



Emerging trends in infrastructure



The Kuwait Perspective

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Foreword

Infrastructure development remains a key focus area for Kuwait to address widening gaps, meet requirements of the future generations and, ultimately, achieve the national aspirations articulated through Kuwait Vision 2035, despite the slowdown in awarding and implementation of projects due to strain resulting from institution- and market-related factors.

As per MEED, the value of projects awarded in Kuwait in 2022 fell to USD 2.8bn, which is well-below the previous five years' average of USD 5.6bn. The Kuwait Government's planned capital expenditure under the general budget for FY2023–2024 is also set to reduce to USD 7.8bn from USD 9.5bn allocated in the previous budget. However, the existence of a strong pipeline of projects, with an estimated value of USD 27.6bn in the bidding stage is setting a tone of optimism for the infrastructure sector.

In the past, we have identified trends that are reshaping the face of infrastructure and this remains our goal as we publish the eleventh edition of *Emerging trends in infrastructure*. The following themes emerged in publishing *The Kuwait Perspective*:

Renewed demand for infrastructure development

The identification of infrastructure as a pivotal agenda in Kuwait's Vision 2035 is raising the demand for advancements in the national infrastructure. This would require the government to progress on stagnating projects as well as aim for higher private sector participation in the national economic activity, as evidenced in the National Development Plans.

Sustainability takes a top-down approach

Large-scale adoption of ESG initiatives will require the government to (dis)incentivize private organizations while bringing significant policy reforms, especially in view of Kuwait's commitment to achieve net-zero greenhouse gas emissions by 2060. In Kuwait, players who can overcome the trifecta of security, affordability and sustainability-related concerns, i.e. oil and gas companies and financial service-based organizations, are driving the agenda as the early adopters.

Redefining infrastructure

The traditional definition of infrastructure assets and roles of infrastructure providers are changing, as the Kuwait Government is moving away from being an operator and assuming more of a regulatory role, reflecting the global trends. The local private sector, in partnership with international specialists, has a bigger

role to play and drive a renewed infrastructure agenda that promotes adoption of contemporary measures and lays special emphasis on how future projects will be structured.

Drive toward digitalization

Investors and stakeholders are constantly seeking meaningful data, efficient operation and adequate planning, all of which can be improved upon significantly through digitalization. The government has identified the necessity for a comprehensive digital transformation as it would mean better investment timelines, resource commitments, and likely attract more capital into the sector.

With the intention of providing Kuwait-centric insights from industry leaders engaged in various facets of Kuwait's infrastructure sector, we have conducted exclusive interviews with a few business leaders in Kuwait. I offer my sincere thanks to these gentlemen for taking the time to participate in the publication and making it more valuable. I am also grateful to everyone who helped bring this report to reality.

I hope this edition of *Emerging trends in infrastructure* — *The Kuwait Perspective* inspires you to look at the opportunities and challenges in the sector through a new lens.

In case you want to learn more about the trends or share your feedback with us, feel free to reach out to the contacts provided on the last page.



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The Kuwait Overview

Pandemic-led challenges and bureaucratic hurdles are forcing organizations to keep projects on shelf, many a times after procurers and bidders have incurred substantial costs. Consequently, the following observations emerge.

Stable oil revenues to propel economic recovery

The extended run of high oil prices is further bolstering the country's oil and gas sector. With the country focusing on diversifying its economy, increased oil revenues can encourage investments in other important sectors such as infrastructure that can, in turn, further support GDP growth.

Customizing unique experiences

While the government predominantly caters to broader groups with blanket needs, private sector involvement can lead to better personalization of services. However, in the long term, far-reaching adjustments to infrastructure value chains can pave the path for improved response times and value generation that can, as a result, support the growth of infrastructure as a service.

Financial pressure and the push for PPP

Kuwait faces an ever-increasing burden of public wages and social subsidies which continue to exceed its total budgeted revenues (USD 67.9b vs. USD 63.4b in Kuwait's budget for FY2023–24). This greatly diminishes the government's ability to allocate funds toward high-investment, long-duration infrastructure projects. The private sector's role becomes more important than ever in supporting the development of nationally important projects, bringing in capital, technology, operational skillsets and the focus on efficiency, and profitability which is a hallmark of private sector-led projects. Therefore, it is essential for Kuwait to make its PPP program a success to help drive its infrastructure agenda.

Prioritizing procurement

Procurement and supply chain management are now core focus areas for organizations as they seek to anticipate and plan for potential disrupting events, such as the COVID-19 crisis and Suez Canal obstruction. Be it key workforce, material and/or equipment, organizations want them where required in advance and avoid long lead times.

Avoiding urban decay

Between the COVID-19 crisis and the decline in expatriate population, expectations around infrastructure have changed, accelerating the adoption of relatively newer concepts, such as work from home and e-commerce. As a result, developers and institutions are looking to remodel cities, coalescing the work, play and live agendas, to create a fully nurturing ecosystem that appeals to a larger audience.

Navigating sunk costs and assets

In some cases updating and/or upgrading existing infrastructure may prove to be a more effective and quicker strategy to address capacity issues, compared to greenfield projects. However, as climate change gets increasingly factored into projects, holding on to outdated assets that are at the risk of obsolescence and add to costs and waste is unlikely to solve any of Kuwait's infrastructure problems. This is considering most of the old assets are kept operational only to be dismantled after new ones are brought in.

Reluctance to pay and use

The dearth of parking facilities in Kuwait is slowing down the implementation of modern features, such as smart parking. The reluctance toward pay-to-use services is prevalent and further hindering such projects from being carried through, especially in areas with low- to medium-income populations. The more modern assets that are up to date with the developed countries are present only in small pockets.

Kapil Kumra

Deputy General Manager Head of Project Finance National Bank of Kuwait

In what manner do you think sustainable financing policies will impact infrastructure projects in Kuwait?

The banks in Kuwait are aligned with Kuwait's commitment to be carbon neutral by 2060 and have formulated sustainable financing policies. Many banks have regionally and internationally signed up to be part of the net-zero alliance. This is expected to provide better and more competitive financing for sustainable infrastructure projects. Many of the planned renewable power and wastewater infrastructure projects in Kuwait can expect larger liquidity of funds available from the local, regional, and/or international banks at competitive terms.

Is there a gap in the availability of capital and investible projects in Kuwait? If yes, what is leading to this gap and what challenges do you foresee in bridging it?

Kuwait Vision 2035 envisages large investment in the nation's economic infrastructure via the construction of new airports, ports, roads, industrial areas, residential developments, hospitals, a railroad, and a metro rail. Infrastructure investments have been largely financed by the government. It is increasingly being acknowledged that alternative sources of financing and private sector involvement are needed to fill the gap in infrastructure development.

Kuwait Vision 2035 aims to increase private sector participation in Kuwait's economy by creating a more investor-friendly environment.

Public-private partnership (PPP) is emerging as the preferred path for bringing in private investors to fund major projects and, perhaps as importantly, bringing in private sector expertise and efficiency to the table. Making greater use of the PPP model in infrastructure delivery will help in reducing public financing pressures while also promoting development.

In PPPs, private parties are largely responsible for the design, construction, operation and maintenance of an infrastructure asset, implying that they are assuming bulk of the development, finance, construction and market risks associated with the project. The government has established a clear regulatory framework for implementing PPP projects, the laws and regulations established high levels of transparency and certainty throughout the PPP process — both key to the success of a PPP program. The new PPP law creates a greater degree of certainty, reliability and flexibility for foreign contractors, investors and lenders that participate in PPP projects in Kuwait.

The Kuwait Authority for Partnership Projects (KAPP) serves as the main body responsible for PPP projects' implementation. KAPP aims to utilize private sector skills and expertise to maximize value for money and service quality. KAPP is currently in the process of initiating several high-impact projects in the power, water/wastewater and communications sectors.

- Most projects are financed using a combination of equity and debt on a limited recourse or non-recourse basis. Banks will remain important financiers, particularly in the early stages of new projects. However, boosting infrastructure financing will require broadening of the potential group of investors and a broader mix of financial instruments.
- Pension funds, insurance companies and other long-term institutional investors have very large and growing long-term liabilities and need long-term assets in their portfolio, very little of which is allocated to infrastructure. Alternative financing, in the form of infrastructure investment funds and bonds, can also help in tapping into some of the vast resources for international capital markets.
- Rising climate awareness, strong environmental policies and regulations, and the demand for green and infrastructure projects in the region



will likely support the development of the green finance market. This will likely comprise a diverse combination of conventional green bonds and green sukuk, which could lower the cost of capital and help provide massive amounts of funding for projects in the pipeline.

