



Foresight

A global infrastructure perspective

Special edition — January 2017

Ten emerging trends in 2017

Trends that will change the world of infrastructure.

Around the world, uncertainty is rife. Political agendas and social expectations are changing. Global, regional and national institutions are weakening. Power is shifting. And technology is disrupting everything.

In 2016, we led our *Emerging Trends* report with the prediction that 'no normal will become the new normal'. This year, we see a continuation of many of those trends. Political uncertainty will undoubtedly continue, both in the developed and the emerging markets. Funding, as opposed to finance, will continue to be a key

challenge, even while governments strive to develop innovative mechanisms to unlock their pipelines. The demand to get more from existing investments will only heighten.

At the same time, new trends are emerging (or, in some cases, evolving). Governments are rethinking their approach to funding and capital investment. Transparency in public sector decision making is increasing as public discourse rises. And access to new technologies is changing the way governments and investors plan and manage infrastructure.



However, in most cases we have seen either more talk than action or more action than talk. Both can be a problem. When it comes to the creation of credit enhancement mechanisms or the value of technology within the sector, there has been too much talk and fine tuning and not enough action. In other cases — such as the drive to more fully account for social and environmental impacts of investments or the privatization of assets — more talk is certainly required.

This year, we expect a shift towards more responsible leadership, both from governments and from the private sector. And this will require

the public and the private sector to rethink their approach to funding, developing and operating infrastructure. It will also require them to gain a better understanding of what their constituents, stakeholders and users actually want.

We hope that this year's *Emerging Trends in Infrastructure* helps decision-makers and investors to better understand the changes flowing through the sector. And, in doing so, we hope to catalyze responsible leadership on a global scale and a wider debate on infrastructure morality. To discuss these trends and their impacts in more detail, we encourage you to contact your local KPMG infrastructure team.



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The traditional lines between energy, transportation and technology have been blurring for years. But as governments start to think more holistically about their long-term infrastructure objectives, many are starting to recognize the need for a new approach. Failure to address the increased connectivity between energy, transportation and technology will result in poor investment decisions.

All signs suggest that the confluence between the sectors is about to sharpen and demand for energy is set to increase dramatically. Consider, for example, the careful balance governments will need to strike as they implement a low-carbon transportation agenda while simultaneously striving to shift energy generation towards renewables, all while addressing demand and supply imbalances in the network. Or the pressure that the electrification of heating will put onto the existing power grid in the less temperate developed markets.

The challenge will be sharper still in many of the developing markets where the ability of government — particularly at the city level — to respond to growing demand for energy, transportation and technology will underpin economic growth and social harmony.

Over the coming year, we expect the more responsible governments to look for new ways to improve alignment and drive integrated planning across the three sectors. In some cases, this will require the establishment of new structures that encourage shared investment and planning across different government departments. In other cases, it may be driven by focused leadership and strong policy direction.

We also expect this year to bring some exciting developments and ideas that will continue to disrupt the way governments and consumers view energy, new transportation and technology.

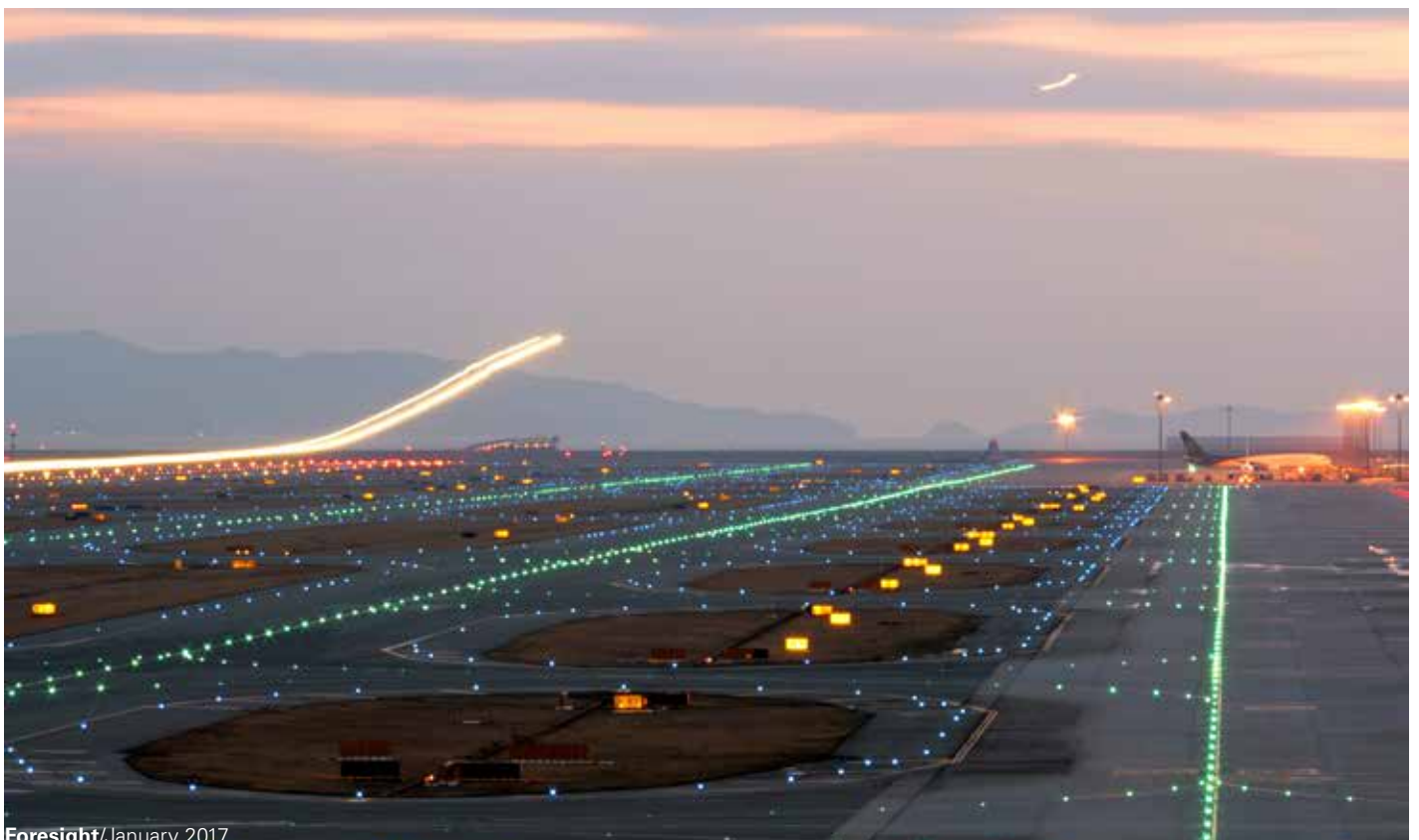
These changes will occur at the macro level (economy/city-wide) and at the micro level (individual consumer/citizen behaviors). This will not only lead to a shifting of priorities (as we note in Trend 4), but also significant challenges as governments decide which technologies to invest in and when.

