sector executives told us they found delivering on time and on budget challenging. Our research identified six internal causes that combine to create problems throughout the project, from financing and deal structure, design management, procurement and commercial arrangements to risk management, project setup and performance management. These problems have been hard to untangle, diagnose and cure chiefly because P&U organizations have lacked ways to create, and collaborate around, a holistic view of the full project life cycle.

## Leveraging leading practices and digital innovation

Our survey sought to identify whether the sector is leveraging leading practices, and the extent to which digital and analytic innovation provides opportunities to overcome common infrastructure financing and delivery challenges. The majority of executives we surveyed told us they had not identified specific process or data innovations. We strongly feel that sector leaders need to rethink program management and innovate around big data to create:

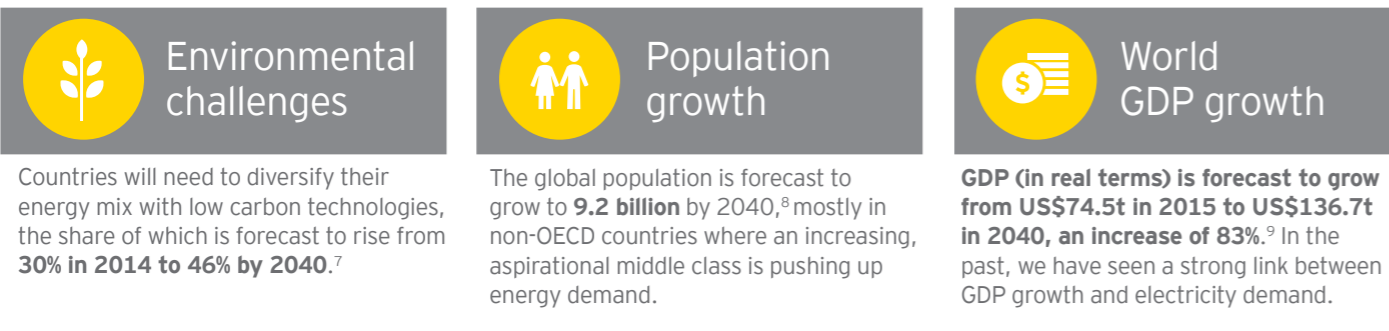
- **Innovation No.1:** a rigorous up-front assessment of project fitness to address financial structuring and boost investment attractiveness
- **Innovation No.2:** a powerful, holistic digital asset to address complexity and risk in design interfaces and construction planning
- **Innovation No.3:** digitally connected performance reporting to provide holistic and independent analysis of project performance

The average megaproject is delivered 35% over budget and two years behind schedule. The new wave of investment in large-scale projects is designed to transform our energy future, stimulate economies, create societal benefits and support long-term growth. Setting these infrastructure projects up for success, therefore, is vital.

<sup>1</sup> International Energy Agency World Energy Outlook 2016 – New Policies Scenario.  
<sup>2</sup> Ibid.  
<sup>3</sup> Institute of Asset Management – first published in *Assets*, the magazine for Members of the IAM, February 2013.

# Off the blocks and onto the grid

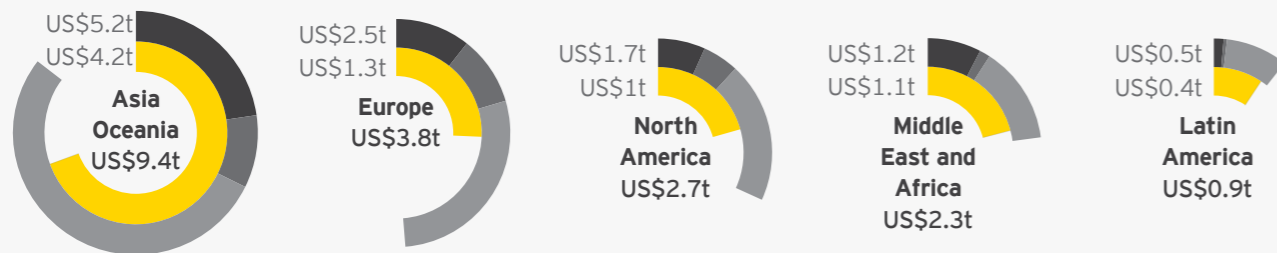
Electricity demand is forecast to grow by nearly 70% over the period 2014-40 with a 4,779 GW net increase in global installed capacity and 2,405 GW of aging assets needing replacement (2016-40).<sup>4</sup> More than 75 million kilometers of new transmission and distribution lines are required, with a capital investment of US\$8t (2016-40).<sup>5</sup> The global gap between existing supply and 2030 water demand is expected to be nearly 2.7t m<sup>3</sup>, or 40%, requiring an additional annual infrastructure investment of up to US\$200b over and above current levels.<sup>6</sup> GDP growth, population growth and environmental challenges are some of the main drivers:



The infrastructure projects that this sector will build in the next three decades will be the bedrock of growth and prosperity in mature and developing economies. Should these projects fail to be developed, there would be serious consequences for economic development, security of supply and commodity prices. Unless P&U organizations can make major strides in accuracy and quality of planning, control and collaboration, they risk wasting billions of dollars on projects that either fail or massively overrun on cost up to delivery stage and billions more in suboptimal asset management, prejudicing investment in future projects, with serious negative consequences for GDP, the environment and wider society.

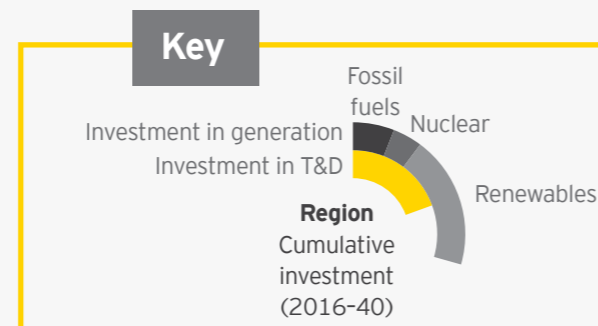
**Figure 1: Cumulative investment in the power sector by region and technology, 2016-40**

High population growth is expected to drive almost two-thirds of capital investment in the power sector in non-OECD countries by 2040, particularly in Asia Oceania. Investment in power plants is expected to account for 58% of this global investment, with renewables taking the lion's share and 42% going into transmission and distribution (T&D) networks that enable greater renewables deployment.



