

Infrastructure

with impact

ISSUE 02: IMPROVING LIVES, SOCIETY AND THE ENVIRONMENT
April 2023



A new mega project is on the horizon

The Washington State Department of Transportation is exploring how the Cascadia ultra-high speed rail network could benefit communities.

Page 8

Waratah super battery accelerates transition to renewable energy

The Southern Hemisphere's largest network battery will help secure a clean energy future for Australians.

Page 16

Women in infrastructure

Fifteen Deloitte female leaders, one unifying passion: to leave a lasting legacy for the next generation, challenge the norm and be active role models.

Page 34

Deloitte.

Discover how the future of infrastructure is being revitalized, rebuilt and reimagined.



Read more in the first edition of *Deloitte's Global Infrastructure magazine*



Contents

05

Welcome

WELCOME TO ISSUE 2, INFRASTRUCTURE WITH IMPACT
We look at how infrastructure is improving everyday lives, communities, local and regional economies and the environment.

05

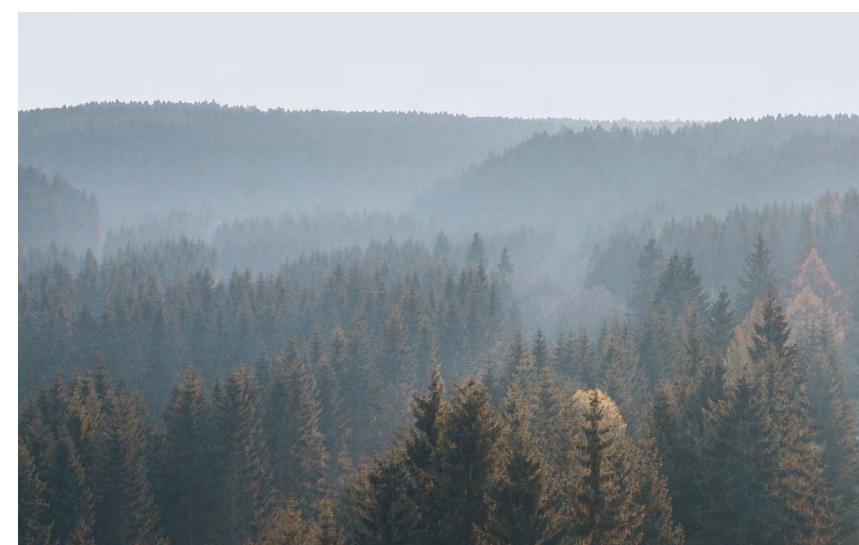
Best practice

INCREDIBLE INSIGHTS
Inspiration from near and far to showcase how infrastructure is connecting people better and faster.

08

Feature

A NEW MEGA PROJECT IS ON THE HORIZON
The Washington State Department of Transportation is exploring how a new ultra-high-speed rail network could benefit the Cascadia Corridor.



12



YOUR GUIDE TO ARCHITECTING GIGA PROJECTS
We explore what it takes to make sure giga projects succeed so they transform entire societies and the way we live and work.

14



TOP 10 MOST SUSTAINABLE BUILDINGS IN THE WORLD
These phenomenal buildings are reducing our carbon footprint.

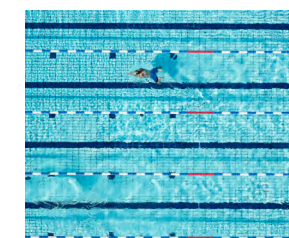
16

Feature

WARATAH SUPER BATTERY ACCELERATES TRANSITION TO RENEWABLE ENERGY
As part of a rapid energy transition drive, the Southern Hemisphere's largest network battery will help secure a clean energy future for Australians.



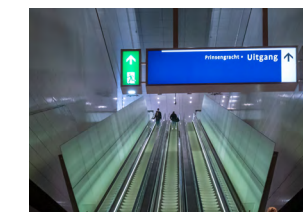
18



BETTER OR NEWER? COLLABORATION UNLOCKS INFRASTRUCTURE'S FULL POTENTIAL
Australians are thinking outside the box to extend the purpose and the full benefits of infrastructure assets.

22

STAKEHOLDER ENGAGEMENT, OVER MANAGEMENT: THE KEYS TO SUCCESS
The art of early, planned and ongoing stakeholder engagement is critical to the success of infrastructural and major projects.



24



SAVANNAH COLLEGE OF ARTS AND DESIGN UNITES WITH DELOITTE
Read about how the Deloitte Foundry is a first-of-its-kind design studio, working with creative students to help deliver infrastructure with impact.

26

THE NATIONAL HIGHWAYS AUTHORITY OF INDIA IS MOBILIZING FUNDING
To improve its national highways, Deloitte is helping the Authority harness brownfield road assets for greenfield investments.



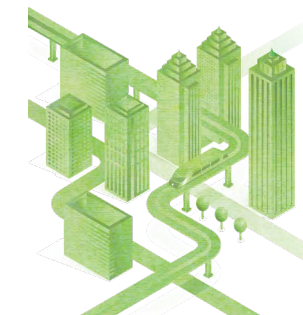
28



COST EFFICIENCY FOR INFRASTRUCTURE CLIENTS
Our Deloitte team explores the five golden rules of good practice.

29

IT'S TIME TO LOOK BEYOND COST-BENEFIT ANALYSIS
Governments have relied on cost-benefit analysis to prioritize infrastructure investments, but it's time for a new approach.



30



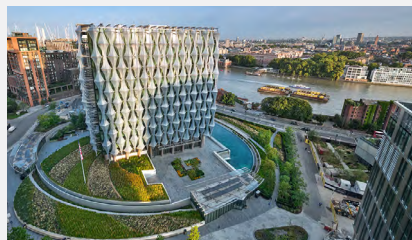
TOKYO IS MAKING WAVES IN SMART CITY INNOVATIONS

The recent City-Tech Expo in Tokyo attracted 10,000 visitors to Japan's capital to explore how start-ups are playing a critical role in modernizing cities.

32

THE EMBASSY EFFECT

The U.S. Department of State continues to strengthen diplomacy by connecting cultures through respectful and modern infrastructure.



34

Feature



WOMEN WHO LEAD THE WAY IN INFRASTRUCTURE

We interviewed 15 Deloitte female leaders who are united in their passion to challenge the norm, be active role models and leave a lasting legacy.

38



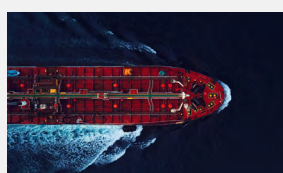
INCLUSIVE INFRASTRUCTURE CAN SUPPORT A CLIMATE RESILIENT FUTURE

A new UNOPS report is advocating for essential services for women and marginalized groups to protect against climate-related hazards.

44

FIVE FORCES ARE SHAPING THE FUTURE OF FREIGHT

Our research with U.S. and European executives reveals five major forces at play.



46



DID YOU KNOW ...

Female mayors are running the world's three most sustainable cities – all in Northern Europe.

48

Feature

HONORING THE MĀORI WAY OF LIFE

We find out how Nicholas Dalton and his team at TOA Architects are delivering life-changing architecture for indigenous New Zealanders.



50

BEING INCLUSIVE ISN'T JUST GOOD, IT'S THE RIGHT THING TO DO

We share guiding principles and insights for embedding inclusivity, celebrating diversity and what makes us different.



52

FIVE GLOBAL TRANSPORTATION TRENDS

Transport can play a bigger role in enhancing people's lives. This Deloitte report considers trends, challenges and how to steer around them.



54

Feature

MODERN INFRASTRUCTURE IS HELPING DELIVER NET ZERO GOALS

We interviewed the CEO of Connected Kerb to find out how affordable, reliable and convenient EV charging solutions are driving behavior change in the UK.



58

HARNESSING PRIVATE CAPITAL IN TURBULENT TIMES

This Deloitte report reveals how to make the most of infrastructure stimulus programs.

60

ENHANCING CRITICAL INFRASTRUCTURE RESILIENCE IN NEW ZEALAND

Find out why Transpower, the country's national electricity grid owner and operator, is reviewing its supply chain.



62

FOOD SECURITY AND INFRASTRUCTURE MUST GO HAND IN HAND

We found out how infrastructure planning can be leveraged to support Malaysia's growing population.

64

INFRASTRUCTURE FOR GOOD BAROMETER

We proudly supported Economist Impact's *Infrastructure for Good* program, resulting in a unique barometer that explores excellence in infrastructure.

Introduction from Luke Houghton



DELOITTE GLOBAL INFRASTRUCTURE LEADER – ADVISORY

IN THE FIRST EDITION OF THIS MAGAZINE, WE FOCUSED ON EXPLORING THE FUTURE OF INFRASTRUCTURE SO WE COULD BETTER ANTICIPATE AND DELIVER ON ITS ROLE IN IMPROVING OUR EVERYDAY LIVES.

THIS TIME, WE'RE BUILDING ON THAT STILL VERY RELEVANT THEME AND TAKING A DEEP DIVE INTO WHAT IT TAKES TO DELIVER INFRASTRUCTURE WITH IMPACT.