How do you expect global recessionary trends to play out in terms of financing considerations for local infrastructure projects in Kuwait?

On the positive side, Kuwait has an ambitious pipeline of development plan projects that would probably need implementing regardless of the state of the world economy. Power, water, waste treatment, housing, transportation and even the oil sector come to mind.

While the government does indeed hope to secure private financing and investment from both local and international actors, its plans are unlikely to be derailed by the absence of private financing were that to happen. And yes, while the government's purse

strings could be tighter if international oil prices lower perhaps due to a global recession ultimately, many of the projects are fairly essential and will need to be undertaken in due course anyway. Of course, if the global economy is weak, then investor appetite and ultimately financing flows would be expected to be somewhat subdued; but with the right incentives, local investors and banks could step in as well, and even be backed by the government guarantees. Kuwait's credit rating is a solid A+/AA- (S&P/Fitch), and with ample fiscal/external reserves and extremely low public debt, the sovereign is investment grade.

Ultimately, in terms of financing considerations, financiers and investors will probably put a greater weight on local rather than international conditions when assessing the suitability and returns on infrastructure projects — the business environment, regulations, incentives and, importantly, the capacity of the government and political system to approve, facilitate, accelerate and deliver on projects on time.

Note: The comments are personal views and not that of National Bank of Kuwait SAKP.



**Dr. Dheeraj
Bhardwaj**
Group CEO, City Group
Co. K.S.C.P.

Our report speaks about the Future of cities which is digital and connected. How do you see public transport playing a part in the city of future?

The mobility sector is a highly regulated sector globally and comes under the ownership of the country/city authorities/councils, and they have the master plans for operations and every other component of infrastructure. For example, how the pedestrian traffic would move or how the metros/buses must move come under it. Any new change in the structure can create chaos.

As we know in the world of innovation, absence of regulations mean true innovation, considering, sometimes, even the authorities do not know that there is something new. The regulations usually come after. For example, countries are struggling in terms of drone regulations, autonomous vehicle regulations, etc. Infrastructure is a combination of several moving parts, multiple functions and departments coming together to create regulations that will only benefit the nation/city.

A country such as Kuwait requires a coherent approach that brings in all the stakeholders to develop a long-term vision, policies and regulations with regard to its developing infrastructure. Therefore, a well-coordinated and collaborative approach between public authorities and the private sector will enhance innovation.

When we talk about the future of cities and public transport playing a part in it, it is important to understand the history of industrial revolutions. There are three fundamental infrastructure technologies that have been instrumental in industrial revolutions. They are energy, communication and transportation. These core technologies drive economic activities.

Transport is one of core technologies that moves economic activities and drives the economic value of a country. Transport is even more important because you have to make it affordable, comfortable and available to the public and for the transport of goods. The core nature of public transport is that it must be accessible, inclusive and affordable for everyone in the city, and that is one of the reasons why, sometimes, public transport becomes inefficient.

Because we have fixed/defined routes and frequencies, we have to run them irrespective of the demand. But through digital innovation, we are trying to optimize that. Why run all of these things? You just do not run them all the time, every time, right? But still, you have to do it to a certain degree. You have to run it because that is the definition of public transport. And that is

why, regardless of any development, public transport will play a critical part in the overall infrastructure demands of the future.

Mobility-as-a-service has the potential to be cost-competitive with public transport services and more convenient in servicing the last mile of customer journeys. How do you see public transport services facing these challenges?

One of the challenges when it comes to public transport modes such as metros is last-mile/first-mile connectivity. The question arises, "What has been done to bring people from their homes to the stations and to take them from the stations to their destinations?" If you want to make public transport more attractive and thrive, you need to have a one-stop end-to-end mobility solution available, preferably through a mobile app.

If you do not have that solution, then any public transport mode will be difficult to grow because there is no way you can expect people to park their cars and board the train/bus and vice versa. You need to have full connectivity to be successful and get returns on such investments. All these investments are based on one of infrastructure investments' biggest risks, i.e. patronage risk. And ridership is key in deciding whether you will get the right patronage of customers, be profitable, etc.

Mobility-as-a-service does make your life easier by offering you all the modes of transport to go from one destination to another. In cities like London and Dubai, they are creating walking as a mobility service. There are dedicated lanes/areas where you can walk comfortably, take the electric scooters/bikes, opt for feeder buses, etc. A country cannot have only the metro and say it has public transport. It is an ecosystem and you need to provide this ecosystem on a single platform, i.e. mobility-as-a-service (MaaS).

Customers are increasingly asking for personalized services even in the public transport space. What steps is CityBus taking to address it?

We are working on something called 'Super app', through which our customers can top-up money in their digital wallet, which they can leverage to pay for their travel needs when using CityBus and Demand Responsive Transport (DRT) service, making peer-to-peer transfers, such as paying a friend, conducting FX transfers and buying groceries. The mobile app will allow CityBus customers to plan journeys and buy tickets and period passes at their convenience. Through this, we will get interesting data that we can use to

personalize customer experiences by creating efficient routes, among other means. Currently, we are working on a mobile ticketing system known as the Automated Fare Collection (AFC) system. Once it is implemented this summer, it will become a benchmarked ticketing system for global cities.

Decarbonization of public road transport will likely become a strategic business priority. How focused is the City Group Co. on using renewable energy in the public transport space in Kuwait?

Speaking about sustainability, we have to accept the fact that we operate in an oil-rich country. So, do not expect anyone to go electric in one go. Extreme weather conditions and the lack of electric charging infrastructure makes the transition to electric even more challenging. Furthermore, electric bus technology needs to evolve (e.g. a battery technology that can provide a 450-kilometer run 20 hours a day) to fulfill operational requirements.

Nevertheless, we cannot sit and say that we will not do anything. There is a lot of waste we need to talk about. And when I talk about waste, we go back to all types of waste that we learn in Six Sigma (e.g. process waste, energy waste, etc.). Let us first reduce these wastes and make our operations highly efficient. This will certainly help in creating positive environmental impact.

Digitalization has evolved rapidly in Kuwait, including digital payments. What steps are you taking in terms of digitalization and infusing digital payments into your systems?

As an organization, we have decided to digitalize everything and chose to go with fully automated service delivery. We have a new planning/scheduling tool which is based on cloud, AI and data analytics. It is a business case as well as a CSR case. Using these tools, we know the routes we are running, no. of buses we are running and at what times, and when we are resting them. Everything is digitalized. We have a command-and-control system and CCTV cameras that provide us with live feeds of our buses, behavioral data of the drivers, etc.

All our buses are equipped with the AVL (Automated Vehicle Location) system that allows us to know how the driver is driving. We have a digital fuel management system and each bus has a unique RFID tag. The nozzle has an RFID tag and it identifies the bus number the moment you put it in. Using our tools, we can track who is driving, the amount of fuel going in and the

real-time fuel consumption per kilometer. Thanks to this system, we have cut down fuel loss from 10 percent to 0.1 percent in the last three months, started to understand fuel efficiency better and even reduced our carbon footprint. As for the other digitalization initiatives in mobility, we are moving from card centric to account-based systems, i.e. digital ticketing, where you will have a unique ID and all your account details, information and interactions will be saved on cloud in real time. Digital wallet is core to our new mobile ticketing system.

Our study finds that as cities grow in size and density, private and public transport players must work closely to deliver accessibility and livability. How are you collaborating with the authorities in Kuwait to enhance the public transport space?

We were told that we had too many buses running and it was crowding the traffic. However, when we looked at the data, we realized that we move 15,000 passengers per hour during peak hours. To move such numbers, we can easily calculate how many buses we need. We did the math: how many routes to run and how many buses to use. We realized that the number of buses needed is more than what we currently operate. When the buses enter the crowded areas, we lose the headway, i.e. the distance between two buses. So, every trip, we need to create extra headway. We have to stop the buses somewhere and do it. The second problem is the lack of dedicated sideways to alight and onboard passengers to free the road lanes for moving traffic. Currently, it is being done on the main lane. Once the buses enter, they start bundling up and it looks like we are running too many buses. It is a fundamental infrastructure issue.

The second problem is the lack of standardization in transport vehicle capacity. For instance, a 9-meter bus and an 11-meter bus are allowed to be used as a public transport means. Another issue is lost mileage. We have almost 4–5 percent lost mileage every day as we have to return to our depot, which is 35 kilometers away from the city, for refueling and maintenance. We have not been provided with a depot within the vicinity of our operations. It is about increasing the capacity of the road infrastructure as well as vehicles' carrying capacity. Having said this, we are working very closely with the authorities to resolve such issues.