This is the beginning of a long journey, so while there may currently be more talk than action, we believe this is a good sign: transparency in public discourse is a necessary precursor to real change.

► The long view:

The next 15 to 20 years will be difficult for governments as they balance increased demand for low-carbon energy against the realities of their current energy mix. On the one hand, nobody wants to own a brand new — but soon to be obsolete — asset. But at the same time, we can't afford to gamble on the belief that disruptive technology will save the day. Disruption is not an excuse for inaction.

For the developing world, this confluence of energy, transportation and technology will create significant opportunities to leapfrog the west, for example by harnessing the benefits of distributed generation such as solar plus storage. We have already reached cost parity between thermal and solar power in a number of markets, but delivering against growing demand for energy-intensive technology and electric transportation will be a continuous struggle. The reality is that — as incomes rise and the middle class expands — demand for energy in all its forms will grow exponentially.



At the start of 2016, we predicted that political and social uncertainty would rise. Having witnessed Brexit, the recent US election results, the fallout of the Operation Carwash scandal in Brazil and countless other 'unexpected' events, it seems we (like many), may have understated the impact.

What is clear is that the underlying current has shifted towards more populist agendas. And that has pushed infrastructure onto center stage as a form of policy mitigation. Donald Trump is not the only politician to have offered voters a 'path to greatness' through infrastructure renewal; governments from Colombia to Canada are also staking their reputations on infrastructure. In many markets, infrastructure is being discussed in the same way it was during the Great Depression. And in Asia, it is being lauded as the path to sustainable prosperity. China has long viewed infrastructure as a panacea to social upheaval (as evidenced by the One Belt One Road project); Vietnam and Myanmar are starting to follow in the same footsteps.

This shift towards populist agendas underpinned by infrastructure will lead to three key 'sub' trends. The first is obvious: infrastructure budgets should swell. However, we expect many projects will be funded on a taxpayer-pay basis and, as a result, it seems almost certain that public deficits will rise.

The second sub-trend is one of protectionism. One can assume that part of the draw of infrastructure is the potential to create local jobs. For various reasons it is unlikely that the US will want to rely on foreign workers and developers as they strive to 'make America great again'. From concerns about loss of control and national security through to impacts on local labor and consumer protection, various 'reasons' will be offered for closing borders to international players. In most markets, the chances of a regulatory 'sideswipe' that harms international developers and operators will rise.

The third sub-trend will be a shift in infrastructure priorities, not only towards more popular assets and 'people first'

projects, but also towards new technologies and models that speed up infrastructure delivery. Indeed, the infrastructure investment playing field will likely become flatter as developing and developed markets gain simultaneous access to new technologies.

Consider, for example, how advances in solar technology has allowed governments in Africa to stop worrying about (and investing into) massive power grids and generating sets. Mobile telephone technology has eliminated the need for fixed lines in many markets. We expect technology to continue to play a significant role as governments, at all levels and in all markets, strive to respond to more populist demands and deal with social inequality.

Care will need to be taken to ensure that protectionist ideals do not diminish the value that international experience, ideas and capabilities can offer. In fact, at its ugliest, protectionism only increases the cost of infrastructure delivery and results in lower-quality assets as international competition and best practices are driven out of the market.

► The long view:

Those with national infrastructure strategies that focus on industrial competitiveness will sow the seeds of durable growth in national income and, in doing so, will support enhanced quality of life for their citizens.

Governments will continue to put 'people first' projects at the top of the agenda, thereby allowing social equality and other issues to influence infrastructure planning and shift priorities.

For governments and international developers, contractors and operators, the long-term challenge will be to articulate a much clearer story about the value they plan to deliver while seeking to allay local concerns.



Trend | 3

Understanding consumer behavior will be the key to infrastructure planning and management

The underlying parameters of infrastructure planning have changed. For the past 50 years, the common wisdom has been that bigger populations require more roads, bigger generation capacity and more transit, all macro solutions and quite appropriate given a 'fixed' technology solution (such as suburbs and the automobile) and 'fixed' consumer behavior.

But over the past decade, both technology and consumer behavior have begun to change. Changes in the way consumers now interact with infrastructure are turning common wisdom on its head. Infrastructure planners are struggling to keep up.