So what does infrastructure with impact mean, exactly? For me, it's four-fold: infrastructure with impact benefits *individuals, communities* (remote, regional and in cities), the *economy* and the *environment*. Sure, that's a huge agenda, but all are vital and can be protected and improved with the right infrastructure solutions. I firmly believe that the best infrastructure solutions revolve around a winning formula of principles. These include embracing diverse thinking, using modern technology to transform

new or existing assets, considering deliberate and wide collaboration, applying clever funding and financing strategies and overlaying this with a laser sharp focus on sustainability. And let's not forget the benefits that come with embedding inclusion in all its forms so everyone is represented.

To succeed, we all need to work together – share ideas, actively network, debate the exciting and challenging topics – and most of all, pursue a lofty but realistic aspiration: to deliver infrastructure with impact.

I hope you enjoy this latest issue of our *Deloitte Global Infrastructure Magazine* which features interesting client stories, the latest trends and thought leadership, and plenty of inspiration and actionable insights.

To encourage connectivity, we have included a key contact for every article. I would love to hear from you.

Contact Luke Houghton
✉ lhoughton@deloitte.com.au

Let's take a moment to celebrate pockets of excellence from around the world where infrastructure with impact is improving citizens' lives, communities, economies and the environment.

These great examples aren't just inspirational, they're interesting and show how we can set the next generation up for long-lasting success.

Incredible insights

AI IN DUBAI: SAVING LIVES, CUTTING COSTS AND REDUCING EMISSIONS

H.E. Mattar Al Tayer, Director General and Chairman of the Board of Dubai Roads and Transport Authority, has said he wants Dubai to achieve 'smart city' credence through the country's AI program.

The program includes smart and sustainable infrastructure, mobility and transportation – all designed to improve the population's wellbeing by providing world-class AI services.

For example, a new regulatory system was introduced to monitor fatigue and exhaustion in over 300 bus drivers, contributing to a

65 percent reduction in accidents. Improvements don't end here.

Dubai also plans to transform 25 percent of its transportation to autonomous modes by 2030 to reduce transportation time, costs and carbon emissions, while raising the productivity of individuals.



Dubai's transportation infrastructure. (Image: Getty Images)

EXTREME WEATHER ROCKS ASIA'S ECONOMY

According to a new report from the World Meteorological Organization (WMO), in 2021 alone, weather-related hazards caused damages totaling USD 35.6 billion, affecting nearly 50 million people. These impacts are taking an increasing human, financial and environmental toll, worsening food security and poverty and holding back sustainable development.

The report paints a worrying scenario for water stress in Asia, too. High Mountains, including the Himalayas, contain the largest volume of ice outside of the polar region; these water towers are vital for freshwater supplies across Asia. However, the

rate of glacier retreat is accelerating due to worsening climate change and global warming. In response, several Asian countries have prioritized adaptations in their climate action plans, including strengthening early warning systems, building stronger infrastructure, and investing in more efficient water resource management.

Armida Alisjahbana, UNESCAP Executive Secretary, declared, "Further strengthening is needed in establishing early warning systems. Similarly, new infrastructure needs to be made more resilient, alongside improvements in water resources management." Investing in these actions will catalyze progress in sustainable climate action and secure the continent's developmental future.



Extreme rainfall in Asia. (Image: Getty Images)



Autobahn GmbH construction. (Image: Torsten Hanspach)

SPEEDING UP HIGHWAY UPGRADES THROUGH PPPs

Public Private Partnerships (PPPs) are accelerating infrastructure developments all over the world, enhancing citizens' everyday lives. A great example is Germany's largest ever PPP infrastructure project, commissioned by the Federal Republic of Germany, represented by the Autobahn GmbH of the Federal Branch North Bavaria.

Following a successful public and international tender, the newly created A3 Nordbayern private sector consortium won the contract to expand a four-lane federal motorway to six lanes – in just over five years, or 2,039 days to be precise. The primary objectives? To increase road capacity, alleviate traffic congestion, reduce noise pollution and enhance road safety along a 76 km stretch in Southeastern Germany.

This PPP is based on the V model (availability model), in which the federal government makes payments to the private contractor according to the availability of the lanes. A3 Nordbayern started work in mid-2020 with plans to finalize the upgrade by the end of 2025. On completion, a 30-year government contract will cover the operation and maintenance of this highway section, with the route handed back to the Federal Republic of Germany at the conclusion of the contract on 30 April, 2050.

Andreas Scheuer, former Federal Transport Minister, described the A3 as one of the most important transport axes in Europe when he said in 2021, " ... we are eliminating another bottleneck and starting the six-lane expansion in Franconia. With PPPs we build quickly, economically and with high quality."

SMART CITY EXPO WORLD CONGRESS IN BARCELONA ATTRACTS 24,000+ VISITORS

Deloitte was proud to be the Global Partner at the recent Smart City Expo World Congress, the world's leading event for smart city solutions driving sustainable urban transformation. The Expo gathered leaders from the world's most innovative companies, governments and organizations to move cities – and their inhabitants and visitors – toward a better future. At this year's Expo, Deloitte connected with a myriad of partners and clients to show how close collaboration is turning bold ideas into practical realities for cities.

in Lisbon, Portugal, says, "Cities are the best place to drive change and make a difference to the wellbeing of people, the competitiveness of the economy and the sustainability of our planet."

Deloitte displayed its assets and innovations, such as Synergy, a solution that leverages the power of technology to integrate and manage all critical factors shaping cities toward a more human-centric future. This innovation is contributing to a more sustainable ecosystem, improving the quality of life in cities around the globe. Miguel proclaimed, "At Deloitte we're now working beyond consultancy. We're building global solutions that make a real difference in our day-to-day lives."

Miguel Eiras Antunes, Deloitte's Global Leader for Smart Cities & Urban Transformation who is based



Exhibition Area '22. (Image: smartcityexpo.com)

GUINNESS WORLD RECORDS – INDIA LAYS THE WAY FOR SUCCESS

India replaced Qatar as the Guinness World Records holder for laying the longest stretch of highway in the shortest amount of time. The winning entry was a 75 km stretch of road which was completed in just five days, and in less than 106 hours, by a team of 1,400 people who worked around the clock, starting in the early hours on 3 June, 2022, and finishing on 7 June at 5pm.

The new road forms part of National Highway 53 and is considered a critical East-West corridor, boosting connectivity between communities in major Indian cities and reducing travel time and congestion for commuters.

Nitin Gadkari, Minister of Road Transport and Highways of India, shared his praise for the record-breaking team on social media:

"Proud moment for the entire nation! Feel very happy to congratulate our exceptional Team NHAI, Consultants & Concessionaire, Rajpath Infracon Pvt Ltd & Jagdish Kadam, on achieving the Guinness World Record of laying 75 km continuous bituminous concrete road in a single lane on Highway 53 section between Amravati and Akola. I would specially thank our engineers and workers who toiled day and night to achieve this extraordinary feat."

You can read more about how Deloitte is helping the National Highways Authority of India to mobilize funding to continually improve its national highways network on page 26.



A section of the new road in Maharashtra. (Image: Twitter)

BEIRUT PORT REHABILITATION: A COMMUNITY-MINDED APPROACH

Najib Mikati, Lebanon's Prime Minister, shared his thoughts on the port and its importance as an infrastructure asset last year: "We want the Port of Beirut to remain the beacon of this country and the first gateway in cooperation and integration with all the other Lebanese ports." A strategy to attract private sector investment into the redevelopment and rebuild of the country's public facilities includes a new modern port with a more community-oriented precinct.

For example, a bus shuttle system is being considered to accommodate traffic and make moving around easier. Observation platforms and pedestrian bridges will further enhance the visitor experience. Global best practice research into waterfront development will inform the port's future, which will include recycled materials in the rebuild.

The hope is that the project will be the impetus for regeneration, not only for the port but also for the city of Beirut – marking the city's rebirth into a Mediterranean cruise hub.



Port of Beirut rehabilitation and extension. (Image: dar.com)



Montreal's Rue Wellington at sunset hour. (Image: timeout.com/Caroline Perron)

CITIZENS RANK THE WORLD'S COOLEST STREETS

If buildings are the lungs of the city, the streets are its veins, carrying us around each day to our destination. They're where we spend most of our time - walking to work, grabbing coffee and meeting friends - and where we feel the most alive.

In late 2022, global media group **Time Out** surveyed 20,000 city-dwellers and local experts to rank the world's top streets for their culture, food, sense of fun and community. The results are in!