We helped impose the regulation where if a driver picked up passengers from non-designated bus stops, then they would be reported straightaway. This applies to all three operators. We are investing and innovating to enhance public transport services. Additionally, we

are pushing an initiative called the fare evasion policy, wherein if you got caught travelling without a ticket on a bus in Kuwait, then all the ticket inspectors can do is sell you a ticket. This does not happen anywhere in the world. We have prepared a full benchmark report with the recommendations, and whatever fines we will collect, will go to the government.

Talk to us about the vision behind Citylink Shuttle services.

Let me talk about Citylink. This is called Demand Responsive Transport (DRT) which is a major global mobility transformation to make public transport easily available and accessible. Citylink Shuttle is a complementary public transport service to CityBus to make public transport more accessible, comfortable and convenient for the residents. The reason is that public transport is based on networks, routes, timings and availability.

At some point, it becomes very inefficient because the demand is periodic and not continuous everywhere. You can predict it to a certain level, but you cannot predict it to the level of efficiency you want. With DRT becoming popular, you do not have to run your services continuously as it functions on a demand and dynamic routing basis. You could do fixed routing too. DRT is much more efficient, economic, optimized and runs on a digital platform.

You book it when you need it, see how long it will take to reach you, you board it, and then you can see how long it will take to drop you. It is a self-learning data-driven AI tool, so it is much more effective. Currently, we have created more than 3500 virtual bus stops across Kuwait based on the DRT system. Depending on the locations we get, we check if there is a place for stopping a bus for a few minutes and onboarding the passenger(s) safely. So, this may not be a right at your doorstep. It may be within, you know, a maximum of two-minute walking distance.

To offer flexible options to our customers, we ask them if they need a virtual stop anywhere. And depending on their request and our survey, we will create a new one. These virtual stops help people select where to go so that we know where to pick them from. For the first 15–20 minutes, it will try to pool the vehicles in the area where the first booking was made and then it will go straight to the destination. We want to minimize the number of rides where there is a single passenger as that is the idea of shared mobility. You can pay using cash and credit cards. And if you do not

want to interact with the driver, then you can choose not to. This mode of transport has to be slightly more expensive than buses but a lot cheaper than taxis.

Currently, we also have distance-based dynamic pricing, considering we are deploying everywhere in Kuwait. It is considerably more affordable than the taxis and we are witnessing phenomenal growth in its usage as well as the requests for virtual stops. We are working on taking the platform to other regions such as Europe, the UAE, and Saudi Arabia.

Shi Yifei

Deputy Chief Representative of AVIC INTL in Arabic Gulf Area

How do you expect the global recession trends to impact financing considerations for local infrastructure projects in Kuwait?

It is difficult to make precise predictions as to how the global recession trends will impact financing considerations in Kuwait or any other specific country as there might be several factors that can influence this.

However, during a recession, there may be less money available for infrastructure projects as private and public sectors may be more cautious in terms of investing in large-scale projects. This could potentially make it more challenging for local infrastructure projects in Kuwait.

On the other hand, the public sector may also be more likely to invest in infrastructure projects during a recession as a means to stimulate economic growth. Therefore, it is important to closely monitor the economic situation and policies in Kuwait to assess how infrastructure projects may be affected by the global recession trends.

Overall, what will be the impact of sustainable financing on various infrastructure projects? Will sustainable financing cause more project delays or push infrastructure players to plan more sustainable projects?

If the sustainable financing we are talking about refers to financing that takes into account environmental, social and governance (ESG) factors in addition to financial considerations and forms such as green bonds, sustainability-linked loans and social impact bonds, the adoption of sustainable financing might potentially cost more time as additional due diligence and verification processes may be required to ensure that the projects meet the sustainability criteria. This can increase the complexity and cost of financing, which may slow down the development process.

Overall, the impact of sustainable financing on infrastructure projects will depend on various factors such as the specific sustainability criteria, the availability and cost of sustainable financing, and the regulatory and policy environment. However, in the long term, it is likely that sustainable financing will drive infrastructure players to plan more sustainable projects which can benefit both the society and environment.

Sunk costs caused due to delayed and abandoned infrastructure projects pose a challenge to all of the players. How do you anticipate such situations and create a plan to mitigate the associated risks?

- From the project owner/developer’s perspective, it is better to: conduct thorough feasibility studies and risk assessments: before initiating an infrastructure project, it is important to conduct a comprehensive feasibility study and risk assessment to identify potential obstacles that may cause delays or lead to abandonment. This can help in developing appropriate mitigation strategies to address those risks; and
 - develop a clear and realistic project plan: a clear and realistic project plan can help identify potential delays and risks early on and allow for the implementation of appropriate mitigation strategies.
- From the project contractor’s perspective, it is better to:
- use effective project management tools and techniques: effective project management tools and techniques such as project monitoring and control, progress reporting and risk management can help identify and address issues before they escalate; and
 - implement appropriate contractual frameworks: appropriate contractual frameworks, such as performance-based contracts and dispute resolution

mechanisms, can help manage risks and ensure that parties fulfill their obligations.

For all the players of project, it is better to engage with local communities that can help recognize potential areas of concern in a timely manner so adequate mitigation measures can be put in place to resolve them.

How do you see infrastructure owners, operators and users benefit from a comprehensive digital transformation?

The most obvious benefit is that it would improve project planning and management. Digital tools such as Building Information Modeling (BIM) can help contractors plan and manage infrastructure projects more efficiently. BIM allows contractors to create 3D models of structures, which can help identify potential issues before construction begins, reducing the risk of costly delays and rework. Digital tools can also help contractors gather and analyze data on project performance, which can be used to improve decision-making and project outcomes.

Beyond the benefits mentioned above, we firmly believe that by embracing digital tools and technologies, contractors can position themselves for success in an increasingly competitive and complex industry.


With inflation at its peak globally, the cost of running a large project has increased significantly with the increase in cost of labor, parts and technology. How do you plan for inflation and other geopolitical shifts?

Planning for inflation and other geopolitical shifts is an important consideration when running a large project. There are quite a few aspects that shall be considered:

- To conduct thorough risk assessments before starting any project: this will help you identify potential challenges and develop strategies to address them.
- Try to build flexibility into your budget: despite it being difficult to implement, in such a scenario, your contingency fund will help you if and when unforeseen circumstances arise.

- Keep an eye on economic indicators, such as inflation rates, currency exchange rates and commodity prices, which can affect your project: this will allow you to make adjustments to your budget and project plans as needed. Certain financial derivative tools might be helpful for you to transfer the potential financial risk planning.
- By working closely with your partners and suppliers, you may be able to find an alternative solution to keep your project on track.
- Finally, it is important to stay informed about global events and be adaptive in your project planning. If you anticipate changes in the economic or political landscape, be prepared to adjust your plans accordingly to stay ahead of potential challenges.



A professional portrait of Hassan Choudhry, a man with dark hair, wearing a grey suit, white shirt, and a blue tie with small gold dots. He is smiling slightly and looking towards the camera.

Hassan Choudhry
Chief Financial Officer,
Umm Al Hayman for Wastewater
Treatment Company K.S.P.C.

The Umm Al Hayman wastewater mega-project in Kuwait proved the strength of a PPP project. Since the launch, have you seen a shift in the mindset of the authorities toward PPP projects? What are your views?

Since this is the first mega infrastructure project under the PPP law no. 116 of 2014 for the State of Kuwait, besides Shamal Az-Zour which was established under the old law, I think the overall essence of the market in Kuwait toward PPP projects is welcoming. There is a general understanding that public and private partnerships can bring significant overall efficiencies and economic benefits to the State of Kuwait. With the deficit in the budgets, the capex budget is also getting squeezed. On the contrary, new infrastructure projects such as power, water and wastewater plants are facing high demand and are of utmost importance, owing to the increasing population and growth plans.

Therefore, implementation of PPP projects is the way forward. In doing so, the most important aspect to consider for building local and international investors' and lenders' confidence is the timely execution of the PPP projects, especially from the tender stage and contract award signing of the PPP agreements through to financial close. Thereafter, the timely and within budget execution of the PPP projects and close collaboration between the public and private investors will resolve any challenge along the way.

You see, there is always a learning curve whenever a new economic law is applied in any country. Kuwait is going through that phase right now, including the bureaucratic challenges. Some other countries within the region have moved quite ahead within the PPP industry. But with the current pipeline of PPP projects that are to be executed in the State of Kuwait, I am sure that Kuwait will be competing and at par with such economies soon.