Source: International Energy Agency World Energy Outlook 2016

<sup>4</sup> International Energy Agency World Energy Outlook 2016 – New Policies Scenario.  
<sup>5</sup> Ibid.  
<sup>6</sup> 2030 Water Resources Group. Charting Our Water Future – Economic frameworks to inform decision-making, 2009.  
<sup>7</sup> International Energy Agency World Energy Outlook 2016 – New Policies Scenario.  
<sup>8</sup> Ibid.  
<sup>9</sup> Oxford economics, Global Data Workstation, 2016.



# But not without a challenge

All over the world, P&U infrastructure projects are regularly delivered significantly behind schedule and over budget. Our survey of top sector executives sought to understand the challenges they face in delivering capital projects to market, and to identify the root causes. The vast majority of respondents told us that securing finance was the single largest challenge, followed by delivering on time and on budget (see Figure 2).



This report focuses on boosting performance in financeability and delivery. Asset management will be the subject of a follow-up *Spotlight* report.

Our survey revealed that industry leaders are not expecting the situation to get easier: the majority of respondents felt the challenges they face today will persist as disruptive trends continue to impact the sector (see Figure 3). The implications of not addressing these challenges extend beyond the industry to the macroeconomic level. If infrastructure development fails, **69%** of respondents said there would be serious consequences for economic development and **63%** said there would be an impact on global security of supply.

We sought to identify whether the sector is leveraging leading practices and the extent to which digital innovation provides opportunities to overcome some of the infrastructure delivery challenges commonly faced.

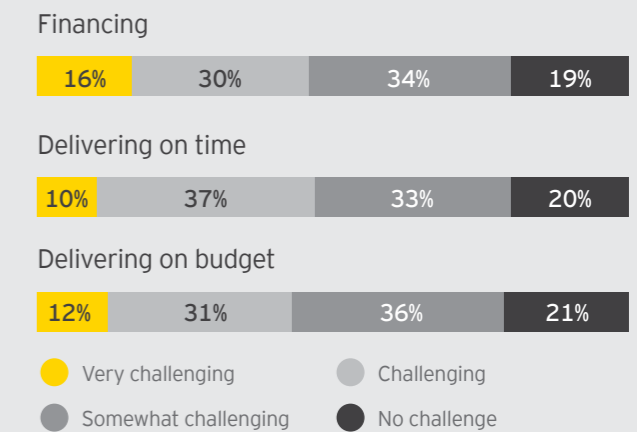
The majority of sector executives we surveyed told us they had not identified solutions for tackling challenges in project delivery or project management in particular. And a large proportion of companies are not collecting data consistently across their business, which could be a key tool in understanding how to tackle challenges.

**Innovation is critical to support project financeability and deliverability.**

<sup>10</sup> Institute of Asset Management – first published in *Assets*, the magazine for Members of the IAM, February 2013.

**Figure 2: EY global executive survey reveals 80% of respondents find financing and delivering projects on schedule and on budget challenging.**

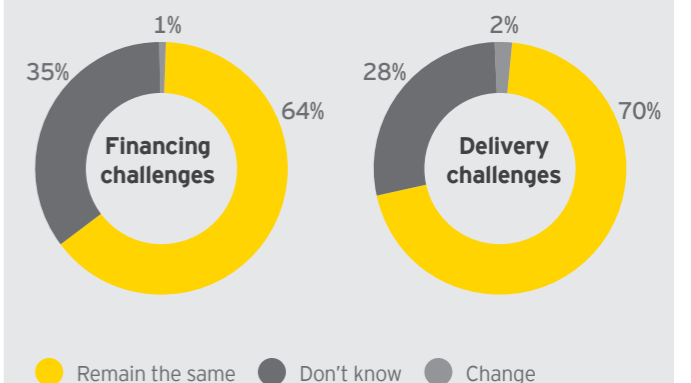
**Q: Thinking of your current infrastructure projects, to what extent have you had challenges in the following areas?**



Source: EY research

**Figure 3: The majority of EY survey respondents think challenges in project financing and delivery will continue across future generations of projects.**

**Q: Thinking of your future large infrastructure projects, will the biggest challenges you have identified remain the same or change?**



Source: EY research



# A global perspective

EY analyzed 100 of the world's largest power generation, transmission and distribution and water projects across all asset life cycle stages – from pre-financing through to decommissioning – for reported project delays and cost overruns. Our research confirmed that large capital projects are inherently challenging due to their size, scope and complexity, with systematic and significant delays and cost overruns across all technologies and geographies.

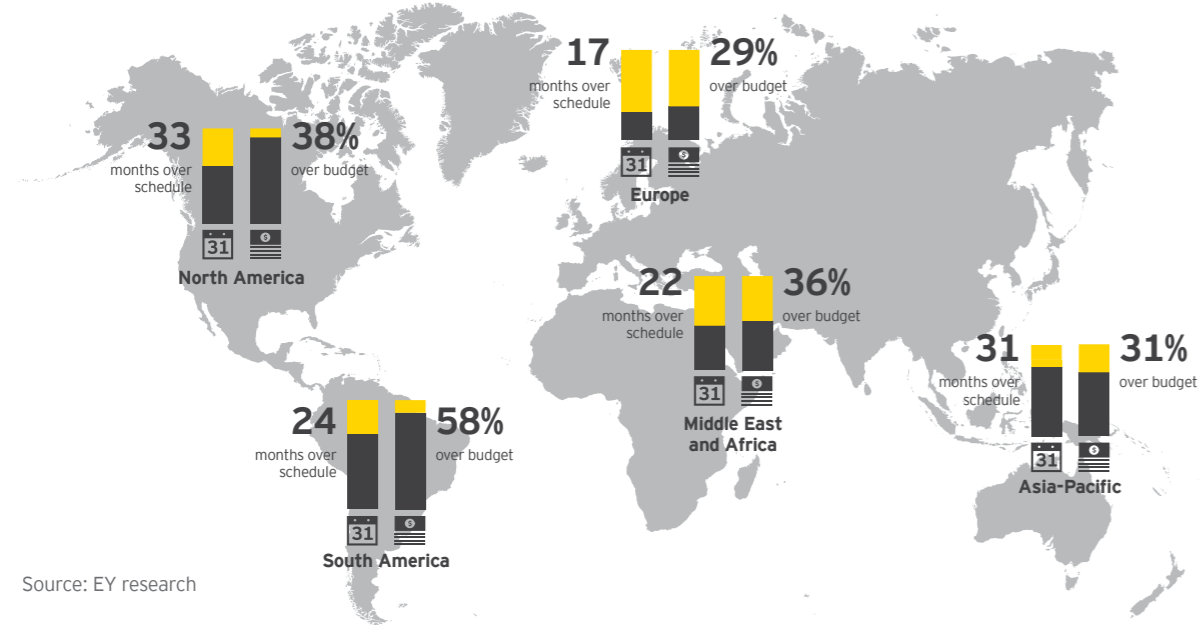
Mapping megaproject delivery across regions shows average delays of 17 to 33 months and average overspend of 29% to 58% (see Figure 4). The highest reported average delays occurred in North America (a little under 3 years), whereas megaprojects in South America reported the highest average cost overruns at nearly 60%.