Consider, for example, how some Millennials in the developed world interact with transportation infrastructure. They do not see the need to own cars. When they do use a personal vehicle, it is often shared. They use real-time traffic and navigation apps to select their route through a city. And environmental impact influences their transportation decisions as much as cost and convenience.

In many developing markets, this trend is playing out somewhat differently. In Asia, rising affluence and a rapidly expanding middle class have led to massive demand for air travel. In Africa, the development of solar has reduced demand for electricity distribution investments. And across the globe, governments are considering how a bevy of new technologies — renewable generation, energy storage, driverless cars and others — will influence future demand for infrastructure.

Cities, too, are taking note of the need to embrace disruptive technology — blockchain, bitcoin, sharing economy, open data and autonomous vehicles — recognizing that these growth enablers will become particularly important as they compete for the share of future employment growth, particularly from the young wealth creators.

Over the coming year, we expect governments to take a more 'bottom-up' approach to infrastructure planning and development, taking the time to understand the changing demands of both current users and future generations to help shape their infrastructure agendas. Some may want to examine the UK's Mistral-ITRC program, a leading initiative to build a 'system of systems' model designed to forecast future infrastructure needs.

We also expect some governments to take advantage of these changes to solve some of their larger infrastructure challenges. Incentivizing Millennials to ride bicycles to work, for example, would respond to their desire for low-carbon, low-cost transportation. Copenhagen has been remarkably successful in driving similar programs across the wider population. Improving access to solar generation sources in Africa would not only provide power to rural areas, it would also drive economic growth and help create a new consumer class.

Ultimately, we expect this year to bring significant change to the way consumers use their infrastructure. And this, in turn, will create even bigger challenges for infrastructure planners.

► The long view:

While this trend may cause some consternation for governments over the next decade or so, we believe that changing consumer preferences and demographics may eventually bring demand and supply back into line. However, as the micro decisions of consumers start to influence the macro infrastructure agenda, new areas of demand may emerge. Over the next decade, we would not be surprised to see a city or two ban all forms of carbon-fueled vehicles.

Trend | 4

Investors starting to care about social and environmental impacts...not just financial returns

Over the past year, we have seen increasing pressure on government — and through governments — to prioritize infrastructure investments that deliver greater social and environmental benefit; simply put, to become more responsible leaders.

Governments are being asked to account for the social and environmental value of their investments and public opinion has drawn the spotlight onto social inequality (as evidenced by recent election and referendum results).

Institutional investors are recognizing that their returns are also under pressure from social and environmental concerns (witness the debates about pipelines in the US or coal fired power plants in India). The beneficiaries of the bigger public pension plans are starting to ask searching questions about the social and environmental benefits of their investments. Some, like CalPERS and CalSTRS have begun to create policies to help



their deal-makers measure social and environmental impact alongside financial return.

To be clear, this is not about 'impact investing' where financial returns might be sacrificed in the pursuit of social benefit. This is about measuring and assessing the wider basket of benefits that an investment delivers beyond purely financial returns.

Over the coming year, we expect investors (public and private) to make serious efforts to measure and communicate the real impact of their investments. In some cases, this will lead to difficult choices as plan managers and their beneficiaries gain greater awareness of their social and environmental footprint. It will also likely lead to growing competition for projects that are able to demonstrate stronger social and environmental benefit.

In the short term, however, the challenge for investors and governments will be in formulating a consistent and appropriate approach to measuring and reporting on social and environmental impacts, a discipline that is currently at a relatively early stage of development.

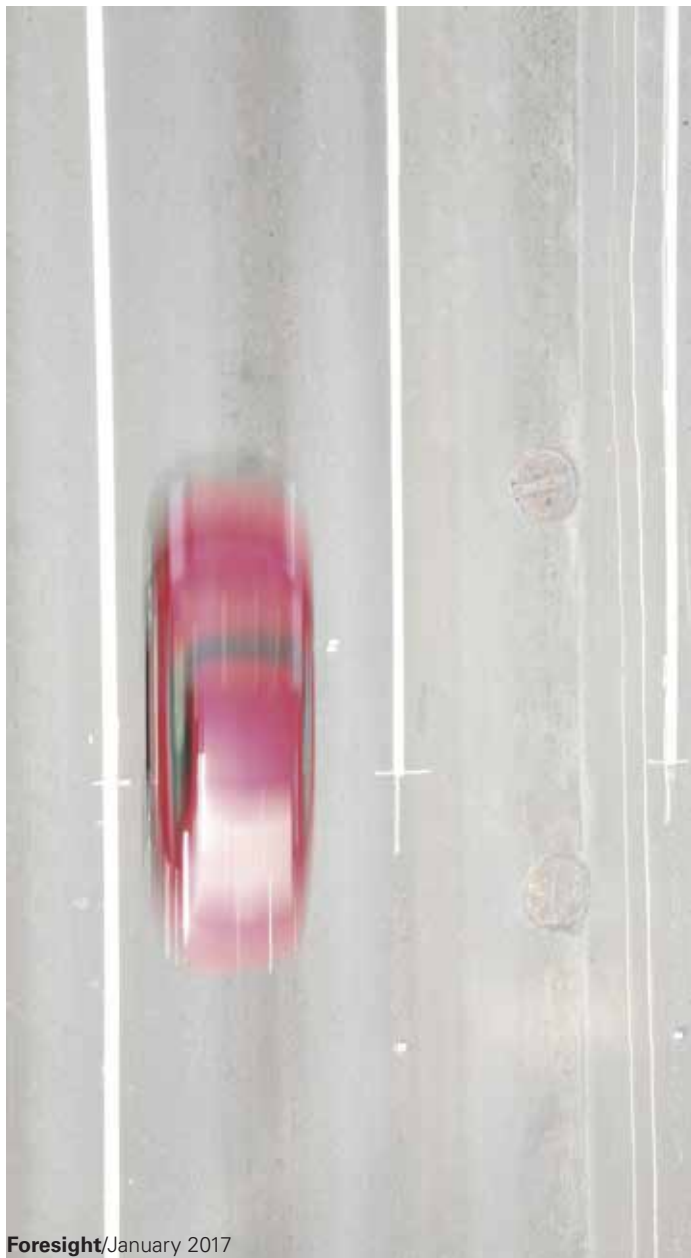
► The long view:

In the medium term, we expect some confusion as different players and markets test different approaches to creating a clear, comprehensive and workable set of measures. However, once institutional investors and governments start reporting on social and environmental benefits using a generally-accepted set of measures, the pressure to deliver even greater benefits will start to rise. And as measurement and reporting becomes more sophisticated, we expect investors to move towards achieving a true 'triple bottom line'.

However, further recessions and bear markets may complicate matters as governments are forced to focus on investment for economic growth, and for institutional investors the fiduciary imperative to provide for the beneficiaries' retirements comes under pressure.

Trend | 5

Technology enables greater infrastructure productivity and increases obsolescence risk



Last year, we predicted that technology would fundamentally change how we plan, design, develop and operate our infrastructure. In many sectors, we were right: the falling cost of solar power generation and increased efficiency of energy storage, for example, is already changing the dynamics of centralized generation.

The rapid pace of technological change is also creating growing concerns from infrastructure investors who are now assessing the risk of their investments becoming technologically obsolete before the end of their anticipated operational lifecycle.

This year, we expect to see the impact of technology widen and deepen. The widening will come from the discovery and application of new technologies, new uses for existing technologies and increased collaboration between asset owners/operators and consumers. The deepening impact will be driven by the infrastructure owners and operators themselves as they strive to achieve greater efficiency and value from their investments.

At the macro (society level), we expect to see entirely new technologies start to gain traction and become increasingly commercialized. Distributed distribution is already here. So, too, are driverless cars (though we have yet to even scratch the surface of their application). Even the Hyperloop (maybe one of the most audacious 'leaps' in transportation technology) is quickly moving from research to pilot. And this is creating both opportunities and challenges as infrastructure investors try to assess demand for future infrastructure.

But it is at the micro (consumer) level where much of the action will be. This year, the true value of data and analytics will begin to emerge, helping to improve capacity, performance, reliability, reduce operational costs and transform operational performance. Infrastructure productivity will become mainstream.

Automation tools that eliminate human error and enhance performance will be adopted. New slick consumer apps and visualization interfaces will emerge to allow customers to control their infrastructure usage. And the age of personal service robots will come to reality, creating massive implications for sectors like health care, elderly care and banking.

In 2017, we expect infrastructure owners and operators to start focusing on developing robust technology plans, balancing the need for competitive advantage against the desire to achieve quick returns on their investments. We also expect to see a select number of governments move from being technology followers to technology leaders and using this prowess to better relate to their citizens and manage their infrastructure.

Last year, we suggested that infrastructure CEOs and leaders should be thinking more like technology CEOs. This year they will need to redouble their focus. The bottom line is that those who fail to take technological change into account will start to fall behind.

► The long view:

Infrastructure owners and operators will become much more comfortable with understanding, assessing and adopting new technologies, albeit from a fairly low base (just 8 percent of construction companies categorize themselves as 'cutting edge' when it comes to technology).¹

With little experience of forecasting technology trends, infrastructure planners and investors will likely continue to struggle with the longer-term challenge of understanding consumer/citizen behavior and demand in an ever-changing technology environment. The challenge will be particularly acute in the energy and transportation sectors where the pace of technological change seems to be picking up speed.

Trend | 6 Getting more out of existing infrastructure



With demand for infrastructure at an all-time high, governments around the world are thinking about how they might squeeze more from their existing investments. Not surprisingly, investments geared towards demand management and capacity enhancement are coming to the top of the agenda.

The reality is that much of our existing infrastructure — our roads, our transit networks, our electricity generation and our airports, to name but a few — are designed to meet peak demand. Rather than build entirely new capacity to meet ever-higher peaks, governments at all levels are now thinking about ways to smooth out the peaks. Staggered work days, time-of-day billing, pricing incentives and regulatory measures are all on the table for consideration. But most have been slow to implement.

At the same time, infrastructure owners are looking for opportunities where incremental investments can deliver significant capacity enhancements. New signaling systems that allow trains to run closer together, for example, or better maintenance analytics that prevent system outages and reduce system downtime. Major gains will be achieved as infrastructure owners learn to do more (and often better) with less.

Interestingly, efforts to smooth out demand and improve capacity will largely depend on two other trends identified in this document. The first is the rapid pace of technological change (Trend 5), which is influencing the way consumers interact with infrastructure and may ultimately make some existing infrastructure obsolete. The second is the shift

¹ *Global Construction Survey: Building a technology advantage*, KPMG International, 2016

in social norms and work patterns (Trend 3) which is also reshaping demand as people start to work remotely and change how they interact with infrastructure to suit the way they want to live their lives.

In the developing world, the challenge continues to revolve around the need for basic infrastructure to improve capacity. In the mature markets, we expect infrastructure owners to focus on making smaller investments that, in turn, unlock improved performance, capacity, reliability and service delivery.

We also expect to see governments — particularly at the city level — start to think about how they might incentivize behaviors that help better manage peak demand in various sectors. France, Belgium and the UK have all experimented with subsidizing commuters to ride bikes to work. Other schemes will likely be floated.