Furthermore, compared to the rest of the region, the PPP law in Kuwait offers a uniqueness when it comes to the real essence of PPP projects. In Kuwait, the project company has to be listed on the Kuwait Stock Exchange (Boursa Kuwait) and 50 percent of its shares have to be distributed to the nationals at par value upon completion of the project. So, in that context, there is a positive sentiment for PPP projects, but overcoming bureaucratic challenges and educating the overall benefits of PPP may take some time. However, when that happens, Kuwait is going to really benefit from it.

Our report finds that sunk costs and delayed projects present a challenge for businesses involved in mega-projects. In your opinion, is there a way to predict sunk costs for mega-projects? If yes, how to plan for a catastrophe?

Kuwait's infrastructure sector has recently opened up to the world through its PPP law no. 116 of 2014. For any investor who is willing to invest in Kuwait, there is always that extra investment that they have to make before entering a new market. But whether that investment will convert into a project is always a question mark for an investor. It depends on many factors, right from creating the overall investment structure, learnings from the existing projects, the overall risk assessment and, above all, how the bid is compiled. With such mega infrastructure projects, there are always risks.

Therefore, how much of those costs can be recovered is a matter of strategy and how one structures the bid, given the close competition with the other bidders. Due to the long-term nature of these projects, it is a matter of choice for the investors to see how such costs may be recovered, keeping the investment time-horizon in perspective as well as the other opportunities that it may offer.

With regard to project delays, I would say that the best part of the PPP model is that there is very little room to delay the projects as these are heavily project financed and pose more repayment obligations toward the lenders. When you build your financial models, you do build contingencies — be it in terms of time or cost. Can you measure them accurately? Is there a formula? How much can you predict? These are some of the questions that can only be answered with experience. Take the example of the COVID-19 crisis, which was declared a Global Pandemic by the World Health Organization (WHO) and resulted in a force majeure. Nobody could have measured it; nobody could have

realized it. There are always certain provisions in the contract through which you can recover both costs and time, and that is how you try to minimize the associated risks. Also, during the bidding stage, there is always room for further negotiation in terms of the contract's clauses. That is where you could play a key role.

So, you do have some period and open clauses where you can negotiate with your client to cover some extra costs. Additionally, working closely with the client is key. In the Umm Al Hayman project, we all committed to invest our time on working with different groups within the client, so we could educate and/or work with them and create value at the same time. The bigger picture is always to create value at the end of the day.

Sometimes, people get stuck with small costs and lose the bigger benefits. So, you have to see the bigger picture and always create opportunities and value. Simply put, in PPP projects, there has to be some sort of partnership, and decision making has to be done on a timely basis. And when it comes to PPP, sometimes not making a decision is worse than making a bad decision.

Therefore, it is in the best interest of all key stakeholders to assist each other as partners and make the projects successful.

With inflation peaking globally, the cost of running a large project has increased significantly, owing to the increased cost of labor, parts and technology. In line with this, how do you plan for inflation and other geopolitical shifts?

Managing inflation is fundamental in pricing for the PPP projects, given their long-term nature. There are usually two broad phases in these projects: one is during the construction phase and the other during the operational phase. The inflationary impact during the operational phase is usually covered under the contractual mechanisms in which the pricing is adjusted on a regular basis to cater to the inflationary changes, not only to cover the cost of running the plant but also to ensure guaranteed returns to the shareholders.

The inflationary impact during the construction phase can also be managed through different schemes, and the most common way is to have a fixed EPC cost. Depending on the nature of the PPP project and the time required to complete the construction phase, such inflationary changes are usually included in the pricing model of the EPC.

There are always mechanisms in the PPP contracts to deal with unforeseen circumstances as they are sometimes beyond anyone's control, especially due to the action or inaction of government entities causing a government risk event, and/or due to force majeure events. These clauses protect the interest of the project to either claim for extra time and/or costs. However, under such circumstances, it is fundamental to work together and find solutions to mitigate any such effects and/or minimize their impact on the project. For example, during the COVID-19 pandemic, most of the businesses dealt with limited or delayed availability of contractor services, goods and disrupted supply chains, including challenges around the mobilization of workforce, travel restrictions and obtaining timely permits from various governmental institutes, among others.

In terms of supply chain, that is where your procurement strategy plays a key role because you have to find alternative means of getting the equipment and material to the site. Based on the respective contractual clauses, you need to find your way around such challenges. With regard to government-related restrictions, you have to engage with your client closely by informing and educating them about their effects and how you can work together to overcome them.

With COP27 concluding in Egypt, the focus on renewables is back in the Gulf region. Do you see an increased focus on renewable energy in Kuwait?

Our project is actually an initiative toward sustainability by the Government of Kuwait. The Umm Al Hayman Project is one of the world's largest wastewater treatment projects, treating sewage wastewater from the southern part of Kuwait to provide agricultural and various other industries with highly treated wastewater (treated sewage effluent — 'TSE'). The dimensions of the project, which is being carried out by WTE Wassertechnik GmbH (WTE), as a one-stop solution, are enormous. The wastewater treatment plant has an initial capacity of 500,000 m³ per day, with the option to expand to 700,000 m³ per day at the client's discretion. It is designed for 1.7 million people and is part of a 450-kilometer-long network of wastewater and TSE pipelines, pumping stations and vast reservoirs.

We are not only going to produce clean water which will go back to the ecosystem, we are also going to produce sludge which will later be turned into a fertilizer. With this whole initiative, there is a huge demand in the two agricultural areas of Kuwait to make them more progressive. The plant, which will also receive its own 300 kV substation, will produce its own biogas in the course of the purification process, which will cover a huge part of its energy requirements by itself, i.e. based on design conditions, approximately 40% of the plant's electricity demand can be covered by its green power house. Overall, this project is the true definition of ESG in Kuwait.

You see, infrastructure projects are substantially financed by consortiums of international and local lenders. And as part of international lending, Green Financing is becoming increasingly important. They have strict ESG compliance requirements which will naturally follow and ensure the implementation of greener infrastructure projects. So, from a future perspective, any big future project that is being financed by an international bank will have a lot of compliance requirements in terms of ESG reporting, etc. Since many banks have a strict risk management criterion on ESG, deciding which projects to finance and which not to is becoming important. And if they do not finance such projects, where does one go? So, naturally these projects will come to a point where they will have to be more compliant with the sustainability requirements. It will be a slow process for the region, in particular. However, we are seeing positive signs, especially with the adoption of green friendly technologies.

On the sidelines of COP27, Kuwait has promised to become carbon neutral by 2050. How can WTE help in achieving this vision? What innovations is WTE bringing to the space of renewable energy?

As a management representative of the Project Company, I can say that one of the reasons why WTE was a successful bidder for this project was its innovation. WTE was able to demonstrate to the State of Kuwait the innovations and projects that they have implemented on a larger extent globally, especially in Europe which has the highest standards in terms of reducing carbon emissions. Therefore, it was the obvious choice to bring them on board.

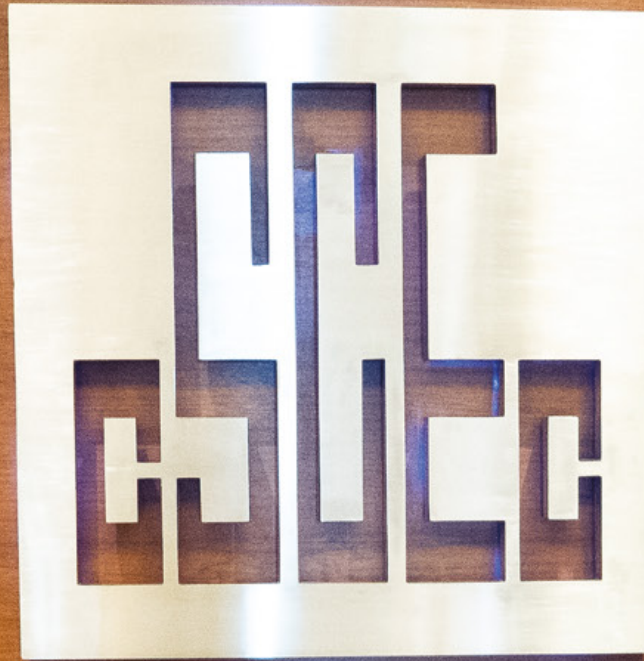
Their idea to treat the sludge resulting from the wastewater treatment within an anaerobic digestion plant in order to produce green energy from biogas utilization in combined heat and power plants was ingenious. From a technology perspective, there are many different ideas that are being developed in this project. For example, WTE will provide its in-house developed software called WARIOS for a computerized maintenance management system that will allow engineers to know the history of the plant's assets and to plan, organize and execute preventive maintenance and servicing measures, making the maintenance process of the Plant that spans over 1.5 km² more convenient and faster. WTE is building it in a way which will facilitate smooth operation and maintenance, and ensure sustainability for the next 25 years and beyond. With such technologies, WTE is bringing in new innovations into the country. There are a lot of lessons here for the Government to learn from and utilize in the future prospects.