Of the megaprojects we surveyed:

- ▶ 64% were delayed.
- ▶ Average delay was 25 months.
- ▶ 57% were over budget.
- ▶ Average overspend was 35% of initial cost estimate.

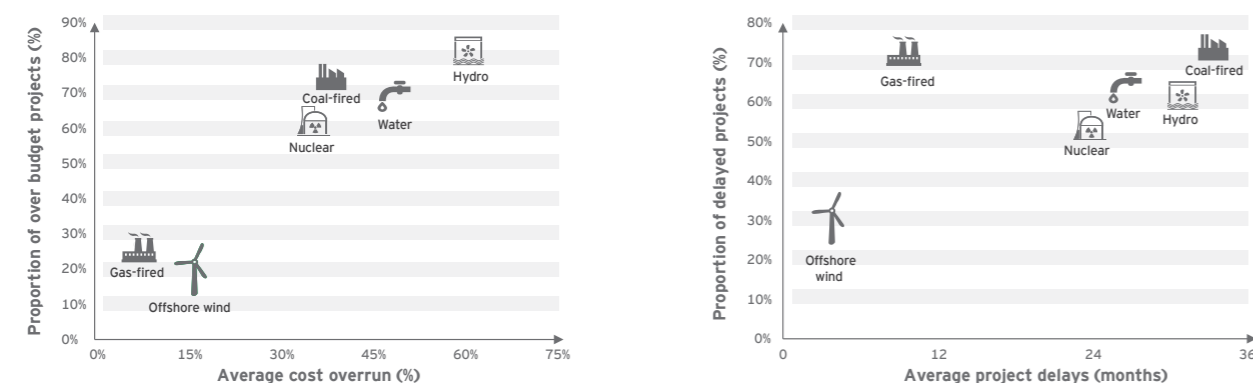
Almost three-quarters of hydropower, water, coal and nuclear infrastructure projects were over budget by 49% on average (see Figure 5), with hydropower and nuclear projects typically suffering the greatest cost overruns at US\$4.6b and US\$4b respectively. Project delays were longest for coal and hydropower technologies, at nearly three years on average. In absolute terms, offshore wind and gas-powered generation projects suffer significantly less delays and cost overruns than water, hydropower, nuclear and coal projects.

Figure 4: Megaproject delivery: average delays and overspend by region



Source: EY research

Figure 5: Proportion of 100 megaprojects with reported delays and cost overruns

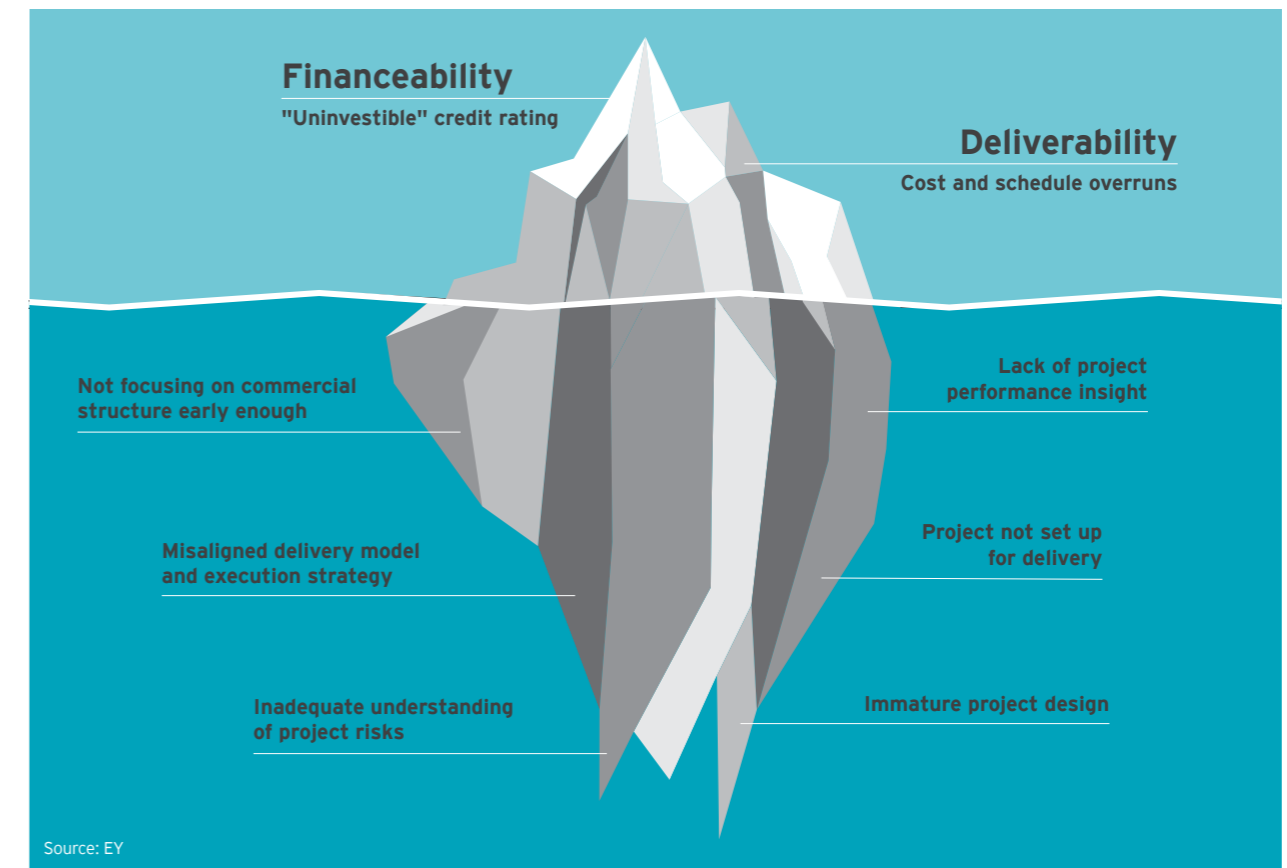


Source: EY research. Other technologies (oil, onshore wind, geothermal, solar and T&D) are not shown as they represent a small fraction of the 100 megaprojects analyzed.