Montreal's Rue Wellington (pictured here) took the top spot with its lively energy and distinct European feel, and Melbourne came in a close second thanks to its beautifully unassuming Gertrude Street, home to a cozy collection of cafés and boutiques. In third place was Glasgow's tree-lined

Great Western Road, with its historic western architecture, followed by Taipei's Yongkang Street filled with food vendors, traditional tea rooms and hole-in-the-wall restaurants. Copenhagen's Værnedamsvej, with its fresh flowers, bike trails and bustling wine bars, ranked fifth:

1. Rue Wellington, Montreal
2. Gertrude Street, Melbourne
3. Great Western Road, Glasgow
4. Yongkang Street, Taipei
5. Værnedamsvej, Copenhagen
6. Karangahape Road, Auckland
7. Tai Ping Shan Street, Hong Kong
8. Yaowarat Road, Bangkok
9. Oranienstrasse, Berlin
10. Hayes Street, San Francisco.

THE NETHERLANDS AND CALIFORNIA COLLABORATE TO IMPROVE EV REGULATION

By 2035, all new cars sold in the EU and California will be zero emission. Although a huge step to reducing pollution, environmental experts from the Netherlands and California have identified an opportunity to work together towards updating regulation. Not only does the charging of electronic vehicles (EVs) need to become simpler and safer, greater uptake of new technologies is needed to drive efficiencies.

In September 2022, **Vivianne Heijnen**, Dutch Environment Minister, and **Yana Garcia Gonzalez**, Secretary for Environmental Protection of California, signed an agreement committing to a new partnership aimed at improving EV regulation. Specialists from ElaadNL, the knowledge and innovation centre in the Netherlands, and the Californian Energy Commission

will collaborate to develop and test technologies to improve safety, security and usability. They will then make recommendations to be incorporated within EV legislation to address three requirements:

1. Enforcing charging stations to apply the same global standards. This will lead to improved accessibility and driver experience, especially when they travel overseas
2. Increasing the development of smart charging so EVs can feed power back to the grid and improve the grid's capacity during peak demand
3. Enhancing digital security to protect charging stations against hackers.

This new cross-continental partnership is also committed to finding ways to reduce greenhouse emissions, transition to a circular economy and improve climate resilience.



Her Majesty Queen Máxima of the Netherlands, **Eleni Kounalakis**, Lieutenant Governor of California, **Jennifer Siebel Newsom**, First Partner of California, **Vivianne Heijnen**, Dutch Minister for the Environment and **Yana Garcia**, Secretary for Environmental Protection signing the agreement in June, 2022. (Image: Itg.ca.gov)

Cascadia ultra-high speed ground transportation: a new mega project is on the horizon

THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION IS EXPLORING EVERY ANGLE TO BENEFIT COMMUNITIES

THE PACIFIC NORTHWEST REGION OF THE UNITED STATES AND CANADA HAS AN ENTREPRENEURIAL SPIRIT AND IS GLOBALLY KNOWN AS A HOTBED FOR SUCCESSFUL INNOVATIVE BRANDS INCLUDING MICROSOFT, AMAZON, STARBUCKS AND NIKE, TO NAME A FEW.

There's no doubt that more companies will follow in these big footsteps but in order to attract the most talented people to work for them, improvements to the connectivity along the Corridor will need to be made. Equally important are the close to 10 million people who live in communities in and between Vancouver, British Columbia, Portland, Oregon, and Seattle, Washington (also known as Cascadia or the Cascadia Corridor). Commuting along the

Northwest coast is currently time consuming with limited convenient transportation choices. High speed rail could offer a huge opportunity to ensure the region's competitive position on the global stage for decades to come, while significantly benefiting regional communities.

Meanwhile, COVID-19 has impacted citizens' lives in several ways. Many have moved from urban to rural settings and teleworking, or working part-time, has become popular. These trends impact how transport systems are being used. People want to commute differently, not just during formerly traditional peak hours. They want more choices and flexibility for both near and far destinations. The question is, how can a high-speed rail network address these and new challenges to come?

A STEADY JOURNEY SINCE 2016

Jason Beloso, Strategic Planning Manager at the Washington State Department of Transportation (WSDOT), has been on what he describes as "quite a ride." Since 2016, he has been responsible for leading the department's exploratory work on all things ultra-high speed rail – speeds of up to 250 mph or 400 kph.

When asked about his personal vision for the project, he said, "I don't think of this as a transportation system. We're after more than that - think of gaining access to more open spaces, enabling a mobile workforce, giving more housing and transportation options to anyone using public transport... Ultimately, this is about improving connectivity for everyone who lives in and visits the Corridor."

In his role as the department's lead, Jason doesn't see himself as the primary decision maker. His personal philosophy is to make sure that whatever investments the state has made, and will continue to make, benefit businesses and citizens living in the state and along the Corridor, directly or indirectly – from its city centers to regions and far-flung remote areas.

To inform his thinking, in the last seven years Jason and his team have proactively researched what it takes for high-speed rail networks to succeed, especially projects like this one that connect two neighboring countries like the United States and Canada. He mentions that until he visited Singapore and Malaysia, he had some underlying questions.

"When I visited Malaysia, I realized that a high-speed rail network could smoothly connect vast numbers of people in Kuala Lumpur, who are eager to work, with Singapore, a country looking for more highly-skilled workers. That's the moment I realized there are tangible socioeconomic benefits at play with high-speed rail. A change like this applied to the Cascadia Corridor can be absolutely transformative, and that's what we want for Washington State and the region."

RAIL NETWORK FOR GOOD

Jason is proud that the planning and research completed to date has abided by a number of deliberate principles, lessons learned, and best practices to ensure the project's benefits are fair and widespread.

"For example, a question I often get asked is if the high-speed rail would replace our existing intercity rail system, bus and rapid transit, or commuter rail. Or would it emit more carbon emissions? The answer to both questions is no. On the former, if the project goes ahead, it does so on the premise of providing riders with more choices every day, so this would augment their experience and connect them to existing transport systems, because you need both. And as for the latter, high-speed rails are designed to be low or no emission. One thing we're mindful of is that the high-speed rail will not become an expensive commuter rail system. Rather, frequent stops between train stations could be accommodated by our existing rail systems, and the high-speed rail would focus on connecting a few carefully chosen

new train stations that benefit both commuters and local communities. This is about maximizing utility of the systems we already have and eking out more value for riders."

The importance of vertical integration is also being factored into the team's thinking. In the same way that the high-speed rails are more than just a railway or mode of travel, the same would be true for the newly purpose-built train stations en route. The intent is for these stations to be "vertically integrated" to create and provide a sense of place, offering locals and visiting commuters a full range of commercial and residential spaces, shops and restaurants. This will give a boost to local economies while meeting the needs and preferences of local communities and visitors alike.

"This is all about capturing value seamlessly and raising the bar from a simple train station to a hub of commercial space, residential housing, community center and so on. Land use is also a key focus, in addition to providing more transport options. We are doing the opposite of taking a silo mentality approach. We're looking at the entire Corridor and seeing how land use and transportation enhancements can be integrated for good. We know passengers won't just magically appear at stations. We need to think carefully about the convenience those station hubs will provide, as seamless connectors to other transport systems, to improve Corridor connectivity, and better manage growth," says Jason.

Canadian landscape. (Image: Getty Images)

NEXT STOP ... EARLY COMMUNITY ENGAGEMENT

To better understand the range of benefits, we spoke about the stakeholders for this potential 300 plus-mile-long high-speed rail network and the “need to do this with them rather than to them.” Stakeholders include the citizens in three cities at the heart of the intended route: Vancouver, Seattle and Portland – and include every village, town, community and farm in between.

“From an economic perspective, these three major cities with their tech and biotech sectors, professional service industries and academic institutions are far apart. Despite the physical distance between them, high-speed

transportation could bring them closer than ever before. Travel time savings with high-speeds can shorten the travel time between Seattle to Vancouver or Seattle to Portland to an hour or less. Jason states, “This transformative change is inspiring our commitment to explore all possibilities of making this happen.”

As well as navigating the *Infrastructure Investment and Jobs Act* funding application process through the Federal Railroad Federation in the short term, Jason and the team are focused on learning from previous community benefit agreements to inform an optimal approach in the coming years. This is partly inspired by the bill’s Justice40 requirements (see bottom right box on page 11), and because it’s the right thing to do.

“Our focus is on actively seeking and listening to local and regional communities to understand their unique needs, and then using these insights to shape any plans, project designs, decisions and short- and mid-term priorities. This is also true for tribal and indigenous communities. We want to make sure we’re engaging all communities earlier rather than later. We can learn from the past to inform a better future,” explains Jason.

The team is currently developing a strategic plan to engage with various communities, ranging from downtown Seattle to lakeside tech businesses, rural farmers, tribal, indigenous, overburdened and disadvantaged communities; and more.

The initial focus will be on early education, awareness building and meaningful two-way communication.

In the meantime, the decision to advance the project beyond the planning stage is likely to happen in about three years’ time based on public, financial and political support. Along the way, as can be seen from some of the key project milestones undertaken to date, the project team is focused on working with the three jurisdiction partners to secure funding for the research, planning, engagement and collaboration required in order to make a decision to proceed with this large capital investment.