Hassan is currently CFO at Umm Al Hayman for the Wastewater Treatment Project (UAH). He is a qualified chartered accountant (ICAEW & ACCA) with 19+ years of experience.

Connect with Hassan on LinkedIn through [linkedin.com/in/hassanch](https://www.linkedin.com/in/hassanch). To know more about the Umm Al Hayman project visit www.uahpc.com.

Yang Chunsen

Representative of China State Construction Engineering Corporation Limited in Kuwait and The President of Chinese Enterprise Association in Kuwait



How are advanced technologies such as AI and Machine Learning disrupting the construction sector? Do you think technology has the power to transform the industry?

I don't think they are disrupting the construction sector, on the contrary, these new technologies will boost us toward a better future. The construction sector relies heavily on human resources, and which requires various long-term trainings of different professional skills to handle the works. However, many countries, such as China, Japan and most European countries, are facing the problem of lack of workforce which brought by aging population and other social issues. AI and Machine Learning can enable us to reduce the demand of workforce, and even improve the quality of work and provide more accurate products. I believe that technology can give construction sector a revolution.

The current geopolitical shifts and the supply-chain disruptions caused by the COVID-19 pandemic have pushed up the energy and material (E&C) costs. What measures can organizations take to handle these situations?

Global problems require global solutions. We are a community of common future; we have to work together to overcome these global problems. Geopolitical shifts have damaged the supply chain more deeply than the pandemic. After the pandemic is over, it is foreseeable that the supply chain can be rebuilt; while if the geopolitical issues are not stopped, the supply chain problem will continuous and drastically increase.

In your opinion, how open is Kuwait to embracing sustainable construction techniques? Do you think green buildings will become a norm some day?

The construction market in Kuwait is huge, as there are a lot of demands for buildings, houses and infrastructure works. However, the techniques of engineering and construction are still, in a way, conventional and lack of advanced thinking. Kuwait is facing a shortage of resources in terms of workforce and materials. Without embracing the new systems and techniques, it will be hard to ensure a sustainable development in the construction sector.

We need:

- the government to lead and push the development of construction technology;
- the sector participants to look ahead and invest in new techniques; and
- encouragement and preferential policy of foreign technologies and investment.

Yes, green and smart buildings, among some of the other new systems, will become normal in the near future.

Our report highlights that investors are cautious about financing projects that do not follow the ESG regulatory guidelines. How does the change in mindset impact the sector? Does it increase project delays or allow the players to innovate and change?

I think we need to have more promotion and publicity in this regard. People need to change their mindset and follow the ESG regulatory guidelines. This is a new thing, and it needs a very hard push in the beginning. Yes, it of course increased some project delays, especially at the beginning, but it might lead to a brighter future.



Global Trends

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A silhouette of a person with a backpack, holding a fishing rod, stands on a rocky shore at sunset. The sky is a mix of orange, yellow, and blue, with clouds. The ocean is visible in the background.

Trend 1

Tilting toward territorialism and shifting allegiances

The foundations of globalization are eroding. Protectionism is rising. Populism is turning into unilateralism. And the ties that have bound the old geopolitical world are weakening. Political risk is everywhere, and sensitivities are high.

At a national and a regional level, we are seeing a pull away from global geopolitical consensus. Multiple fracture points are emerging — whether it be on regional lines, political lines, trade lines, environmental lines or economic lines — that are weakening the foundations of globalization. If we're not careful, we risk losing much of what society has achieved since WWII.

Where once we saw consensus-building, what we are now seeing emerge is a web of temporary unstable alliances. Relationships and allegiances shift depending on the agenda. Two countries may partner on regional defense, for example, yet still come to economic blows on a trade issue. To say a 'new world order' is emerging would be wrong — there is very little 'order' to it.

Yet the fractures are not just cracking along national borders. The tone of political discourse at the national and sub-national level has become perilously divided. Centrists seemingly have little place for common ground.

Infrastructure is one of the few places we hope that consensus can still be found. Everyone agrees on the need for new and improved infrastructure (in some markets, leaders joke that the fastest way to get a policy agenda passed is by putting the word 'infrastructure' into the headline somewhere). It is one of the few things, governments provide their citizens that they can actually see, touch and use. In a world of eroding trust, infrastructure can be the tissue that connects people with government.

For global infrastructure players — developers, investors, and operators in particular — this fracturing and shift to continuously shifting allegiances is creating complexity. Suddenly, traditional supply chains seem riskier. Costs and prices seem more uncertain. Regulation seems more fragmented, less consistent and less fit for purpose. The rules of international trade start to contradict. Work with the wrong parties, and you could find yourself blacklisted with other parties (**see trend 8 for more on this**).

A big risk for 2023 is that all this complexity and uncertainty can slow the pace of decision-making to a crawl. Right now, however, action is needed, and lots of it. Populations need more infrastructure and more leadership, not less. Our advice to infrastructure players is to keep their new geopolitical and supply chain security lenses on a pivot. In a world ruled by unstable temporary alliances, awareness and agility may be key.

Trend 2

Backed into the sustainability corner



At the COP27 meetings in Egypt, there seemed to be a tacit recognition that the 1.5-degree goal enshrined in the Paris Agreement had become unattainable. But that does not suggest the fight against climate change is now over. Rather, it means we now need to fight harder.

What is clear to everyone is that the timelines have shrunk. And the potential impacts of climate change are no longer someone else's problem. Outside of those who happened to live on an atoll, most people probably didn't really comprehend the big risk of slowly rising sea levels. Now they are seeing the realities of climate change on their own doorstep, manifesting as floods, hurricanes, extreme heat and cold events and drought. At the individual level, the risks of climate change have become personal, and the costs have become real. In many ways these risks allow the crisis to become real to more people.

This year, we expect to see individuals and organizations take serious steps to move from talk to action. Much focus will likely remain on mitigation (anything we can do to keep global warming and climate change to a minimum is welcome, even if humanity overshoots the 1.5-degree goal). But growing focus will likely be placed on adaptation as people come to terms with what it means to live in a climate-stressed world. There may also be multiple paths to adaptation, though some require a fundamental shift in mindset.