# The infrastructure iceberg

A complex mix of factors is creating tough financeability and deliverability challenges that are sinking business cases for many infrastructure projects. Along with risks arising from external challenges, such as the economic climate, market dynamics and an increasingly complex regulatory environment, all of which need to be considered and mitigated within the business case, EY identified six internal root causes that combine to create delays and budget overruns (see Figure 6).

Figure 6: Infrastructure financeability and deliverability challenges iceberg



Source: EY

The seeds of these challenges are often sown at the very start of a project – although the full consequences may not surface for years. Trouble starts for many projects with failing to invest in the overall commercial structure early on. If design and procurement are not fully aligned with the delivery strategy, the project is destined to experience design changes, cost overruns, contractor disputes and worse, from day one. A second cause is not conducting full due diligence on procurement – with the result that no one realizes their supplier can't deliver what they promised until the product or service fails to materialize.

Another common problem is that projects don't build in rigorous, regular performance reporting. Without it, organizations have no reliable predictive analytics to prove things are progressing. Before long, the project is out of control, contractors have overspent, project owners are forced to seek more funding and the business case has slipped away.

Once these problems have surfaced, they can take months or years to resolve at massive extra cost, with particularly serious consequences for equity stakeholders. But it's not just a problem for the project itself – failures can reflect on the financeability of any future project of a similar nature.

# Root causes – mitigating the hidden dangers

Internal root causes can be tough to tackle because it can be very hard to identify, measure and share information on them. They may be created by the structure or culture of the business – for example, if people are used to working in isolated silos, with a narrow view of project goals. A common problem is a lack of real-time data and analytic tools that align key stages and make performance fully visible to the whole team. The common problems our research identified are:

## 1 Not focusing on commercial structure early enough

Projects often focus solely on raising project capital and developing the high-level business case to get through final investment decision (FID), rather than incorporating a robust project delivery framework and setup. As a result, the deal structure is suboptimal and this leads to financing and delivery difficulties.

## 2 Misaligned delivery model and execution strategy

Often the delivery strategy and execution model for the project are not sufficiently aligned and robust. This leads to significant contractual issues, including cost increases and schedule delays.

## 3 Inadequate understanding of project risks

Identification, impact analysis and mitigation of all key project risks are often not completed in sufficient detail prior to the FID, for fear it will adversely impact the decision. This leaves the project unprepared for risks that materialize in the project delivery phase.

## 4 Immature project design

Design – especially on complex projects – is often not fully developed early enough in the process. Contractors' further development of the design after contractual commitments leads to cost increases and delays.

## 5 Project not set up for delivery

For cost reasons, organizations often don't invest sufficient time and resources to build project delivery capability prior to the FID. This often means the project suffers from limited capability and poor information early in the delivery phase, resulting in costly, suboptimal decision-making.

## 6 Lack of project performance insight

Project performance data is often inconsistent across systems; as a result, it's possible that it may be misrepresented by the project team, in the belief that underlying issues can be addressed without steering group scrutiny.

Figure 7: How internal causes of cost overruns and schedule delays may manifest in the business

Financeability and deliverability					
Not focusing on commercial structure early enough	Misaligned delivery model and execution strategy	Inadequate understanding of project risks	Immature project design	Project not set up for delivery	Inadequate project performance insight
Poorly constructed deal structure	Immature delivery strategy for the project	Unrealistic risk profile at FID	Immature Front End Engineering Design (FEED)	Rushed into project setup post-FID	No "single version of the truth"
"Uninvestable" credit rating of BBB- or below	Ineffective commercial and claims management	Limited understanding of project risks	Incompatible design and delivery	Always one step behind contractors	No predictive insights to guide project leadership
Immature execution plan	Poor estimating capability	Limited control measures and mitigation	Poor design change management	Silo approach and limited project	No timely and transparent insight for project boards

Source: EY

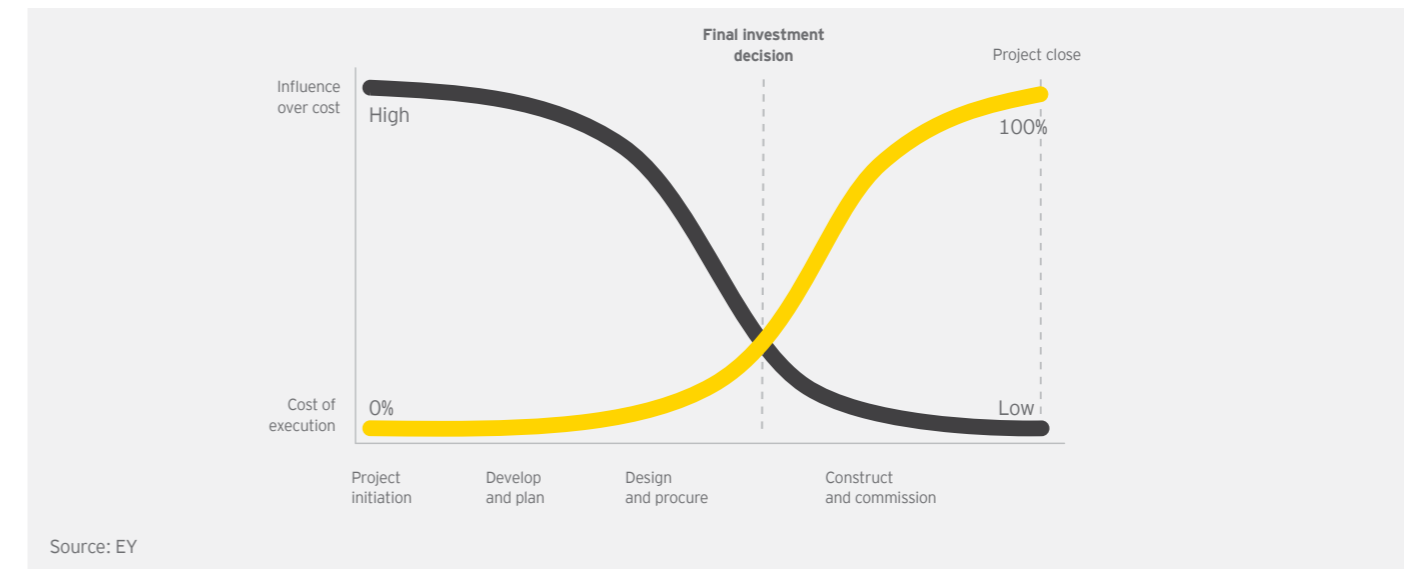
# Setting up for success – finding the silver bullets