As this trend evolves, the interplay between the macro (society-wide) and the micro (consumer/citizen level) will be fascinating, particularly at the municipal level.

► The long view:

As consumers get more (and more timely) data and information on their infrastructure, they will increasingly be able to adjust and change their usage patterns and behaviors. And as infrastructure systems become more sophisticated, owners will find increased ability to adjust pricing to manage demand and more finely calibrate their operations.

In some cases, technology will allow infrastructure to be delivered at a much smaller — more personal — scale, which should also gradually reduce peak demand on existing power infrastructure in developed markets and create new power models in the developing markets.

This may dismay the politicians, however, cutting the ribbon on massive new infrastructure almost always attracts more headlines than flicking the switch on a capacity enhancement.

Trend | 7

Governments look to unlock the funding paradigm

With so much effort being put towards improving project development and increasing finance capacity, why are so many projects stuck? In many cases, the problem has been related to funding. Simply put, infrastructure project pipelines around the world have remained blocked because governments are still struggling to decide how to pay for the assets and services that must be delivered.

Traditionally, governments at all levels have focused on two broad types of infrastructure projects. The first is the 'taxpayer pay' where government essentially pays for the capital and operating costs (on behalf of the consumer) out of current

budgets or future taxes, commonly referred to as an 'availability payment' in the public-private partnership world. This is the typical approach for assets that have no obvious revenue streams (such as schools or hospitals). The second approach is through concession-type deals where private financing covers the upfront cost and then recoups a return directly from consumers (user pay).

Where governments are struggling most is with the projects that fall in the middle — roads and railways for example — where some user pay cash flow exists, but not enough to cover the cost of the entire asset across its lifecycle.

A number of issues have emerged. The first is structural and, to a certain extent, behavioral: many governments are reluctant to provide capital contributions to support projects with user pay options. This must change.

The second challenge is the shift in focus and prioritization towards cities as governments at all levels realize the value of investing into cities. But this, in turn, is creating funding questions as responsibility — and costs — are devolved (sic. handed off) to a municipal level.

Likely the biggest issue, however, is how to fill the funding gap. As we noted in last year's *Emerging Trends*, governments are increasingly devising innovative alternative funding sources for these projects (although, once again, we have seen much more talk than action). Some are trying to leverage land values to fund the gap. Others are exploring the potential for creating new development taxes and business taxes.

Whatever the strategy, it is clear that the public discourse is changing: it is now publicly acceptable to engage in a discussion about who pays for infrastructure. And while these open public discussions may be cumbersome and complex, they are a very important first step to resolving this vexing issue at both the project level and at the economy level.



A more strategic solution is required and we therefore believe (and hope) that 2017 will bring renewed focus on asset 'recycling' (or, to give its politically incorrect term, privatization). While this is currently an unpopular policy in many markets, we believe that more pragmatism is required if new infrastructure is to be built. And, as certain state governments have demonstrated in Australia, political opposition can be overcome through the right messaging.

In many cases, governments will focus their asset recycling efforts on selling existing and profitable assets in order to help fund the development of new assets. But, increasingly, governments will find ways to use their own money to finance the initial development of infrastructure assets and then also sell down once the project is operational and 'de-risked'.

However, to be successful with any alternative funding solution, governments will need to be clear with their populations about how the proceeds will be used. Trust in government is not currently high and success will depend on iron clad commitments to develop new infrastructure, combined with a clear regulatory approach in relation to the privatized assets. Both the consumer and the investor need protection if the use of asset recycling is to become a widespread approach.

► The long view:

In the mature markets, trust issues will continue to vex but — ultimately — populations will become more comfortable with the idea of asset recycling and governments will start to look deeper for less obvious, and potentially more controversial assets to monetize.

In the developing world, asset selection will be key. The absence of robust regulatory environments to protect both investors and consumers will rule some assets out and dampen appetite for secondary sales. The long-term value is there, but strong cash flows and the ability to implement will be key.

As infrastructure grows in size and crosses jurisdictional boundaries, owners will also need to contend with concerns about 'free riders' who live outside of a tax zone but still enjoy all of the benefits of that zone's assets.

Trend | 8 Credit enhancement facilities go back to basics

Governments and multilateral organizations are making valiant efforts to help unclog infrastructure pipelines by developing increasingly-sophisticated credit enhancement facilities and vehicles.

On face value, this is a vital development. There are literally thousands of projects that are being held up by a combination of poor credit ratings and challenging financing markets. Credit enhancement facilities should allow private sector equity and debt providers to take on more of these projects knowing that a certain level of risk is being covered.

Unfortunately, progress with many of these facilities has been slow. In part, this is because private sector investors are still naturally shy about taking on 'borderline' projects that require credit enhancement. And in the developing world, a general lack of regulation, weak institutions and non-existent local infrastructure markets has muted the value of credit enhancement promises. In many markets, the greater need is for support in capacity building and strengthening of government institutions.

The bigger challenge, however, is that few credit enhancement deals have actually been struck. Governments and multilaterals have, on the whole, been far too focused on creating 'perfect' structures and not nearly focused enough on getting the deals done. Simply put, financial instruments have become too complicated and too finely calibrated and this is stopping projects from being delivered.

Over the coming year, however, we expect (and encourage) governments and multilaterals to recognize that — for many of these projects — their choice is to either find a way to work with the private sector or not deliver the project at all.



As we noted in our *Emerging Trends 2015*, governments will need to think more about the broad benefits that infrastructure delivers rather than focusing purely on closing a financial deal. They need to recognize the need to take on more risk at the early stages of their infrastructure program knowing that — as they mature — they will be able to pass these risks back to investors or sell out completely. They need to recognize that they have a role to play in establishing markets, recognizing that the additional risk they take on will be far outweighed by the benefits that new infrastructure brings, particularly in emerging economies.