Cascadia team from left to right: Adam Leuin (WSDOT), Steve Hamilton (Deloitte U.S.), Jason Beloso (WSDOT), Mark Hodgson (Deloitte Canada), Nicole Wang (Deloitte Canada) and Rob Cary (Deloitte U.S.). (Image: Roby Cary, Deloitte)

CASCADIA: A STEADY JOURNEY TOWARDS THE POSSIBILITY OF A FAST SOLUTION

Reflecting on when discussions for this possible mega project first began, Jason says initial scoping started in about 2016, with the first feasibility study commissioned in July 2017. The broader project team has been working together ever since, bringing together the Washington State Department of Transportation, British Columbia’s provincial government and the Oregon State Department of Transportation. Regular fortnightly meetings of technical specialists and quarterly executive-level, policy-oriented meetings across these three jurisdictions have resulted in “good synergy and kept us on track,” says Jason.

Connecting the three cities and their neighboring suburbs and communities better continues to be at the heart of the Cascadia rail project – resulting in continued political commitment, a number of investments in early-stage feasibility studies, comprehensive case studies and annual conferences to build gradual, informed momentum.

2016
Momentum gains, with Washington State and British Columbia signing an agreement to create the Cascadia Innovation Corridor. The Washington State legislature directs WSDOT to study feasibility.

July-Dec 2017
Preliminary feasibility study involved analysis of technology options, and route options, preliminary financing and funding models, and recommended conducting a more detailed business case to examine ridership projections, governance, funding and financing.

Mar 2018
Detailed business case analysis is commissioned by Washington State, to be conducted by WSDOT.

July 2018
Political leaders lobby for additional investment, with Washington Governor Jay Inslee traveling to Vancouver to meet British Columbia Premier John Horgan. The two leaders agree on additional funding requirements, resulting in investments from the B.C. provincial government, Washington State, Oregon’s Department of Transportation and Microsoft.

Jan 2019
Washington State legislature passed a bill approving a study of the possible creation of a high-speed rail authority in Washington State (subject to additional funding, which was again secured from the four sources).

Oct 2018
Cascadia Innovation Corridor Conference, a Microsoft co-sponsored, initiative to encourage cross-border business investment and collaboration, met for the third time. Updates on the high-speed rail business case analysis were tabled and discussed.

July 2019
Business case analysis completed, confirming an ultra-high speed rail system could be constructed within the 2017 estimate of USD 24 to USD 42 billion if construction were to start by 2027.

Nov 2021
Memorandum of Understanding commits to advancing Cascadia high-speed rail and establishing a policy committee to guide the work, signed by Washington Governor Jay Inslee, Oregon Governor Kate Brown and British Columbia Premier John Horgan.

Dec 2020
Framework for the Future completed to chart a potential path forward for governance, strategic engagement, funding and financing to advance the project.

Mar 2022
The Washington State legislature appropriates funding, including USD 4 million during the 2022 Washington State legislative, to continue development of an ultra-high speed ground transportation Corridor. Additionally, USD 150 million was committed as matching funds for any future federal funding of the project.

Sept 2022
British Columbia confirms support, committing a CAD 300,000 investment in the next phase of Cascadia ultra-high speed rail.

Apr 2023
Federal funding applications submitted by WSDOT to the U.S. Department of Transportation’s Federal Railroad Administration for USD 197 million and USD 5 million.

NO ONE SAID THIS WAS EASY

“It’s interesting,” says Jason, “while many have voiced concerns regarding how to fund and finance the project, I’ve also heard from those who administer and manage large infrastructure investments that the real challenge will be one of governance – I think they’re right. There are many decisions to be made across many levels of government – this is multiplied by a factor of three for this project.

“Also, we need buy-in from a number of key stakeholders, jurisdictional partners, communities, and large and small employers ... we need to communicate transparently at all times and use decision making frameworks that provide accountability and reassure everyone that we’ve conducted a comprehensive analysis

to understand the full impact of how the high-speed rail will benefit the entire Cascadia Corridor.”

Jason recognizes that mega projects are complex and hard to adjust once set in motion. “That’s why we take such a deliberate long-term approach, weighing up all the pros and cons, to minimize any unexpected surprises and delays down the line. It comes down to having our eyes wide open, accounting for the details and ultimately protecting future generations and this very special part of North America. I am so proud to be working with experts from Deloitte U.S. and Deloitte Canada as our advisors throughout this process. It has been really rewarding for me personally.

“There is no manual, no blueprint ... we’re faced with connecting two

states, two countries ... this has never been done before in our part of the world and we’re writing the blueprint as we go. It certainly keeps me on the edge of my seat, and I’m loving it. Imagine if we could enhance people’s lives by giving them something we all seem to run short of these days – time – plus a new mode of transportation and more travel choices, speeding up connectivity across the corridor, ensuring global economic competitiveness for the region and leaving a positive and lasting legacy for those that call Cascadia home,” says Jason.

Contact Steve Hamilton
 ✉ shamilton@deloitte.com

THE JUSTICE40 INITIATIVE

Under the Biden-Harris administration, the U.S. federal government made it a goal that 40 percent of the overall benefits of certain federal investments flow to disadvantaged communities that are marginalized, underserved, and overburdened by pollution.

This pertains to a number of investment categories, including clean transit. The initiative will help confront decades of underinvestment in disadvantaged communities, and bring critical resources to communities that have been overburdened by legacy pollution and environmental hazards.

Your guide to architecting Giga Projects

WE EXPLORE WHAT IT TAKES TO MAKE SURE GIGA PROJECTS SUCCEED

GIGA PROJECTS: DELIVERING THE FUTURE

Giga Projects are infrastructure or capital project investments of such scale and ambition that they can be considered “once-in-a-lifetime” for what they deliver to the world, and for the way they deliver it. They typically consist of a number of mega projects, which in themselves are comprised of portfolios, programs and projects as part of a set of interdependent systems.

Marc O’Connor, Global Capital Projects Leader, Deloitte UK, says, “Complexities aside, Giga Projects

have a guiding vision which, if successfully delivered, will have a fundamental and transformative impact on entire societies and the ways we live and work.”

THE SIZE OF THE OPPORTUNITY

Giga Projects have the potential to be immensely impactful in both delivery and long-term legacy. In delivery, they can inspire discovery and innovation, as new solutions are developed to respond to major challenges we face. Furthermore, their long-term legacy can create meaningful change for countries, economies and social systems.

A HOLISTIC APPROACH

Without a doubt, Giga Projects are complex and require discipline and focus to succeed.

Dr Harvey Maylor, Associate Professor, Saïd Business School, explains, “The sheer number of interfaces that need to be managed and integrated present significant challenges for leaders, especially in the way they build their delivery ecosystems. To ensure the delivered outcomes realize the original intent of the project, it’s important that leaders remain focused and aligned with their vision at all times.”

Taking a holistic approach is fundamental to achieving the transformative vision of a Giga Project. The approach is an ongoing and iterative process comprising three elements:

- **Breaking down the vision** into component parts in a series of phases, with delivery models designed for the activities within those phases
- **Integrating the individual components** into a ‘Holistic Delivery Ecosystem’, closely managing the interfaces across all organizational layers and the external environment
- **Holistically evaluating delivery outcomes**, ensuring the combined actual outcomes realize the original intent and vision of the project.

“The future of Giga Project delivery is uncertain. Leaders will need to design their delivery ecosystems with dynamic capabilities that can evolve and respond effectively to challenges. They should consider the vision, desired outcomes, and external environment, and set up their organizations with the right people, at the right time, in the right way,” says Marc.

Considerations for leaders

After securing the foundation of a Giga Project, leaders should consider three key enablers for a successful delivery in their delivery ecosystems:

1. THE RIGHT BENEFITS - ENSURING OUTCOMES MAXIMISE THE LONG-TERM LEGACY.

Investments should deliver whole-life benefits that go beyond financial outcomes, and include social wellbeing and environmental sustainability. If Giga Projects are to provide maximum benefits to society, they need to be guided by a clear vision focused on the long-term legacy rather than short-term project outputs or outcome performance measures.

2. THE RIGHT EXTERNAL ENVIRONMENT - INFLUENCING EXTERNAL SYSTEMS TO ENABLE SUCCESSFUL DELIVERY.

The right external environment needs to be created to enable Giga Projects to deliver the desired long-term legacy and whole-life benefits. The external environment is made up of five key systems: institutions and legal, economic, social, environmental and supply chain.

3. THE RIGHT CAPABILITIES - BUILDING ORGANIZATIONAL CAPABILITY TO FULFIL ACCOUNTABILITIES AND MEET OBLIGATIONS.

Leaders need to focus on building mission-led, integrated and collaborative project teams with dynamic capabilities who can evolve and respond effectively to challenges and changing conditions.