Our research and deep sector experience supporting infrastructure projects worldwide repeatedly show that to secure the best financing arrangements and deliver the project in line with the business case, it is vital to invest more in developing and aligning the foundations of delivery structure in the early phase of a project, when most of the cost drivers are being determined (see Figure 8).

"Investing in pre-FID doesn't guarantee success – but not investing pre-FID often contributes to failure."

Tim Calver  
EMEIA P&U Capital and Infrastructure, EY

Figure 8: Evolution of costs and influence over costs throughout project life cycle



It is often impossible to influence the elements of project delivery after commitments have been made to secure the FID. If these elements are not set up at an early enough stage, post-FID risks to projects include:

- ▶ Risk of major design changes
- ▶ Inability to process and manage contractor request for information (RFI) and design changes, followed by claims
- ▶ Contractor performance and solvency risk; contractor interface risk
- ▶ Project momentum disrupted and inadequate resources in the delivery phase
- ▶ No project performance management information or project controls
- ▶ No visibility – and therefore no management – of project risks

P&U executives are often reluctant to invest in the delivery mechanism that will be required post-FID, for fear that the investment might be wasted. In our experience, investing as early as possible in the project life cycle has proved time and again to be an essential success factor. Projects that invest in a robust delivery framework, including contracting strategy, delivery model, full quantitative risk assessment, team capability, processes and systems, gives projects a far better chance of succeeding. If this investment isn't made, projects are at significantly higher risk of failure.

# Leading practice – smart, lean and green

EY has identified leading practices to limit the impact of the internal causes of failure pinpointed by our research (see Figure 9). Adopting these practices could save projects a significant amount of time and money up to delivery stage, as well as safeguarding ROI.

“Projects that invest up front in the contracting strategy, delivery model, full quantitative risk assessment, team capability, processes and systems have a far better chance of succeeding.”

**Chris Matthews**  
Global P&U Capital and Infrastructure, EY

Figure 9: Leading practices to limit the impact of root causes of failure identified by EY research

Hidden cause activity	Leading practice
<b>Not focusing on commercial structure early enough</b>	The most successful projects will develop a robust, executable plan as part of the financing phase, with a detailed understanding and mitigation of key risks, to attract financing and negotiate the cost of capital to the optimum level. Running a shadow credit rating well before seeking finance is a useful exercise to identify areas that will improve the project's attractiveness for investors. (For more on credit ratings, see page 9).
<b>Immature project design</b>	Misalignment or lack of collaboration between the design and other phases can lead to misunderstandings and delays at delivery phase. Leading practices to remedy this include implementing a virtual “digital asset” that is capable of modeling costs, timing and total cost of ownership at the design stage; involving contractors early to confirm buildability; and working with operations at design stage to ensure full O&M benefits are embedded. (For more on creating a digital asset, see page 10).
<b>Misaligned delivery model and execution strategy</b>	To avoid contractual issues, cost increases and schedule delays, successful projects need a detailed delivery strategy and execution plan, which incorporates appropriate staffing and skills capability; teams also need to understand and be ready with mitigation for major contractual risks.
<b>Inadequate understanding of project risks</b>	Complex projects will only succeed if they have an active, robust risk capability with aligned processes, systems and reporting fully integrated across the entire project, from the initial concept phase onward. This should be used and supported by everyone from the project board to individual project team members.
<b>Project not set up for delivery</b>	Embed robust project performance reporting to provide timely, actionable insight for project leaders. This will create a “single version of the truth,” which is transparent and available to all, enabling collaboration and allowing project leaders and steering groups to take corrective action if needed. (For more on this leading practice, see page 11).
<b>Inadequate project performance insight</b>	Leading practice is to have a project performance management approach that creates a single version of the truth, which is transparent and provides timely and actionable insights for the project leadership and project steering groups to make impactful early interventions if and when required.

Source: EY

# Innovate, innovate, innovate

In common with many other industries, the P&U sector is experiencing unprecedented disruption from innovation, primarily driven by digital connectivity and big data analytics. When we asked the decision-makers in our executive survey whether their organization had identified specific innovations to improve their project financing or project delivery performance, the majority said no (see Figure 10).

It's clear that there is significant opportunity to embrace digital innovation to overcome some of the common delivery challenges we have found. As a starting point, we outline below three key innovations in project fitness assessment, big data management and decision support that have the potential to transform projects. They all focus on providing actionable, timely insight for decision-making and are all geared to ensuring projects deliver on budget, on time and ultimately deliver expected returns.

## Innovation 1 Infrastructure fitness assessment: targeting a better project investment credit rating

Infrastructure projects often struggle to convince investors that they are “investable” and will deliver on time and within budget in line with the business case. As a consequence, they may either fail to secure financing or are loaded for risk and pay significantly above the norm. There's huge potential for innovation in financing decision support early in the project life cycle – and great potential benefits from measuring and monitoring a project's implied credit rating as a leading indicator of successful financing.