► The long view:

Governments and multilaterals will move at different paces to simplify their financial instruments and take on more risk in order to help build the track record and capabilities of markets. Some will continue to tinker around the edges, striving to achieve the best possible deal, but not closing any. This will be as much about changing culture and historic practices as structural change. It is ironic that it is the most developed and liquid markets that have taken the biggest steps (such as the UK with its Guarantee Scheme).

Trend | 9

The search for yield drives convergence in the investment market

Last year, we noted that increased competition for 'investable' infrastructure assets was driving up competition and pushing down yields. And we (correctly) predicted that this would drive more sophisticated investors into higher-risk markets, projects and sectors.

Starting this year, we expect that trend to continue, but with some interesting consequences. For one, the lines between the different types of investors will start to blur. We are already seeing financial investors recruit operational teams. Construction companies and developers are

creating investment arms. Operators, too, are starting to invest debt and equity into projects in order to move them forward and better balance their risks and returns.

At the same time, the search for yield is changing investment patterns. Greater appetite for risk has meant that new markets and projects are starting to come into scope, taking deal-makers farther into unknown territory. Appetite for greenfield projects is growing in the developed markets, while investors simultaneously look for brownfield opportunities and improved value in new geographies. At the same time, many institutional investors are now turning away from the 'fund model' and are looking for opportunities to invest directly into infrastructure assets.

As a result, infrastructure investment teams are starting to grow and become much more sophisticated in how they hold and manage their investments. Rather than focusing passively on financial returns and risk, many are developing important operational capabilities as well. At the same time, operators are developing financial capabilities and developers are building up strategic and financial skills.

Over the coming years, we expect to see the lines blur further as the search for yield continues. Some will make the transition successfully. The risk, however, is that some may move too quickly and, in doing so, take on risks that they do not fully understand with unexpected results.

► The long view:

This trend will continue to have an impact on the infrastructure 'value chain' for some time as players jockey for position and assess their capabilities. Funds will still play a major role in the market, particularly in more specialized markets or regions with more fragmented opportunities. Investors will become fundamentally more active — less financially orientated and more operational, and hopefully more customer focused. But over the longer term, we expect lines to be reestablished as players start to focus on one or two areas of expertise so once the dust settles, don't expect any of today's players to look the same.





While the consumerism of infrastructure (Trend 3) and the rise of populist agendas (Trend 2) will drive populations to focus on the demand side of infrastructure, all signs suggest that the 'supply' side is rapidly globalizing.

In our *Emerging Trends 2015*, we noted that infrastructure players — investors, developers and, increasingly, operators — were starting to expand their global capabilities and transcend national borders. And over the past 2 years this trend has continued, catalyzed by rapidly-maturing players from the developing world, a new cohort of global operators have emerged seeking to expand their footprint. Some have been encouraged, supported or even subsidized by government 'outbound' strategies (often wielding infrastructure as a policy tool). Others are simply looking to diversify.

China is a case in point. The country boasts a massive pipeline of projects and local operators and investors are rapidly gaining valuable experience. As the government continues to encourage their State Owned Enterprises and private sector to compete in open market tenders, these capabilities are starting to influence international competitions. The One Belt, One Road project is also a massive statement of intent.

At the same time, we have noted a relative 'globalization' of models and approaches as governments start to learn from each other and share best practices for everything from infrastructure planning and prioritization through to deal

structuring and procurement. And this, in turn, is helping international players standardize and improve key capabilities.