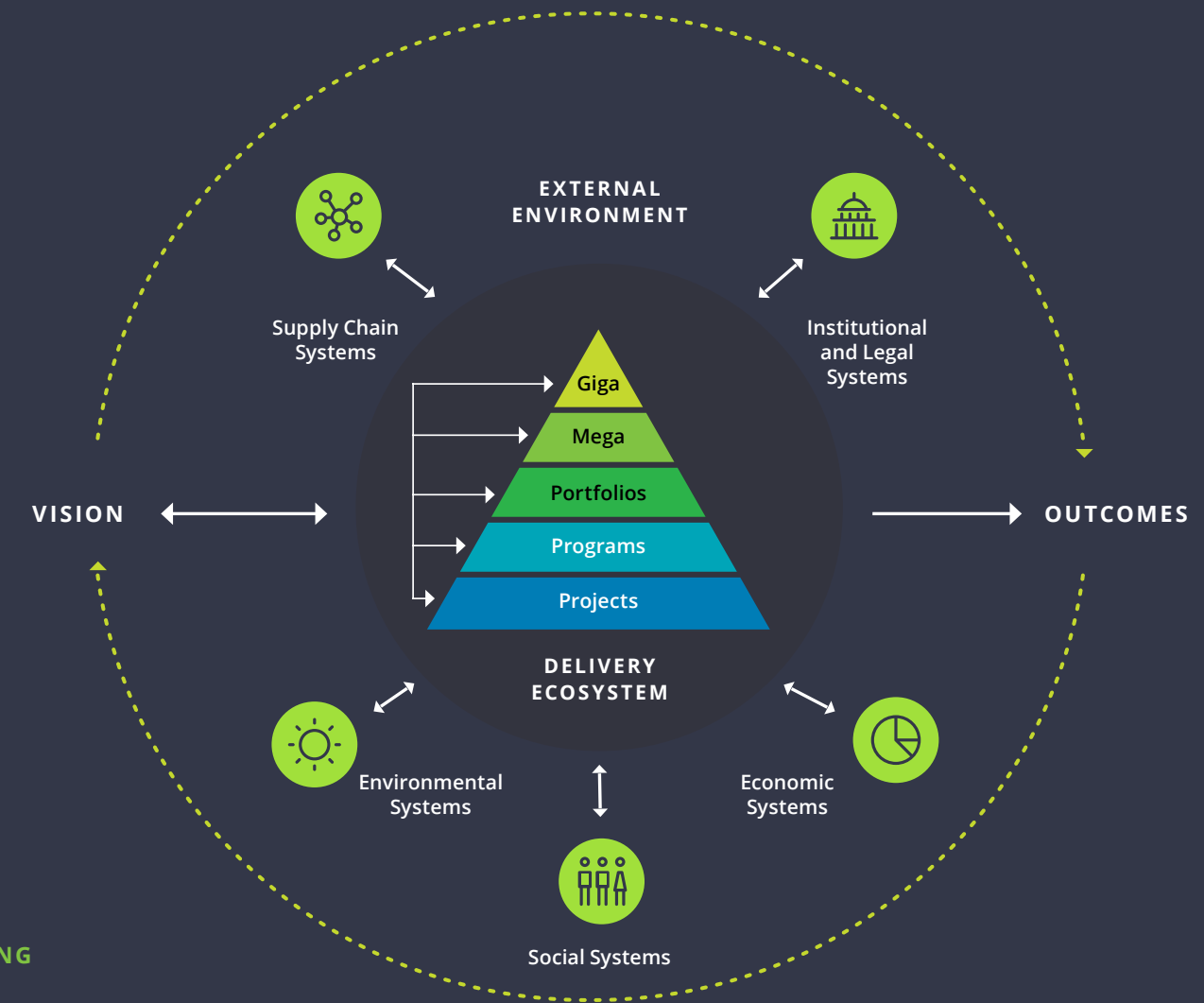


Diagram: The delivery ecosystem of Giga Projects

DELOITTE’S NEXTGEN DELIVERY FRAMEWORK

Deloitte is passionate about making the world a better place to live and work for all people. For that to happen, it’s essential that Giga Projects achieve their bold ambitions.

In that context, Marc is proud of the delivery framework that has been designed by Deloitte, which is helping clients navigate and manage

the major changes that come with Giga Projects. He says, “Deloitte’s Program Aerodynamics® is a next-generation delivery framework designed to create the conditions for success for the world’s largest complex programs. It brings together mindsets, expertise, and solutions to better anticipate, shape, and manage change in major programs.”

Marc concludes, “No matter where you are on your Giga Project journey, we would love to hear from you and share our latest thought leadership, perspectives and insights we have gained from working on Giga Projects.”

Contact Marc O’Connor
✉ maconnor@deloitte.co.uk



READ ARCHITECTING GIGA PROJECTS, 2023 BY DELOITTE

Top 10 most sustainable buildings in the world

COOL BUILDINGS THAT ARE REDUCING OUR CARBON FOOTPRINT

IN 2021, THE UNITED NATIONS ENVIRONMENT PROGRAM RELEASED A REPORT STATING THAT BUILDINGS AND THE CONSTRUCTION SECTOR ACCOUNTED FOR AROUND 37 PERCENT OF ENERGY AND PROCESS RELATED CO2 EMISSIONS AND MORE THAN 34 PERCENT OF ENERGY DEMAND GLOBALLY. WE WERE INSPIRED BY *SUSTAINABILITY MAGAZINE* TO EXPLORE SOME OF THE WORLD'S MOST SUSTAINABLE BUILDINGS.

1 SHANGHAI TOWER SHANGHAI, CHINA

A showcase of 21st century engineering, this incredible skyscraper (pictured) includes several sustainable design elements that make it green, as well as striking.

The building is designed to maximize energy efficiency through its double layer glass façade. Acting like a thermos, it provides both insulation and temperature regulation. It also has a rainwater collection system that is used to flush toilets and irrigate green spaces, reducing the demand on potable water.

The Shanghai Tower has multiple green roofs that provide insulation and reduce the "heat island effect" – a common occurrence in metropolitan areas that experience higher temperatures than the rural areas surrounding them. This optimizes energy consumption, lighting and temperature control in real time.

3 MUSEUM OF TOMORROW RIO DE JANEIRO, BRAZIL

Brazil's Museum of Tomorrow is one of the world's most remarkable examples of sustainable engineering. It incorporates solar panels with futuristic design and a cooling system that uses the air from the nearby harbor to control temperature.

All construction materials were chosen to meet strict sustainability and low environmental impact criteria. Even the exhibitions are digital, rather than permanent, and are used to inform visitors about the significance of the natural world.

2 THE CRYSTAL LONDON, UK

One of the most sustainable buildings on the planet, this events venue incorporates a public exhibition space that showcases how innovative technologies improve citizens' lives today and will transform the way we live and work tomorrow.

The building is fully electric and operates completely free of fossil fuels, using solar power and ground source heat pumps to generate its own energy. Any surplus energy generated can be used to charge electric vehicles at the onsite charging stations. It also uses a low energy, intelligent mixed-mode ventilation strategy, reducing the need for air conditioning.

Rainwater is harvested and treated for use as drinking water, and 90 percent of the water used in the building is recycled and reused. Carefully chosen drought-tolerant plants further reduce the amount of water required for their upkeep and smart irrigation detects moisture levels in the soil to minimize water consumption.

4 PIXEL BUILDING MELBOURNE, AUSTRALIA

Australia's first carbon neutral office building, the Pixel Building was given the highest award rating from the Green Building Council of Australia.

On its western and northern sides the structure is wrapped by brightly colored zero-waste recycled panels, giving the building a unique identity while maximizing daylight and shade for employees. Pixel generates its energy and water supply through sustainable methods, including onsite wind turbines and an extensive green roof and water storage system.

To reduce concrete-related emissions, a new concrete named Pixelcrete was developed which uses 60 percent less cement and contains 100 percent recycled and reclaimed aggregate, making it as strong as traditional concrete.

5 ONE CENTRAL PARK SYDNEY, AUSTRALIA

This iconic building is known for its environmentally conscious design, construction and green features.

The mixed-use, dual high-rise building includes two large vertical gardens that help to cool the building, improve air quality and provide a habitat for local wildlife. The complex is powered by renewable energy sources, including solar panels and wind turbines, and has a highly efficient heating, ventilation and air conditioning system. It also features a number of water saving technologies, including rainwater harvesting and using recycled water for irrigation and sanitation.

The precinct incorporates green roofs that help to reduce heat absorption and provide insulation, in addition to providing space for gardening and recreation.

7 SUZLON ONE EARTH PUNE, INDIA

The greenest office in India, this building has set the standard in terms of energy efficiency, water recycling and harvesting, and waste management systems for developing countries. By implementing these sustainable practices, it has reduced its costs by 35 percent.

LED lighting systems and solar water heating reduce energy consumption. All rainwater is harvested and used water is recycled into landscaping and air-cooling systems. The corporate campus is divided into five interconnected, individual buildings. This design provides 90 percent of the 1,500 employees with external views and daylight.

9 SEAT'S MARTORELL PLANT BARCELONA, SPAIN

The Martorell production facility, 30 km outside of Barcelona, is one of the most modern facilities of its kind. Its 53,000 solar panels reduce CO2 emissions by 7,000 metric tons and generate 17 million kWh annually – equal to a quarter of the amount of energy required per year to manufacture the SEAT Leon, a hatchback compact car.