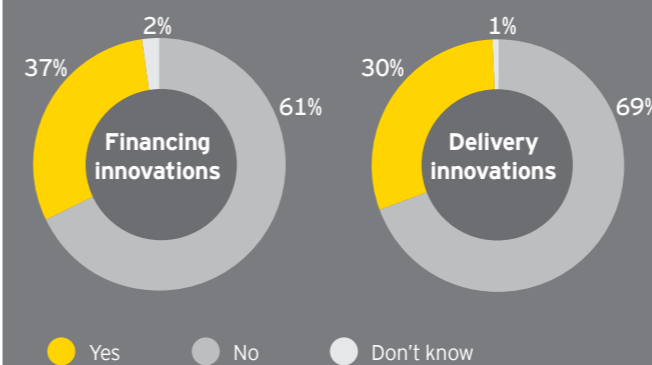
In particular, creating an attractive shadow credit rating can help push projects to the top of the “investable” list. Attracting investors means getting very specific, very early on, and optimizing all the key variables – such as construction, price, revenue and equity, management, optimal tax structure, debt and credit support – to deliver a project credit rating that is attractive to investors.

EY recommends an up-front “fitness assessment” for infrastructure projects (see Figure 11) – a process that analyzes the variable factors that will strongly impact whether or not the project will be awarded an investment grade credit rating.

A fitness assessment of this kind has a dual benefit as a financing analytical decision support tool: it helps to guide decision-making and boost investor confidence – so that projects secure the desired investment and attract more capital at better terms. This will ultimately enhance the project's value for money.

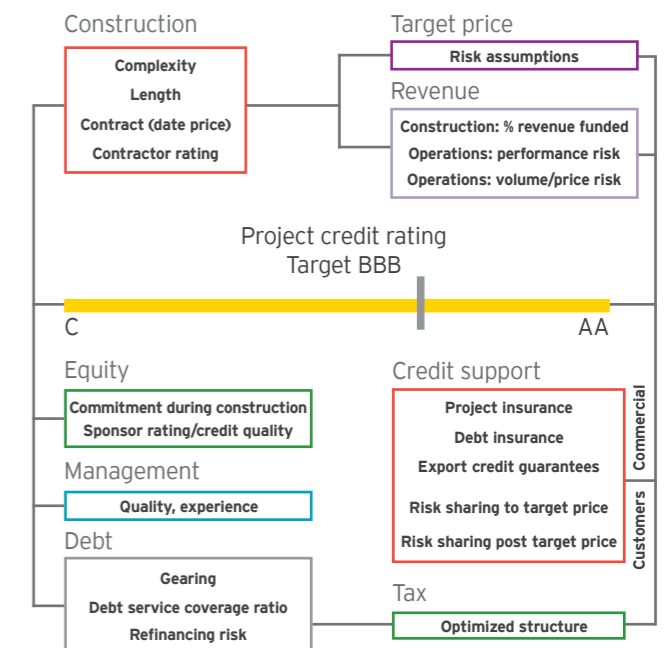
Figure 10

Q: Has your organization identified specific innovations that will be key to improving your performance in financing and delivery?



Source: EY Research

Figure 11: Project financial structuring model



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## Innovation 2

### Creating a megaproject “digital asset”

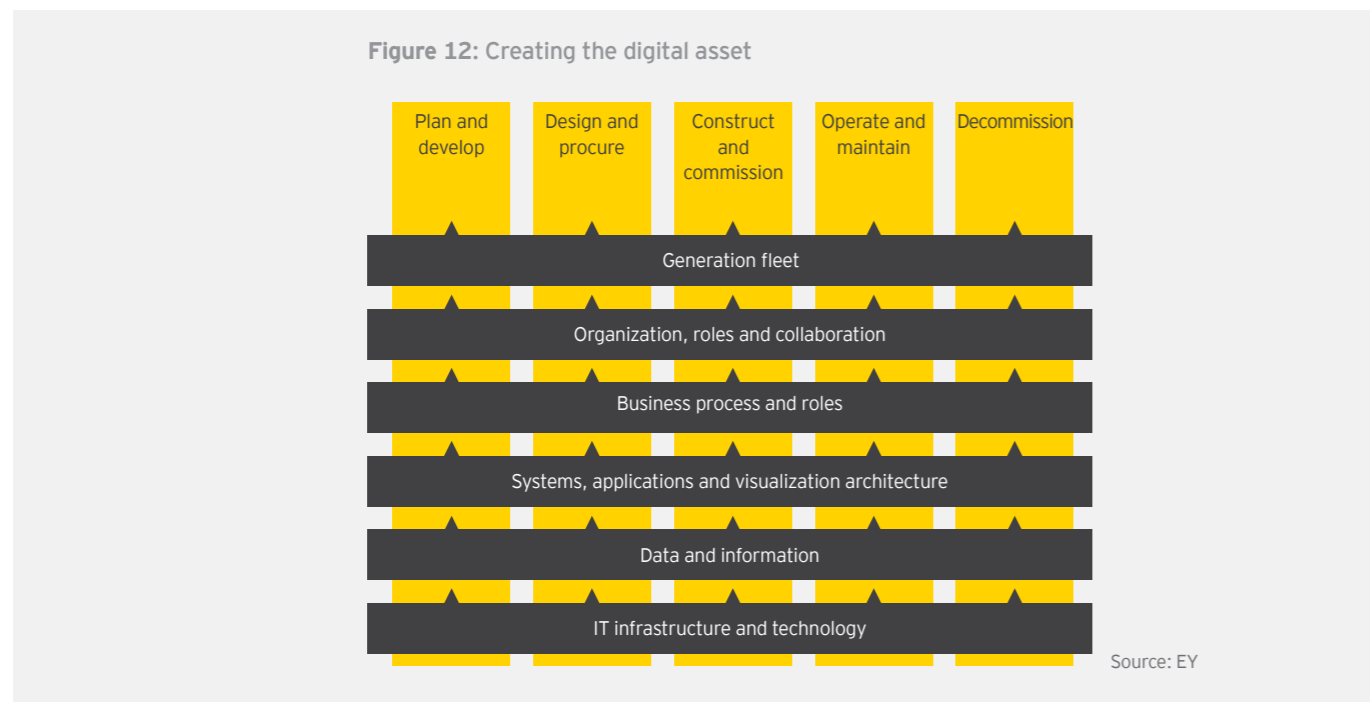
Complex projects commonly require multiple companies to work on the design of a single physical asset. As a result the integrated design often needs to change, creating challenges in construction – and increasing the chances of cost and schedule overruns during delivery. These challenges are compounded by the fact that major projects frequently operate in organizational silos, which obstructs effective management of integration.