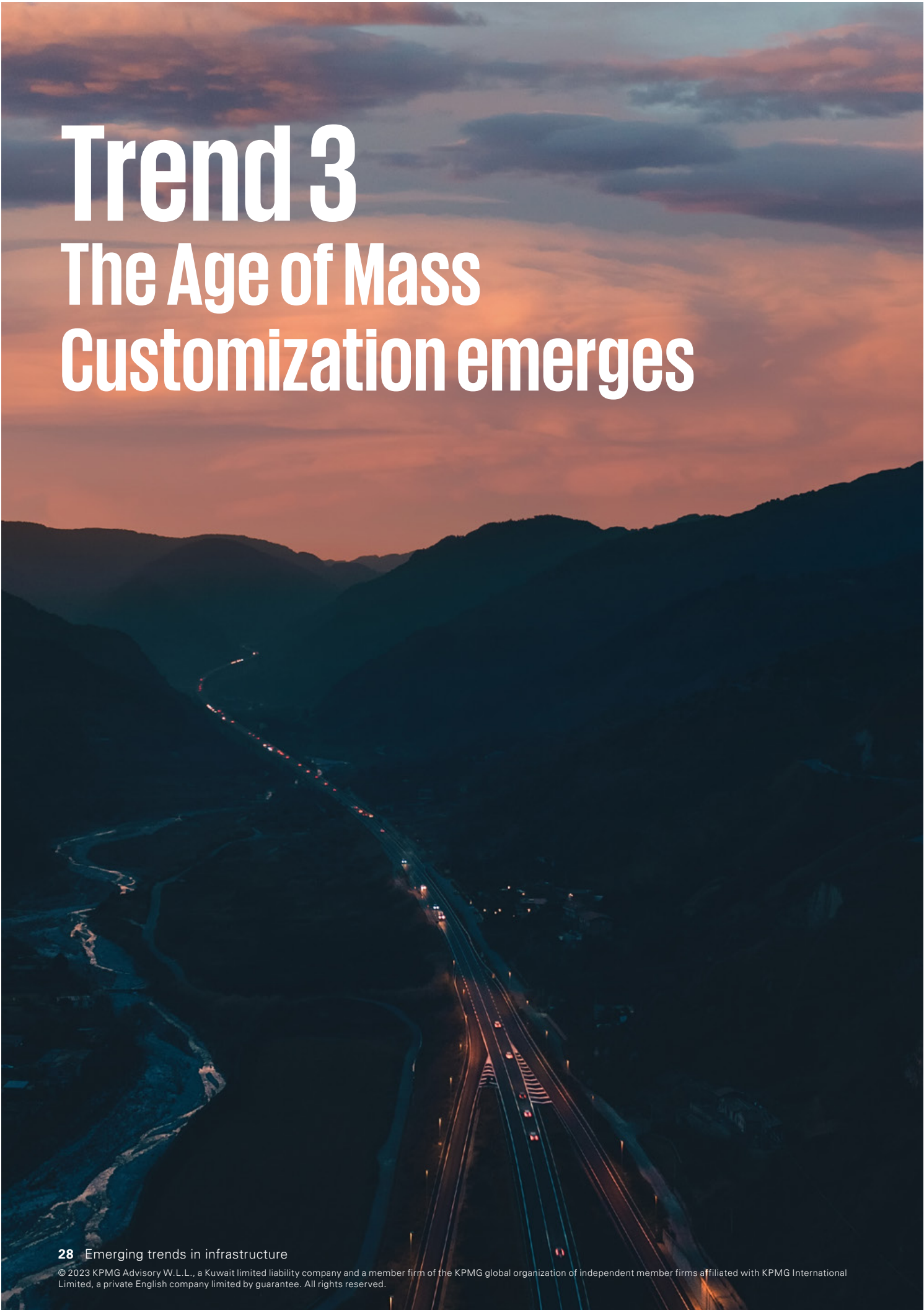
Much of the heavy lifting will likely fall on the shoulders of the energy and infrastructure sectors. The trick will be in coming up with approaches that help solve the trilemma of security, affordability and sustainability at pace. However, we also expect to see a significant shift in investment towards research into cleaner fuels, carbon abatement and energy efficiency. And

while these, along with innovations in new green technologies like green hydrogen, should not be used as an excuse to delay action — they do still offer hope that Scope 3 emissions can be rapidly eliminated, and the 1.5-degree goal can still be salvaged. The problem is that governments — having stated lofty goals and attended high profile conferences — have been maddeningly slow to move their feet. Simply put, the search for perfection is becoming the enemy of progress. In part, this speaks to the enormity and complexity of the task. It reflects growing concerns about the cost of the transition and who is going to fund it **(see trend 7 for more on this). Government progress is also slowed by the concrete boots of an embedded cost mindset and sunk costs (as discussed in trend 9).**

Our advice to governments and infrastructure players is to leave the old mindsets behind and factor sustainability into decision making now. Retrofitting using an old mindset is going to be more expensive, less effective and more disruptive. And history has proven you can't win this fight doing what you have done in the past.

This year, expect to see sustainability become more formalized as a basic pre-requisite for all new infrastructure development, with developers, owners and investors starting to think not just about financial budgets, but also about carbon allocation ones.

Now that society is backed into a corner on sustainability, people need to start thinking differently. And that means doing things smarter, quicker, better and faster.



Trend 3

The Age of Mass Customization emerges

The Industrial Age is over. Humanity is now in an age of mass customization. And the relics of the industrial system are losing relevance. In the past, infrastructure was all about building monolithic ‘factories’ where people could receive a standard service. Organizations and governments built massive ‘healthcare factories’ where people could go when they were sick. ‘Education factories’ where students could learn a set curriculum. Even ‘mass transit factories’ in the form of set-piece systems with rigid structures that moved people along the most common routes. In their place, customized solutions are emerging. We are seeing the emergence of specialized health providers focused on unique conditions. We are seeing the wide-spread adoption of ride-share and mobility options that take people from door-to-door. We are seeing the development of individual educational journeys, tailored around the unique need of each person (some school districts already use AI to identify students with special needs, often far faster than their human teachers can, so learning programs can be personalized).

In many respects, this shift is good news for consumers. It means users are able to get more value from their infrastructure. It reduces the waste of providing services people don’t actually need or use. Perhaps most importantly, it offers an opportunity to make infrastructure more inclusive and accessible. The Age of Mass Customization is about personalizing infrastructure to the user — both in its physical manifestation and in the way we use it. And that will require a step change in digitization (see trend 5), new business and services models. Focus can be placed on creating unique experiences for users while protecting their data, their privacy and their interests. Infrastructure value chains will likely need to be

adapted to achieve better response times and higher value. Enabling technologies (like 5G) and emerging approaches (like the metaverse) should be integrated. The problem is that this move towards customization is happening despite existing infrastructure and policy, not because of it. In fact, more often than not, the shift is being driven by private players who — having spotted a need in the market — took advantage by appealing to the individual consumer rather than the faceless taxpayer. Just consider how community-driven navigation map apps, absent government support, have rerouted the way people travel. Or how private specialist health providers are rerouting patient pathways.

The challenge facing infrastructure providers and governments is two-fold. The first big challenge is how to remain relevant in an age where technologies and private players are already disrupting the service delivery model. Governments may need to rethink where and how they will play (or perhaps, just intervene) in the provision of infrastructure. In part, this requires new ideas and models that eschew the industrial age and embody the age of mass customization. It will likely also require some tough decisions about what to do with existing industrial age assets **(as discussed in trend 9)**.

This year, we expect to see infrastructure players and governments start to focus more on what they deliver rather than how they deliver it. Instead of providing assets or services, they can focus on generating outcomes. Instead of adding more capacity, they can focus on adding more options. Instead of building monolithic temples, they can start thinking about how to create tailored, customized services that help meet the needs of tomorrow’s individual citizens.

Trend 4

Inflation, pricing and supply elevate the risk

A health pandemic, followed by a supply chain pandemic, leading to an inflationary pandemic. The big worry for infrastructure players is that the next stop is a bankruptcy pandemic.

The continued volatility and financial disruption of the past few months have certainly not been easy for infrastructure players. We are seeing infrastructure planners and owners struggling to budget for projects that will take years to deliver and decades to finance. As costs rise, return on investment equations rapidly change. As inflation bites, so does affordability.

What is worrying infrastructure owners and investors is that, more often than not, the price risk in today's contracts flow down to the developers and contractors. For years, costs had remained fairly stable and price risk was generally considered a symptom of poor cost management. It only made sense that those with the greatest control over cost discipline should also hold the cost risk.

But, today, the link between risk and discipline has become unhinged. No amount of cost or price discipline can protect margins during times of

inflationary shocks, supply constraints and volatile commodity price fluctuations. And few contractors understand how to properly price inflation and cost volatility into their contracts. US consumer price inflation hasn't topped 4 percent in more than 30 years¹ which means few developers have any real experience dealing with the issue. Not surprisingly, many infrastructure planners, owners and investors are dreadfully worried that their supply chain is about to go bust.

Yet this is not the first time the world has experienced inflation and supply issues. Some markets — such as Turkey and Venezuela have been suffering through high inflation for years. Any Baby Boomer reading this article will likely remember running dozens of different price scenarios, based on different inflation assumptions, across their investments (business and personal) in the early 80s. In those days, US inflation topped out at 13.5 percent. Yet, still, things were built, investments were made, and infrastructure was delivered. The trick now is to remember how uncertainty was factored in historically.

Over the coming year, we expect to see owners and investors start to rethink who should actually own the

cost and price risk on their assets and investments. Strong trust and cooperation between public and private sectors, owners and contractors, developers and operators, and buyers and suppliers will be key. For some, that may lead to a style of contracting that more closely resembles 'open book' than in the past, while still maintaining a level of price discipline between the contractor and the owner. The challenge will likely be to maintain price discipline while allowing for prudent risk sharing.

At the same time, global supply chains are shifting in response to geopolitical risk and pressure (see trend 8). Contractors and developers may need to start rebuilding their strategic procurement functions, led by a greater focus on price and cost discipline and robust scenario planning capabilities. Governments may need to find the fiscal space to invest in infrastructure in order to boost economic activity (frankly, they may have no other choice).

To be sure, supply chain bankruptcy would be a worst-case scenario this year. But the risk of not building anything at all would be much, much more dangerous over the long-term.