The company has reduced air pollution by 40 percent by installing a photocatalytic walkway that triggers a chemical reaction when it encounters pollutants to dissipate fumes. The plant also features green spaces and parks and its own forest containing 80 trees of different native species, providing a habitat for local wildlife while improving air quality.

6 PHIPPS' CENTER FOR SUSTAINABLE LANDSCAPES PITTSBURGH, PA, U.S.

The Pennsylvania education research and administration facility has achieved the notable accolade of being the world's first and only building to meet seven of the highest green certifications. A net zero energy and net zero water facility, it showcases innovative and sustainable design practices in its structure and grounds. These methods include rainwater harvesting, green roofs, energy efficient systems and the use of native plants in landscaping.

The center also offers educational programs to promote sustainable practices and raise awareness about the importance of environmental stewardship.

8 SUN-MOON MANSION SOLAR VALLEY, CHINA

Located in Dezhou, a place that China refers to as "the biggest solar energy production base" in the world, the mansion was designed by architect Huang Ming. It is one of the world's largest solar-powered structures and office buildings, with its fan-shaped roof accommodating more than 5,000 solar panels, boosting energy-saving efficiency up to 88 percent.

The building's windows are inspired by the night sky, shaded with shutters and form part of a smart sun shading system which further reduces power demand for cooling and heating.

10 MARCO POLO TOWER HAMBURG, GERMANY

This 55-meter-high luxury residential apartment building, designed by architectural practice Behnisch Architekten, is located on the banks of the Elbe River and is one of Hamburg's most impressive structures. Each tower floor is turned a few degrees around a central axis, affording all 58 apartments spectacular views.

Sustainable features include a heat exchanger on the roof that converts warm air into a cooling system for the apartments and the recessed façades are protected from direct sun by the overhanging terraces above, so that air conditioning isn't required.

Since its construction in 2009, the Marco Polo Tower has won multiple architectural awards, including first prize at the Cannes MIPIM Awards, 2010 as the world-best housing project in the "Residential Developments" category.



Shanghai Tower rising out of the clouds. (Image: Getty Images)

Waratah Super Battery accelerates transition to renewable energy

THE SOUTHERN HEMISPHERE'S LARGEST COMMITTED NETWORK BATTERY WILL HELP SECURE A CLEAN ENERGY FUTURE FOR THE AUSTRALIAN STATE OF NEW SOUTH WALES

AS THE WORLD'S LARGEST ISLAND AND SMALLEST CONTINENT, AUSTRALIA IS BOTH VAST AND SMALL, MADE UP OF SIX STATES AND TWO TERRITORIES.

With a population of just over 8 million citizens, New South Wales (NSW) is both the oldest and most populated state situated along the country's East coast. The Australian Bureau of Statistics estimates that its residents live in about 3,500,000 dwellings – with an average household size of 2.57 people. Each of these homes – not to mention thousands of local businesses – rely on electricity to thrive. The state is currently rolling out a rapid energy transition, supported in part by innovative approaches to energy storage like the Waratah Super Battery.

ENERGY FOR GOOD: CLEANER AND GREENER

Five coal plants currently provide around three-quarters of the NSW electricity supply, and four of these are expected to retire by the mid-2030s.

As the Infrastructure Planner for the state's first five Renewable Energy Zones (REZs), the Energy Corporation of NSW (EnergyCo) is working to coordinate the transition of the NSW electricity system and leads the strategic planning of the key transmission infrastructure needed to deliver clean, reliable, and affordable energy to the households and businesses of NSW.

Daniel Westerman, CEO, Australian Energy Market Operator, recently said, "We know that we are likely to see 60 percent of today's coal generation gone by the end of the decade ... [we] need to accelerate Australia's transition to the cheapest form of reliable electricity. And that is firmed renewable energy, connected to Australian homes and businesses through efficiently delivered transmission."

Sandra James, National Lead Partner, Power, Utilities and Renewables, Deloitte Australia said, "Deloitte is engaged with governments, regulatory bodies, and other industry organizations around Australia to help them realize their goals for a clean, equitable, and reliable energy system that meets the needs of all energy consumers."

"The REZ concept and approach that NSW is deploying could be a model for the rest of the world, and Deloitte is proud to be working with our clients like NSW EnergyCo to pave the way for the energy transition. The Waratah Super Battery project is a great example of an innovative way that energy systems can integrate large-scale battery storage to support this transition."



The new Waratah Super Battery will be capable of discharging up to 850MW/1680 MWh. (Image: Powin)

THE POWER OF A NEW BATTERY

Following a highly competitive procurement process that attracted international attention, EnergyCo announced in October 2022 that Akaysha Energy had been chosen to develop a new large-scale Battery Energy Storage System (BESS), the Waratah Super Battery, on the site of the former Munmorah coal-fired power station on the Central Coast of NSW.

This is the largest committed BESS in the Southern Hemisphere and, once built, is expected to be the most powerful BESS in the world – with a nameplate capacity of 850 megawatts (MW)/1680 megawatt-hours (MWh).

The Waratah Super Battery will operate primarily as a standby network asset as part of a System Integrity Protection Scheme (SIPS). Simply put, the Waratah Super Battery

will be designed to function as a "shock absorber" for the electricity grid in the event of any sudden power surges, including from bush fires or lightning strikes.

By supplying additional "on demand" capacity, the SIPS provides a virtual transmission solution that will unlock latent capacity in the existing transmission network, allowing electricity consumers in the Sydney, Newcastle and Wollongong demand centers to access more energy from existing generators.

As well as providing affordable, reliable and clean electricity for homes and businesses across the state, the project is expected to drive up to AUD 1 billion in private investment in new transmission infrastructure, generating over 100 jobs in the Hunter and Central Coast regions.

FROM IDEA TO REALITY

Months of comprehensive planning, scoping and extensive collaboration were essential to turn the Waratah Super Battery concept into a realistic infrastructure solution that would deliver the best value for money for NSW electricity consumers. Deloitte's role was to prepare a revenue proposal on behalf of EnergyCo for submission to the Australian Energy Regulator (AER) to ensure that it approved funding for the SIPS service, provided by Akaysha's BESS, via its regulatory determination. This is the first determination made by the AER under the regulatory framework for transmission infrastructure projects in New South Wales, which was

newly established as a result of the progressive *Electricity Infrastructure Investment (EI) Act 2020*.

Syvilla Boon, Director, Deloitte Australia, explains, "This is a new approach to energy regulation in Australia. The NSW Government is introducing competitive procurement mechanisms to help deliver value for consumers. The AER determined that the competitive procurement process undertaken by EnergyCo to select a suitable SIPS service provider was genuine and appropriate and could therefore adopt the outcomes of the process. Further details of the Waratah Super Battery project costs and benefits to NSW consumers will be published by the AER in 2023."

GOOD FOR THE STATE AND FOR LOCAL CITIZENS

James Codd, Deputy Project Director, Waratah Super Battery, EnergyCo NSW, talks about how Deloitte helped make an impact that matters. "Deloitte collaborated with us and all the relevant parties to deliver a positive outcome in what was a complex process. We value the collaborative approach to achieve the objectives of the NSW Government's *Electricity Infrastructure Roadmap*," says James.

Sandra concludes, "The Waratah Super Battery is truly progressive on a global scale and signals a new era – not only for the energy market, but also for energy regulation."

"We're excited to be working with the NSW Government and the AER in ensuring we continue to deliver positive outcomes for customers and certainty for industry and investors."

Construction of the Waratah Super Battery is expected to begin in early 2023 and be completed by mid-2025, in advance of Eraring Power Station's earliest potential closure date.