Having a stable, constructible detailed design at the point of contractual commitment mitigates common risks at delivery stage. One of the most effective ways to tackle this issue is to create a centrally available, virtual digital model of the asset around which the whole team can collaborate.

Building Information Modeling (BIM) has been available for more than 20 years. Recent advances in digital and analytical tools mean it can now be used to create a single integrated design; model the optimum buildable design for construction, operation and even decommissioning; and integrate innovations in product life cycle management (PLM) and engineering management systems.

Creating a virtual digital asset that is at the heart of design, construction and operation means more than just using a single design tool. It requires changes to key project processes and governance and innovation to ensure effective commercial models around an integrated design. And it undoubtedly requires P&U organizations to make major cultural shifts to bring contractors and operators into a collaborative process.

Clearly this requires considerable up-front investment in time, IT tools, design expenditure, organization and processes. But enabling projects to “prove” design and construction in a safe, benign digital environment has immense benefit, reducing waste and optimizing the operational performance of the asset vs. the cost of investment.



<sup>11</sup> Government Construction Strategy Implementation Report, July 2012 (UK).

### UK government champions digital asset approach

The UK government has mandated use of BIM (level 2) on all new government infrastructure projects valued over £5m (US\$6.2m). In its Construction Strategy (2012), the UK government stated that BIM would play a major part in reducing the cost of government construction projects by 15%-20%.<sup>11</sup>

A major and highly complex UK infrastructure project valued at more than £50b (US\$62.4b) is currently planning to design, procure, construct and operate in a virtual digital world using BIM for scenario planning and optimization before physical procurement and building starts.

## Innovation 3

Digitally connected performance reporting establishes a “single version of the truth”

Complex projects are seldom able to create a “single version of the truth” – a holistic view of delivery performance data to provide appropriate, timely, transparent and actionable insight – which enables project leaders to intervene at the right time. But why not? And what can be done to rectify this?

One key reason is that before the recent advances in digital connectivity and analytics, it was near impossible to collect data, analyze it and forecast in real time. Another key factor is company culture. Intervention from above, resulting in an onslaught of questions about project status, has generally not been welcomed by the teams grappling with projects on the ground.

Advanced digital connectivity and analytics are capable of resolving these issues. All the complex dimensions of project delivery data can be drawn together in a single digitally connected enterprise project performance reporting approach (see Figure 13).

In this approach, digital performance analytics are incorporated to provide independent analysis of project performance against the project plan. Data collection is actively automated across project systems, and the most likely outcomes are forecast using predictive analytics. The reporting aggregates individual work streams and sub-projects to provide a clear view for individual project leaders and those responsible for project governance and oversight. Team members are able to comment on the

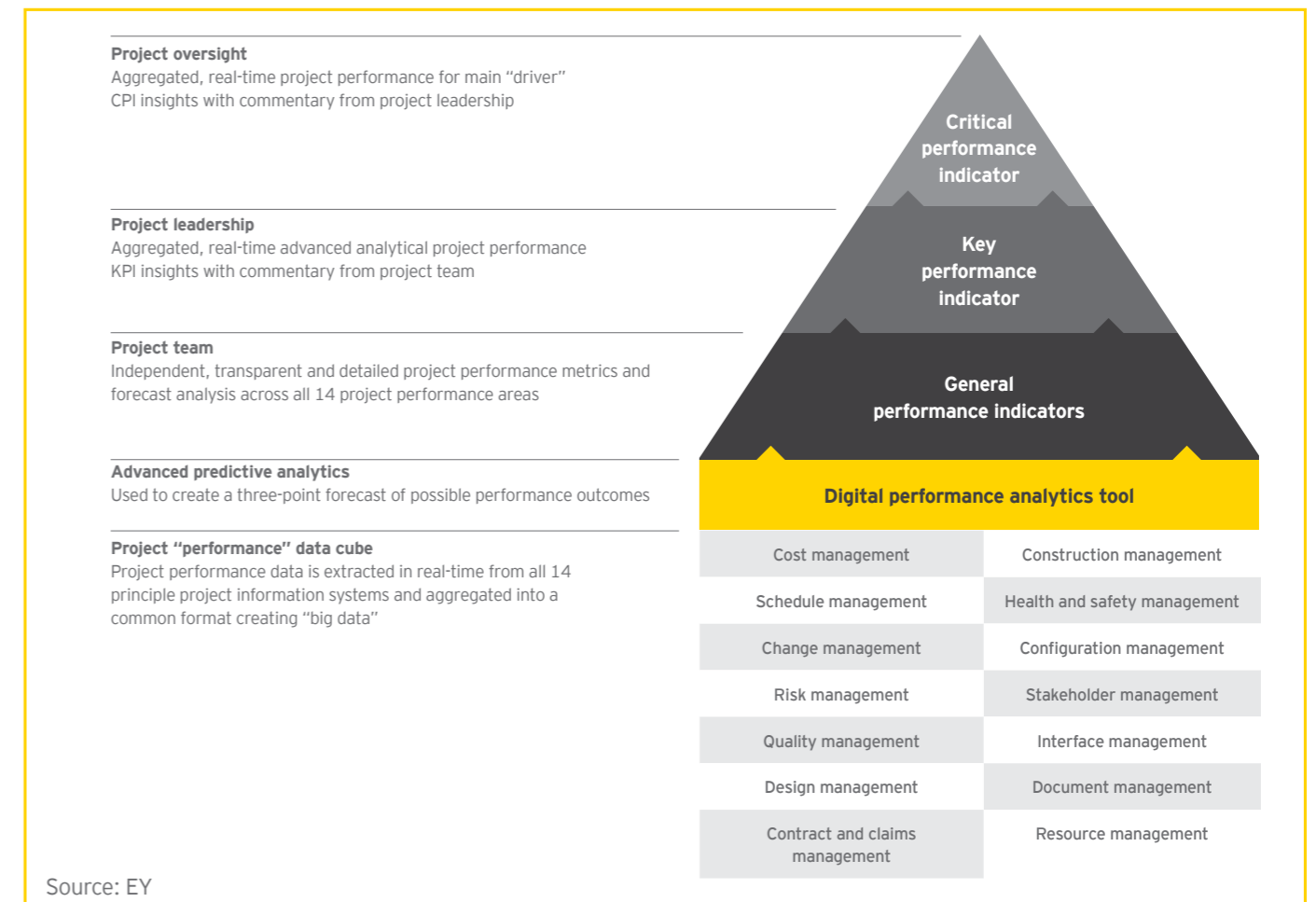
analysis, but the insight data cannot be altered or edited without base data changes. This prevents project managers – at any level – from repressing or altering information upward, while allowing people to contribute comments and observations that will help drive better decisions and project outcomes.