¹ <https://data.worldbank.org/indicator/FRCPI.TOTL.ZG?locations=US>



Trend 5

Getting the most from digital

Nobody denies that digital transformation can deliver massive potential benefits for infrastructure owners, operators and users. The use cases are manifold. The value is quantifiable. The capabilities are plentiful. So why is it taking so long for infrastructure to actually embrace digital?

Part of the challenge is that brownfield infrastructure is notoriously difficult to digitize. And the business case doesn't always stack up. Data quality is often a challenge. Many older assets also struggle with investment timelines, resource commitments and legacy system integration. They also need to be able to quantify the potential benefits which can include better information, more efficient operational management and more effective planning.

In many cases, the ability to optimize existing assets is limited by regulatory constraints that were in place when the asset was planned and designed. However, many brownfield owners are still finding opportunities to vastly improve their asset management through the effective use of data analytics tools and the adoption of newer technologies such as smart meters, predictive maintenance systems and optimization tools.

There is no excuse on the greenfield side. Here, digital should be embedded into every aspect and phase of infrastructure development — from design and planning right the way through to operation and eventual closure. It should connect every player in the value chain and in the ecosystem together around reliable sources of data.

It should drive performance, monitoring and reporting. It should be the de facto foundation stone of every physical asset.

This is clearly what many owners, operators and investors are looking for. Those responsible for driving long-term efficiency and performance from infrastructure assets want to use AI to enhance decision-making, IoT to enable predictive maintenance, and digital dashboards to drive monitoring and reporting. But that requires data to be flowing across the asset lifecycle, between operational siloes and through every node of the value chain. And that requires designers, contractors and developers to get on board.

The big question is whether infrastructure owners, procuring authorities, investors and operators are willing to pay for it and whether they can offer the right incentives into their supply chain to encourage digital design and cooperation. The next big question is whether they will have the right skills and experience to translate their digital capabilities into actual insight and value creation.

This year, we expect to see significant pressure on contractors and developers to up their digital capabilities and integrate into the wider value chain. We also expect to see more infrastructure players work to overlay data with experience — applying human capabilities to drive real value from data. Yet progress will likely remain slower than most owners and operators hope. Finding the accelerator will be key.



Trend 6

Cities look for purpose

If you thought cities would return to normal after the pandemic, prepare to be disappointed. Too much has changed. Hybrid and remote work models are here to stay. Retail patterns have changed indelibly. Citizen expectations and needs have rapidly evolved. And the way people interact with their infrastructure has been transformed.

Even before the pandemic struck, city leaders knew they were in tight competition for resources, investment and talent. They recognized that the ‘magnetism’ of cities had changed polarity. Rather than drawing in the best and brightest, some cities had become synonymous with urban blight, decay and broken dreams. The pandemic made it clear that cities could no longer rely on their network effect alone. In established cities, we are seeing new technologies and concepts radically disrupt the character of the CBD. The most obvious have been the shift to remote

work (which moved commercial workers out of office buildings and into suburbs) and the rapid adoption of e-commerce (which shifted retail workers out of stores and into distribution centers). But new ideas and technologies are rapidly taking shape. Some cities are considering building underground distribution systems to get delivery trucks off local roads. Others are already in pilots to see if drones can do the same thing. Less futuristic ideas are also taking hold — such as the ‘space-time shifting’ of city activities to balance out resource usage and congestion.

Here, the developing and emerging markets have the upper hand. With less legacy and fewer sunk costs to worry about, we are seeing a range of new concepts floated (and occasionally financed) that could radically reshape the city as we know it. From Saudi Arabia’s proposed mega-city, The Line, through to Hong Kong’s new metropolis, we are seeing new cities being

designed and developed as role models of the shared economy where work, play and live agendas overlap. Existing cities have to sprint to keep up. Some will, some won’t.

Every city and every population is unique. And so each government will need to create a vision for their city that is consistent with the norms and customs of their own society. Radically different concepts will likely emerge, thrive and peacefully coexist. Policy makers will need to be able to translate these expectations and demands into the design of their cities — particularly when it comes to housing, transport and commercial infrastructure. Each city and society will evolve in line with their unique attributes. One size doesn’t fit all and there will be an infinite number of adaptation pathways. There may be massive opportunities for the private sector to play a key role in driving the economic engines that cities represent.

This year, expect to see city, regional and national governments start to engage in real and collaborative debates on what value cities can deliver. And, with that, expect to see a much greater focus on bringing together the essential ingredients to drive the work, play and live agenda.



Trend 7

Institutional players drive the climate agenda

Governments have big ambitions on climate change. But they also know that the cost of the required structural changes will likely be enormous — some estimates suggest upwards of 7 percent of global GDP between now and 2050. This, at a time of massive pressure on government pocketbooks, rising inflation and justifiable debates on who holds the costs and reaps the benefits of climate change.

Perhaps not surprisingly, governments are looking to institutional investors to help finance the costs. In many ways, this makes a lot of sense. Institutional investors command some USD100 trillion in assets under management.² That's more than the world's total annual GDP combined.³ From a pure capital perspective, it's clear the money is there.

Institutional investors are also long-term investors. This isn't just about patient capital. It's about investors who understand the long-term effects of climate change and are invested enough to want to do something about it. And over the past few years, many have become much more active in their management of their assets, working with their investments to deliver real and measurable decarbonization goals.

We are certainly seeing institutional investors wield the power of their capital to drive climate outcomes. Some asset managers have already stated they will raise the cost of capital for those not currently actively

decarbonizing⁴. Others suggest they will pull back long-term financing altogether. Some large insurers and reinsurers, for example, are saying they will no longer invest in or insure most oil and gas projects as of next year.⁵ That will be a rude awakening for anyone seeking long-term capital for less-than-clean projects.

Whether or not the new economic realities will dampen their ambition is an open question. Urgent issues around energy security and the rising costs of energy in many markets may force some owners to keep their assets running longer or to continue investing into assets they had once disavowed. Current market volatility is also forcing some asset managers (particularly those more mature pension funds with rising obligations and shrinking contributions) to rebalance their portfolio of liquid and illiquid assets to achieve their objectives.

Over the coming year, we can expect institutional investors, governments and owners to become much more comfortable allowing the power of capital to drive climate outcomes. In part, this may stem from a maturation of global standards (led by organizations like the Climate Change Task Force and the International Sustainability Standards Board). But it may also be driven by a sense of desperation as citizens, governments and policymakers grasp for any help they can get on the climate agenda.

² <https://www.statista.com/statistics/323928/global-assets-under-management/>

³ <https://data.worldbank.org/indicator/NY.GDPMKTP.CD>

⁴ <https://www.bloomberg.com/news/articles/2021-11-09/cost-of-capital-widens-for-fossil-fuel-producers-green-insight>

⁵ <https://www.munichre.com/en/company/media-relations/statements/2022/new-oil-and-gas-investment-underwriting-guidelines.html>

Trend 8

Globalization gets buffeted by security

Did Janet Yellen ring the death knell on globalization? Standing in an industrial park in South Korea last summer, the US Treasury Secretary called on companies and governments to rethink their global supply chains and trade flows to prioritize allies and trusted partners. Since then, the idea of ‘friend-shoring’ has been espoused by politicians, trade organizations

and policymakers as geopolitical risks change the dynamics of supply chain strategy. “Working with allies and partners through friend-shoring is an important element of strengthening economic resilience while sustaining the dynamism and productivity growth that comes with economic integration,” Yellen argued.

Supply chain managers shuddered. For years, the mantra of supply chains had been lowest-cost and lowest-inventory. Private equity had wicked every drop of capital out of the process. Just-in-time was all about keeping supply chains and inventory as tight as possible.

And then the COVID-19 pandemic happened. And Trump’s trade wars. The Russian Government invaded Ukraine. Cracks started to appear in global trade agreements. And companies scrambled to secure their sources of supply, build up inventory and develop new redundancies. Investing into ‘friendly’ markets and suppliers suddenly seems like a smart idea.


This isn’t just about securing supply chains. It’s also about securing infrastructure. Governments increasingly recognize that their assets could be vulnerable to insecure supply. And they are taking a heavier hand in helping infrastructure owners decide where they can source key bits of kit from, and who they can work with to operate them.

The implications for global infrastructure players are potentially massive. Given the fractures now shattering the old-world order and the growing shift to temporary, issue-specific flexible alliances (see trend 1 for more on this), many may find it increasingly difficult to stay on the right side of their customers. With a raft of new supply chain transparency regulations being promulgated, secrets (trade or reputational) will likely be hard to keep.