Contact Sandra James
✉ sanjames@deloitte.com.au

Contact Syvilla Boon
✉ syboon@deloitte.com.au



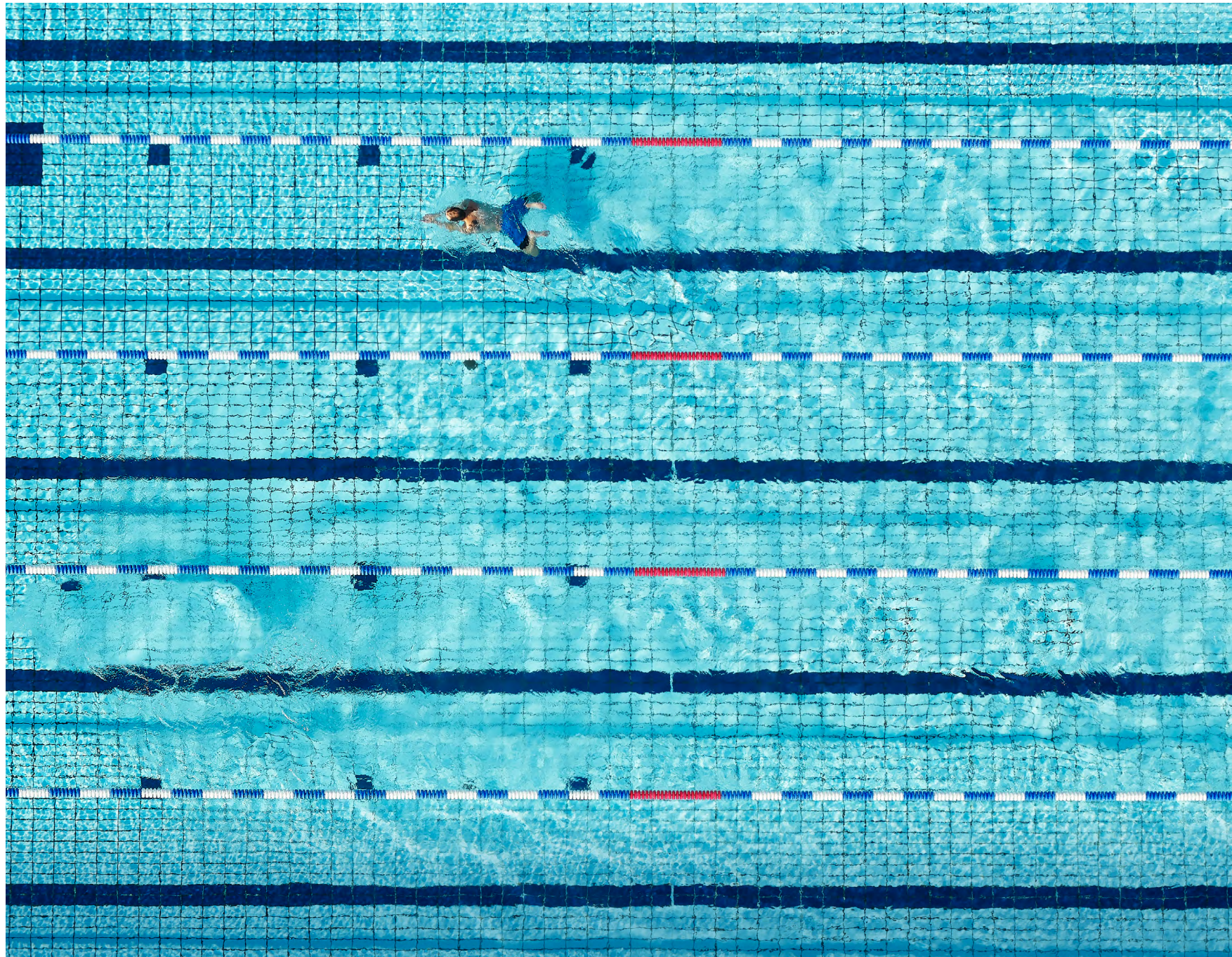
Taking care of consumers

The Australian Energy Regulator exists to ensure energy consumers are better off, now and in the future. Consumers are at the heart of its work, and the regulator's focus is on ensuring a secure, reliable and affordable energy future for Australia.

Wind Farm, Myrtle, NSW, Australia. (Image: Getty Images)

Better or newer?

THINKING OUTSIDE THE BOX TO TRULY BENEFIT THE LOCAL COMMUNITY AND ECONOMY



Swimmer enjoying a public pool. (Image: Getty Images)

WHEN INDUSTRY LEADERS ON BOTH THE PUBLIC AND PRIVATE SECTOR SIDES OF THE FENCE THINK CREATIVELY ABOUT INDIVIDUAL INFRASTRUCTURE ASSETS AND THEIR ORIGINAL INTENT, THAT'S WHEN THE MAGIC HAPPENS. ESPECIALLY WHEN IT COMES TO EXISTING INFRASTRUCTURE, OR NEW ASSETS AT THE PLANNING STAGE.

We speak to **Jason Wozniak**, Partner, Infrastructure and Capital Projects in Deloitte Australia, to find out more.

Community expectations are evolving and putting pressure on infrastructure. For example, citizens want more choices and better access to recreation and leisure facilities, education and child care solutions. This increase in demand is also putting more pressure on government budgets in an economic context – where businesses and consumers are already struggling with rising interest rates and the impacts of inflation.

Interestingly, *Infrastructure Australia's March 2022 Factsheet* states current

planning and delivery processes typically focus on delivering results for discrete, sector-specific assets, rather than on outcomes or multifaceted benefits. Unsurprisingly, as a result of this focus on specific department or agency challenges, we miss the opportunity to take a broader perspective when making specific infrastructure investments – and potentially miss the community benefits from taking a broader view.

TIGHT BUDGETS ARE DRIVING A SIOLED MENTALITY

Infrastructure assets are typically costly, long-term investments. And many state and local governments responsible for delivering them are

facing tight budgets and finding it tough to deliver all the infrastructure they would like. Bridging this gap is a complex interdisciplinary challenge that requires creativity and innovation in the planning, funding, financing, construction and operations of infrastructure assets.

Globally, most governments have tried alternative forms of procurement, including public-private partnerships (PPPs) or other arrangements to introduce innovation and creativity into solving these complex problems. However, the problem remains that departments and agencies are most focused on solving their own issues and are not looking over the fence.

A closer look at local government swimming pools

MANY ASSETS ARE REACHING THE END OF THEIR USEFUL LIFE AND REQUIRE ADDITIONAL INVESTMENT TO MAKE THEM FIT FOR FUTURE PURPOSES.

Take Australia's local, government-owned aquatic facilities which are an essential service for communities and regularly offer activities to over 5 million Australians. *The State of Aquatic Facility Infrastructure in Australia – Rebuilding our Aging Public Swimming Pools* report by Royal Life Saving Australia found that 40 percent of existing public pools – about 500 pools – are likely to need

serious refurbishment or outright replacement at a cost of more than AUD 8 billion. Local governments are the primary funder of aquatic facilities and are currently under extraordinary budgetary pressure.

Here is an opportunity to re-examine the role these facilities play in their communities, and look for other outcomes that can be achieved. This may assist in how aquatic facilities are funded and maintained across all layers of government, and ensure equitable and universal access to community pools across Australia.

ROYAL LIFE SAVING REPORT FINDINGS

THE STATE OF AQUATIC FACILITY INFRASTRUCTURE IN AUSTRALIA – REBUILDING OUR AGING PUBLIC SWIMMING POOLS

The average life expectancy of a pool is

50 years



of public pools will reach the end of their functional lifespan by 2030



The average Australian public pool was built in

1968

AUD 8 BILLION

is needed to **replace** those

500 aging public pools



By **2035**

A further **AUD 3 BILLION**

will be needed to

REPLACE FACILITIES

at the end of their lifespan

A BROADER VIEW WILL DRIVE LONG-TERM BENEFITS

To get the best of any investment, or redevelopment of an existing asset, we should take a broader view across the entire community, and recognize that needs may have changed since the initial project. For this to be feasible, we need a broader cross-section of the community represented in early discussions, and a mechanism for cross-agency contributions to infrastructure development or re-purposing.

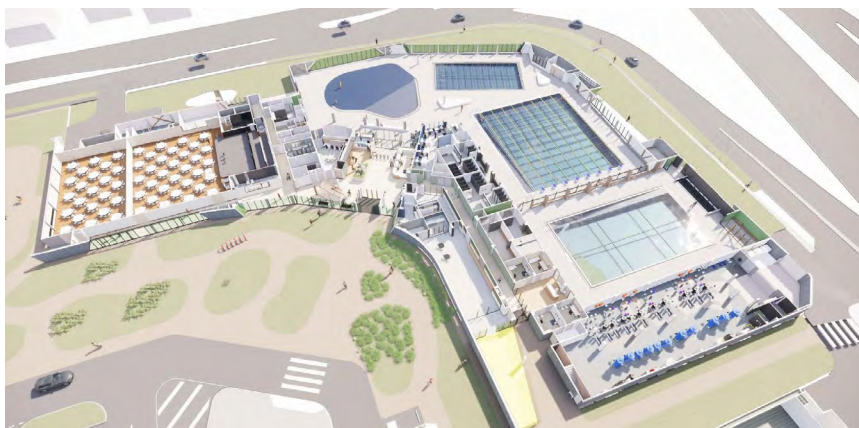
We must ask ourselves: What else can infrastructure enable for the good of the community?

A school is a perfect example. They're usually located in the very hearts of our communities, but heavily underutilized outside of core school operating hours which puts more strain on local council facilities. The possibilities are endless. Imagine a world where 14-year-old school buddies Sarah and Ben attend school during the day, like the many generations before them. After school hours, rather than closing its doors, their school stays open and their parents attend adult foreign language classes. At the same time, Sarah and Ben go to sports training at their own school's facilities – something they never thought possible – while they wait for their parents. Sarah's other

friend Emma is studying at the on-site community library, while Emma's carer talks to a council representative at the Business Hub. The list could go on, but this gives an idea of the new way of interacting with existing infrastructure assets.

In Australia, aquatic facilities have been largely underused outside of morning and afternoon peak hours. Or medical and rehab facilities, conference centers, community meeting places: all of which have already had a significant investment in their base development costs (land, car parking, site infrastructure, offices, etc.), so what are the incremental benefits? If we were to consider a broader definition of end-

users, we could identify opportunities that would unlock the potential of existing assets like these, and meet growing community needs.