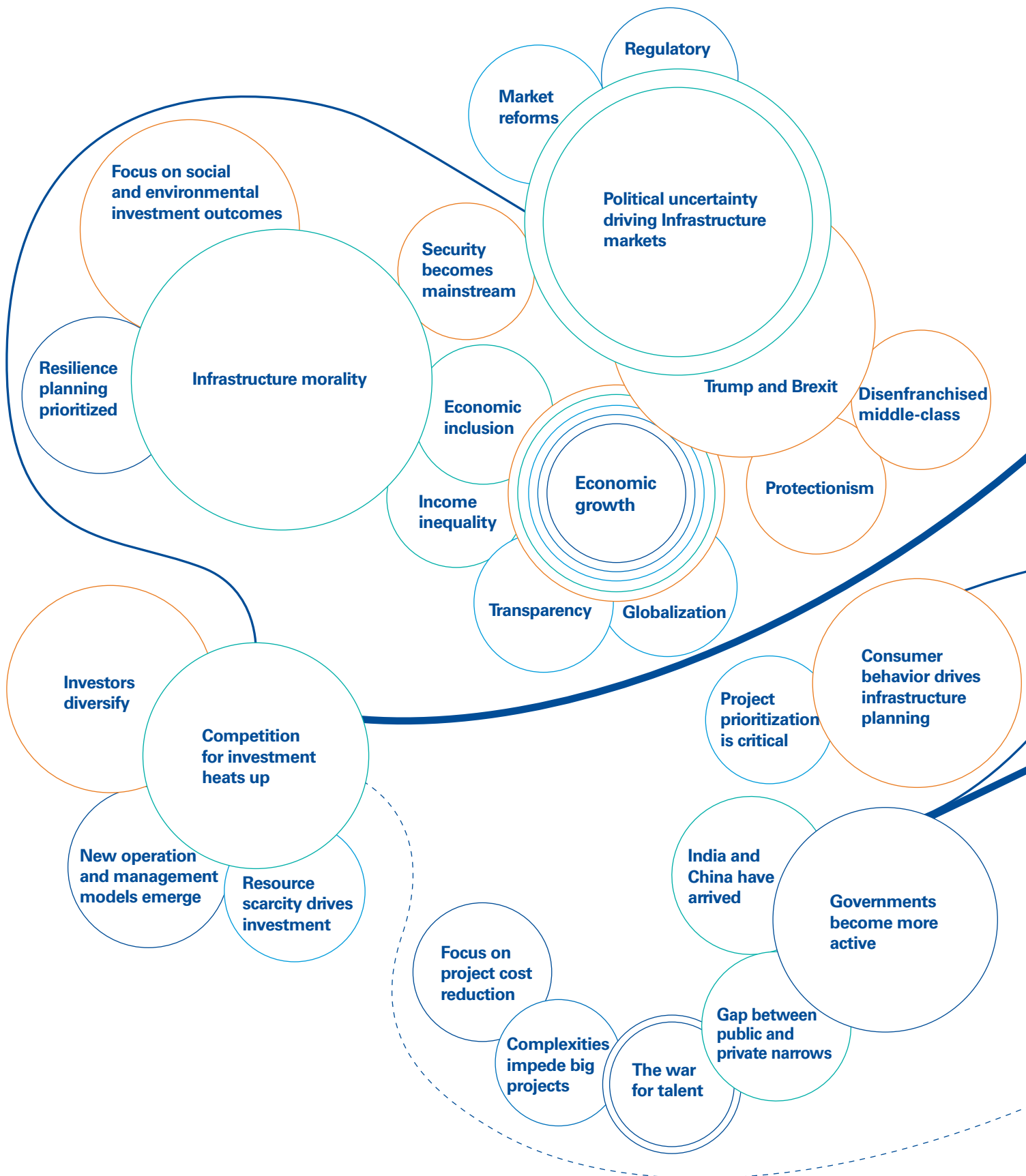
In 2017, we expect this trend to continue and, in many cases, pick up speed. But we also recognize that there will be forces acting against globalization: rising protectionism and nationalist agendas (discussed in Trend 2), shifting social preferences (discussed in Trend 3), increasing focus on 'localization', disruptive trade negotiations and other uncertainties will all act to dampen enthusiasm for globalization. However, while the pattern may be confused, the direction of travel is clear.

► The long view:

The days of western domination of infrastructure are clearly over as the center of gravity shifts east, both in terms of investment and thought. However, the big and ultimate test for globalization is whether it brings down costs, improves accessibility and increases value of infrastructure around the world, through improved competition and greater levels of innovation.

Ultimately, we expect these benefits will drive governments and their populations to once again shift towards a more open and global marketplace.