This approach to reporting is based on four key components and essentially involves:

- ▶ Designing and aligning all performance management reporting criteria – general performance indicators (GPIs), key performance indicators (KPIs) and critical performance indicators (CPIs) – and establishing what information needs to be seen, by whom and when, including associated processes and governance
- ▶ Aligning project management reporting systems and advanced analytics tools
- ▶ Aligning culture and values across the project to support the approach
- ▶ Embedding this into third-party contracts in the procurement process, with the risks clearly understood

The result: everyone sees a single version of the truth about project performance. Everyone is clear about status. Teams have timely, independent insight into project delivery, and the need for any corrective action is clearly flagged at the right stage.

**Figure 13: Digital connectivity and advanced digital analysis establishes a single version of the truth about project performance**



# What next?

## Harnessing digital innovation enables effective control and enhanced performance

While cost overruns and late delivery are the headline issues, they are just symptoms of the real underlying problems.

For a multitude of reasons that lie hidden deep in organizational structure, P&U companies are often unable to accurately assess the true size, cost and risk of big projects. This leads them to proceed with projects that are not actually viable, or inadequately plan, budget and control those that are. The result is that a huge proportion of capital budgets is being consumed by overrun costs, which virtually guarantees that projects won't deliver on their original business case.

There is now a significant opportunity to transform how P&U organizations manage cost, risk and uncertainty on projects – making overspending and overruns a much rarer phenomenon and closing the gap between projections and performance.

We need a fresh approach, and harnessing digital innovation is one important step toward more effective control and enhanced project performance, enabling P&U organizations to formulate a holistic view of projects and embed digital connectivity across the full project lifecycle to introduce a “single version of the truth” approach. This transparent reporting boosts control, eases scrutiny at all levels and makes appropriate intervention possible, to keep projects on track.

Many of the internal root causes of issues that we have identified can be mitigated by adopting the sort of process we describe. And P&U organizations can seek out and apply leading practices to improve financing and delivery – building on past experience in the sector and adopting practices from other sectors – to make their projects “best in class.”

The world is looking to P&U organizations to deliver the projects that will secure our energy and create prosperity and growth. This is too important an endeavor to fail – for the sector, the global economy and society as a whole. It's vitally important to get this right.

“The world is looking to P&U organizations to deliver the projects that will secure energy and create prosperity and growth. It's vitally important to get this right.”

**Claus Jensen**  
Global Program Management  
Leader, EY

## More capital projects insight from EY

This is the first of a new capital and infrastructure Spotlight series. A follow-up report focusing on asset excellence will be available in 2017.

For more information about our capital and infrastructure services for power and utility organizations, see [ey.com/capitalandinfrastructure](http://ey.com/capitalandinfrastructure).

# Research methodology

## Industry survey

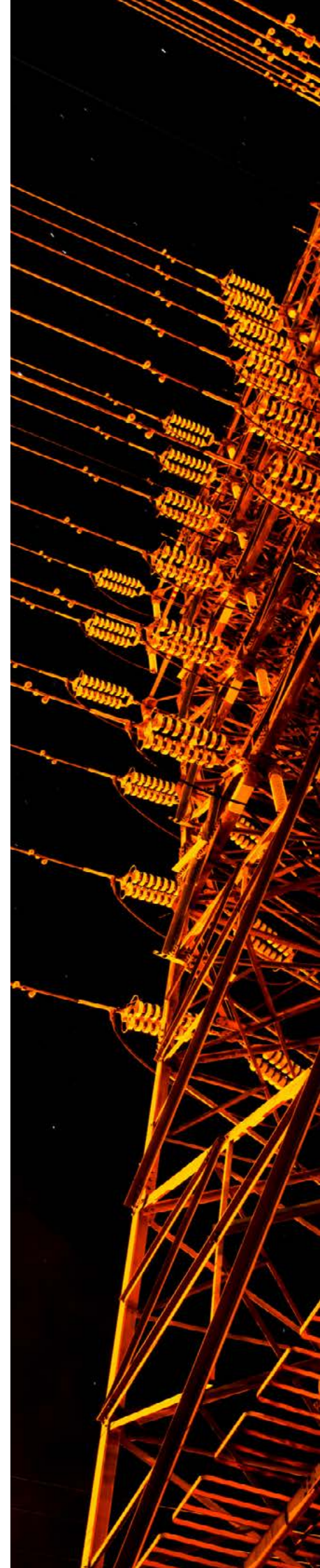
EY conducted a survey of executives from P&U organizations with a turnover ranging between US\$900m and more than US\$5b, using a structured survey questionnaire. Of the 204 respondents, one in four respondents was a C-suite executive, with the remainder at director level across five functional areas comprising finance, strategy, operations, procurement and projects/programs. The respondent geographical split was as follows: 23% from Asia-Pacific, 43% from EMEIA and 34% from Americas. The study targeted executives working in different P&U segments: power generation (nuclear, hydro, coal, gas and renewables), transmission and distribution, and water.

## Megaprojects performance research

EY analyzed the performance of 100 of the world's largest “megaprojects” (by capital expenditure) all featuring time and cost overrun figures reported publicly (in press releases, news articles, company websites, annual reports and/or other articles). These include power generation, transmission and distribution, and water projects, across all stages of the project life cycle, from pre-financing through decommissioning, and were identified from Infrastructure Journal's project database in April 2016.

Time delays and cost overruns were calculated based on the latest available reported figures. In instances where a project was delayed but no expected completion date was available, the delay was calculated as of 30 April 2016. Where project cost data was denominated in currency other than US dollars, the currency conversion to US dollars was applied using exchange rates prevalent on 5 May 2016.

Disclaimer: Identification of the 100 megaprojects and the associated performance metrics have been prepared on a “best efforts” basis, based on publicly available information. The performance of individual companies and projects is not discussed, disclosed or implied. Any broader industry commentary is based on general industry observations and not on the views of any single organization.





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For more information on how we can help you, talk to your regular EY contact or get in touch with one of our Capital and Infrastructure contacts.



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