As most supply chain managers know, it takes significant time, effort and investment to rework supply chains. Organizing around cost was fairly straight forward; organizing around the strength of one market’s relationship to another is more challenging. There may be no simple decisions.

This year, expect to see infrastructure players start to rework their supply chains into more dynamic supply webs that form around security of supply. And don’t be surprised to see some significant fallout as less-friendly markets and companies get dropped.





Trend 9

Dealing with sunk costs and abandoned assets

Infrastructure assets are expensive. And they are made to last decades. So, there is an obvious reluctance to abandon them early. Yet society's needs and expectations have changed. Climate change has rewritten the value equation in many markets. And technological change has upped the risk of obsolescence.

Humans are sentimental creatures. We don't like to throw things away. Doubly so if we have put equity (financial or emotional) into it in some way. The problem is that an obsession with sunk costs is slowing the ability to transform. Some hold on to assets that no longer meet value equations. Others formalize processes that no longer work. Many cling to models that no longer reflect reality and subscribe to schools of thought that only reinforce the past.

The potential risks of trying to solve new problems within an old context and mindset are huge. It limits the imagination. It stifles innovation. It slows investment from flowing into new ideas and technologies. It increases costs, encourages waste and creates redundancy. If society is to move peacefully and confidently from the industrial age to the Age of Mass Customization (see trend 2), it should become much more willing to abandon the status quo and encourage greenfield thinking.

The transition may be the tricky bit. Rather than trying to replace the current kit with lower-carbon alternatives, people should be asking "what we are actually trying to achieve" and then come up with low (or no) carbon ways to do that. And carbon is only one of the important variables. Electric cars offer a good case in point. There may be a point where the damage caused by manufacturing the electric car outweighs the damage

being done by the combustion engine it is replacing. Perhaps a better question is do we all still need to own cars to move around? But few are asking if we still need cars. The sunk costs embedded in road systems, fuel stations, traffic technologies and vehicles force us to cling to cars.

Even if people were to give up on traditional thinking tomorrow, we would still have to contend with a mountain of sunk costs and abandoned assets. What do you do with a coal plant that no longer meets sustainability expectations? Do we simply put out a closed sign, board up the door and walk away? That would leave a lot of investors holding the bag. Do we instead let it be sold down to an operator with fewer scruples or transparency requirements? That would only transfer the problem, not solve it. So is there an alternative that sees investors pour more capital into it, incrementally improving its footprint until it does fall within parameters? We hope so. But that will require new ways of thinking and new approaches to financing, funding, and regulation.

We suspect there will be multiple paths to adaptation and evolution for systems, assets and individuals. Some may lead to dead ends. But we must continue to explore each avenue as we search out a way forward. Scenario planning will be key in this regard.

This year, expect to see infrastructure planners and investors start to think more creatively about the problems they face and the outcomes they hope to achieve. Continuously polishing the status quo will not get us where we need to be. Infrastructure owners and investors need to be willing to walk away from our sunk costs and assets in order to find a better way.



Trend 10

The definition of infrastructure evolves

What is infrastructure really? In the past, it was pretty easy to identify. Infrastructure was stuff that governments built in order to deliver on citizens needs and policy agendas. Now those lines are blurring. Infrastructure is no longer the remit of government alone. It does not always deliver on citizen needs or policy agendas. In many cases, the lines between sectors are rapidly blurring.

Many of the traditional energy majors, for example, now see themselves as technology, mobility, energy and infrastructure players.⁶ Big tech firms are positioning themselves as connectivity providers and — in the metaverse — service providers.⁷ Even old school infrastructure is getting in on the game. Fiber,

power lines and other pieces of kit are being integrated into roads. Schools are doubling as community centers, cooling stations and flood protection. The concept of ‘infrastructure’ is broadening to be much more about serving the needs of society than delivering a specific asset. This is good.

Instead of an increasingly centralized and overlapped future reality, we also see another option where infrastructure investors, operators and owners shift towardS collaborative, evolving partnerships and ecosystems — flexible federations of organizations working together on clear outcomes and use cases. Partnerships tend to see two parties working together to achieve a specific outcome. These federations can

instead prioritize fluidly combining capabilities in order to better respond to citizen needs.

Given all of the trends we have raised in this report — the shift to issue-specific alliances, changing supply chain expectations, rising economic uncertainty, unsolved questions about existing assets, digitization and the shift to the Age of Mass Customization, encouraging this type of flexible federation of capabilities may prove to be the only way that governments may be able to execute on their agendas. They certainly can’t do it alone. And jumping into bed

⁶ <https://autovista24.autovistagroup.com/news/why-big-oil-companies-are-investing-in-electromobility/>

⁷ <https://edition.cnn.com/2022/10/30/tech/meta-metaverse-transition/index.html>

with one big partner to the exclusion of others has proven to be unpopular with citizens who worry about who is controlling their infrastructure.

What is clear is that the definition of infrastructure is evolving. The competitive landscape is rapidly changing. Governments are no longer the sole purveyor of infrastructure. There will likely be implications for everyone in the sector.

Future in Focus

Infrastructure sector in Kuwait

Increasing capabilities amid slowness

In many instances, instead of developing assets ab initio, the government is focusing on expanding the existing capabilities, particularly in ports and wastewater projects.

Albeit slow, Kuwait has a healthy pipeline of projects that indicates signs of progress and the fact that the government has identified assets with the scope for expansion and is working on them. However, this slowness can be attributed in part to the institutional and market learnings that usually abide by the implementation of new laws, such as PPP.

Scope for smart cities

There is no smart without digital. Digitalization is a core pillar of Kuwait Vision 2035, with the Ministry of Commerce and Industry directing the development of a national roadmap for the country's digital transformation, unifying all projects by relevant government agencies under a comprehensive plan.

Moreover, the Public Authority for Housing Welfare is seeking to embed smart and ESG components for its various housing projects right from the master planning phase.

The future of public transport

With a high per capita car ownership among Kuwaiti nationals, meeting urban transport demands is not among the government's top objectives. Prospects have either been scrapped or put on hold, as the government is shifting its focus toward industrial transport projects, such as the 111-km Kuwait Rail Project.

The low preference toward public transport ridership is motivated by low fuel and vehicle prices, supported by insufficient frequency, affordability and last-mile connectivity of the available means of public transport. Most of these issues can be addressed through planning, coordination and public education.

Solving for the future

To achieve parity with its contemporaries or surpass them, Kuwait will have to learn from their experiences, both positive and not-so-positive ones, to discern the adaptations that the country must make to succeed in its future projects.

This may require a change in attitude that brings a 'no compromise' approach to make for timely and in-budget project completion without affecting quality, and emphasizes on value creation and relationship building.



How we can help

Through Kuwait Vision 2035, the government is seeking to transform Kuwait into a financial, cultural, and institutional leader in the region, enhancing its global position and developing human capital, healthcare, public administration, infrastructure, economy, and living environment.

The series of long-term development plans undertaken by Kuwait from 2010 onwards have supported the implementation of institutional reforms, rapid infrastructure development and the steady growth of the private sector and the non-oil economy.

KPMG's integrated services across the infrastructure lifecycle

Our infrastructure services team offers help with many aspects of development or operation. Working with policy makers, contractors, bidders, investors and lenders, we focus on all areas of the sector to provide the support needed to drive your business objectives forward. By combining valuable global insight and the strength of our international network with hands-on local experience, we can help address the challenges you are facing at any stage of an asset's life-cycle; from strategy and planning, procurement and financing to construction, operations and hand-back.

- We develop strategic business cases and feasibility studies to help you understand the underlying economic impacts of a potential scheme.
- We advise on procurement, capital structuring and funding; underpinned by the necessary regulatory framework and governance structures.
- We support the public sector in running a fair and transparent procurement process.

- We help private sector bidders in preparing and pricing for a competitive bid.
- We ensure project delivery and develop operational models to help in day-to-day project management and monitoring, ensuring project delivery is on track — to time and budget.

In-depth sectorial knowledge

Our experience spans across every major sector, including:

Power and utilities

- Independent power production (IPP) and independent power and water production projects (IWPP)
- Renewable energy including PV, CSP and wind energy
- Water and waste-water projects
- Solid waste management

Transport

- Airports, rail, metro, ports, roads and bridges

Social infrastructure

- Healthcare — primary, tertiary and specialist hospitals
- Education — schools, universities and vocational education

Telecom

- Fixed line, mobile and internet

Cities

- New urban developments
- Smart cities

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