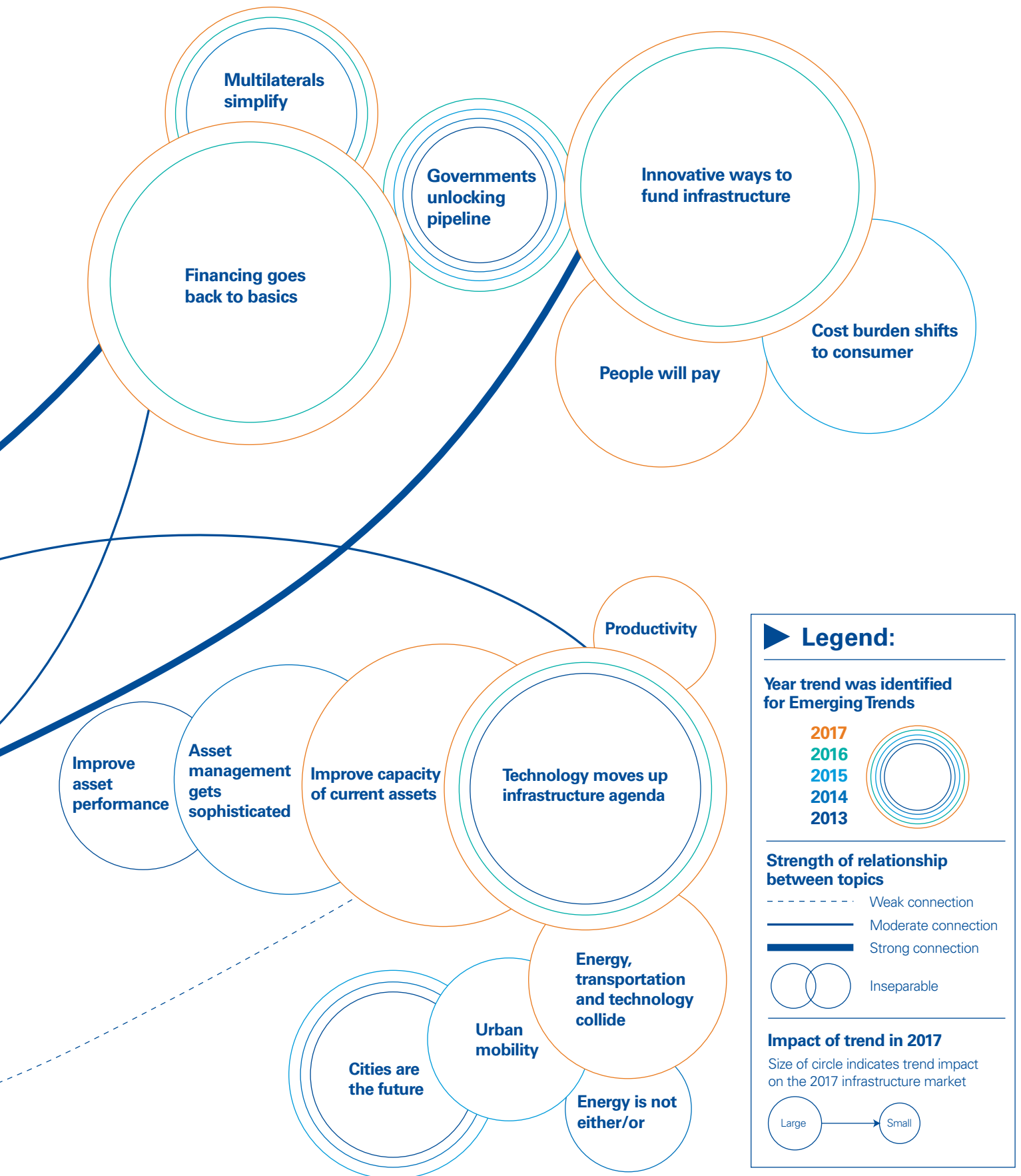
► Emerging Trends Tracker



After 5 years of tracking the key trends that — in our opinion — influence the world of infrastructure, we developed a snapshot of our previously predicted trends by consolidating them into one visual representation. This diagram looks at the impact each trend will have on the infrastructure market as we enter 2017, the strength of the

relationship between topics and the evolution of our industry through the lens of our *Emerging Trends in Infrastructure* report series.

Once again, we hope this year's report and insights serve to not only highlight major trends, but also help readers prepare for the long-term changes affecting the infrastructure sector.



Legend:

Year trend was identified for Emerging Trends

- 2017 (4 lines)
- 2016 (3 lines)
- 2015 (2 lines)
- 2014 (1 line)
- 2013 (1 line)

Strength of relationship between topics

- Weak connection (dashed line)
- Moderate connection (medium line)
- Strong connection (thick line)
- Inseparable (overlapping circles)

Impact of trend in 2017

Size of circle indicates trend impact on the 2017 infrastructure market

Large → Small

Bookshelf

To access the publication listed, visit: kpmg.com/infrastructure or email us at: infrastructure@kpmg.com

Insight

The Global Infrastructure Magazine



Insight No. 8: Infrastructure Morality

This edition focuses on hard issues such as migration, corruption, social equality and affordability — and asks the difficult questions of infrastructure leaders at the forefront of the morality debate. It also includes a Special Report on Asset Delivery.



Insight No. 7: Who controls our infrastructure?

This edition explores some of the big challenges and trends influencing the debate around infrastructure control. It also includes a Special Report on Rail, a sector often at the epicenter of the debate around control.

KPMG Global Infrastructure publications and reports



Assessing the true value of infrastructure investment

Based on global research and supported by case studies, this report provides valuable insights on the current infrastructure assessment and prioritization processes in Brazil, India, South Africa and the UK.



The future of cities

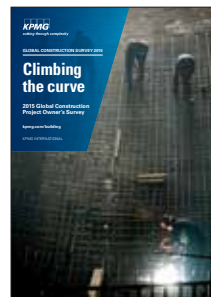
This article series addresses the challenges and opportunities facing cities as urbanization changes the dynamics of our world, and how we can work together to create better, more sustainable places to live and work.

Global Construction Survey series



2016 Global Construction Survey: Building a technology advantage

KPMG's 10th annual Global Construction Survey shows that despite huge investments in technology, the construction industry is struggling to gain the full benefits of advanced data and analytics, drones, automation, robotics and visualization.



2015 Global Construction Survey: Climbing the curve

KPMG's 2015 Global Construction Survey focuses on the challenges facing owners as they seek to climb the maturity curve and features the views of over 100 senior executives from both private and public organizations.

Foresight

A global infrastructure perspective



Rising above: Increasing due diligence to reduce cost in infrastructure

Every year billions of dollars of infrastructure investment are being siphoned out of public and private budgets to cover unexplained cost overruns. As an industry, we have become too comfortable with this reality.



How Community Solar will change the utility landscape

Across the US, people are starting to take more control over how their power is sourced. This is creating the first visible wave of the energy revolution and deeper currents may change the way energy is sourced and developed.

KPMG's Global Infrastructure practice

Integrated services

Nobody knows infrastructure like KPMG. Every day, our network of more than 2,500 highly-experienced professionals work shoulder-to-shoulder with infrastructure leaders across more than 150 countries to share industry best practices and develop effective local strategies.

Our clients see a difference. They recognize that we won't just apply traditional methodologies to new problems because infrastructure projects are unique and often require tailored solutions. We challenge infrastructure to be better, integrating innovative approaches and deep expertise to help clients succeed transparently, sustainably, ethically and commercially. Member firm clients are confident KPMG's Global Infrastructure professionals will provide trusted insight, actionable advice and market-leading services across advisory, tax, audit, accounting and regulatory compliance.

We inspire confidence and empower change in government organizations, infrastructure contractors, operators and investors. Our member

Impartial advice

firms help clients ask the right questions that reflect the challenges they are facing at every stage in the lifecycle of infrastructure assets and programs. From planning, strategy, finance and construction through to operations, divestment and decommissioning, Global Infrastructure professionals apply passion and purpose to help clients solve some of the most significant challenges of the 21st century.

By combining valuable global insight with hands-on local experience, we understand the unique challenges facing different clients in different regions. By bringing together numerous disciplines — economics, engineering, project finance, project management, strategic consulting, tax and accounting — KPMG's Global Infrastructure professionals provide integrated advice that can help achieve effective results and help clients succeed.

For further information, please visit us online at kpmg.com/infrastructure or contact:

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Designed by Evalueserve.
Publication name: Foresight.
Publication number: 133954-G
Publication date: January 2017