New Northern Aquatic and Community Hub plan. (Image: GeelongAustralia.com.au)



Community representatives, Government officials and broader team members on site. (Image: Council magazine)

REPLACING AN OLD AQUATIC CENTER WITH A NEW COMMUNITY HUB

The City of Greater Geelong, in the Australian state of Victoria, has used the need to replace its loved but aging Waterworld Leisure Centre as an opportunity to create something bigger and better – a vibrant community hub which will become a destination for leisure, recreation, cultural and community wellbeing activities. It is intentionally going beyond the “traditional” aquatic center to address the significant needs of the local community.

Jason Wozniak explains, “All levels of government have recognized the need to support growth in this region by investing in residential developments and connectivity to Melbourne, and the new Northern Aquatic and Community Hub is an excellent example that benefits both the community and the local economy. It will provide traditional aquatic center services as well as rehabilitation facilities such as a hydrotherapy pool, plus broader community facilities including a hall,

multi-purpose rooms and library. It has been great to see how Deloitte’s business case has helped make sure this exciting development is becoming a reality.”

Encouragingly, the new facility is being funded in a partnership between the local council (AUD 48.84 million), the Victorian government (AUD 8.5 million) and the Australian government (AUD 8.26 million). In an important nod to the environment, the local council increased its contribution by AUD 4 million through its 2022-23 budget to convert the facility from gas to electricity, thus enabling it to be powered entirely by renewable energy.

Construction of the hub started in February 2022 and is expected to be completed in early 2024. The contractor is managing community expectations with monthly progress updates.

WHEN MAKING DECISIONS ABOUT INFRASTRUCTURE, WE ENCOURAGE YOU TO EXPLORE:



1. PUTTING COMMUNITY FIRST
What are the broader needs of the community, and do we understand them?



2. IDENTIFYING FURTHER BENEFITS
How do we benefit from leveraging the full range of potential users and improving their experience?



3. EXPLORING ADDITIONAL USES
How do we make an infrastructure solution ready for multi-use, better linking it to community needs?



4. TACKLING FUNDING CHALLENGES
Proactively address traditional funding allocation approaches that limit multi-service outcomes. Be innovative.



5. CHALLENGING TRADITIONAL THINKING:
Always remember that infrastructure decisions have long-term outcomes for the local community. Each investment is an opportunity, so it’s worth the effort.

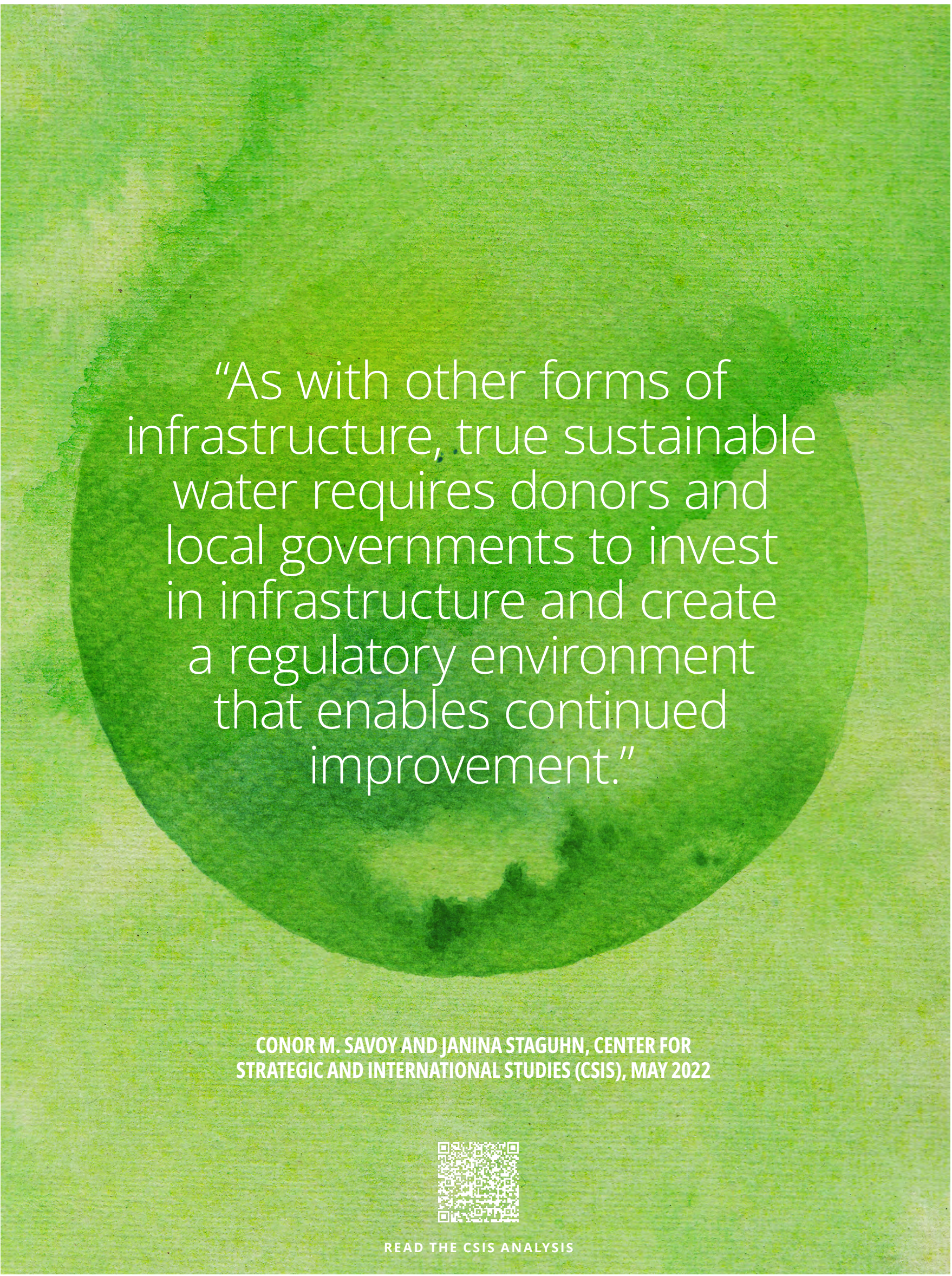
Contact Jason Wozniak
✉ jawozniak@deloitte.com.au

Thinking outside the box

FOOTNOTES:

Infrastructure Australia Factsheet March 2022: Infrastructure as a System – Delivering outcomes <https://www.infrastructureaustralia.gov.au/sites/default/files/2022-03/Factsheet%20%20-%20Infrastructure%20as%20a%20system.pdf>

Royal Life Saving Australia: The State of Aquatic Facility Infrastructure in Australia – Rebuilding our Aging Public Swimming Pools https://www.royallifesaving.com.au/_data/assets/pdf_file/0004/69385/RLS_AquaticInfrastructureReport2022.pdf



“As with other forms of infrastructure, true sustainable water requires donors and local governments to invest in infrastructure and create a regulatory environment that enables continued improvement.”

CONOR M. SAVOY AND JANINA STAGUHN, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES (CSIS), MAY 2022



READ THE CSIS ANALYSIS

Stakeholder engagement over management: the keys to success

THE ART OF EARLY, PLANNED AND ONGOING STAKEHOLDER ENGAGEMENT

SOCIETIES AROUND THE WORLD ARE FORCED TO DEAL WITH A RISING NUMBER OF MOMENTOUS CHANGES. URGENT AND LONG-TERM PROGRAMS SUCH AS CLIMATE ADAPTATION, DEVELOPING THE CIRCULAR ECONOMY AND THE ENERGY TRANSITION ARE HIGHLY DEMANDING FOR THE PUBLIC AND PRIVATE SECTORS AND, IN TURN, MAKE THE ASSOCIATED INFRASTRUCTURE PROJECTS INCREASINGLY COMPLEX AND EXTENSIVE. THERE'S LITTLE ROOM FOR FAILURE, COUPLED WITH HIGH EXPECTATIONS.

These concurrent major transitions set ambitious targets – and integrality is essential in meeting those targets. Simply “managing the process” doesn’t solve the issues. Located in Amsterdam, The Netherlands, local Deloitte colleagues **Jorien Douma**, Director, Responsible Infrastructure & Capital Projects, and **Frédérique**

Demenint, Partner, Team Resilience, Crisis & Reputation, argue that stakeholder engagement is critical to the success of infrastructural and major projects.

Frédérique says, “The Netherlands faces major challenges: chief among them the healthcare and energy

transition, the housing market and moving towards a more sustainable agriculture. Transitions are rapidly succeeding each other in an increasingly complex playing field.”

Jorien adds, “Strikingly, with stakeholders themselves now having the resources to put their issues on

the agenda, public commissioning parties or developers are no longer the parties setting the agenda and driving the process. In short, stakeholders are gaining greater influence; even a single individual without any formal power can have a huge impact on major projects whose costs run into the billions.”

STAKEHOLDERS AND TOOLING

Getting all actors in major projects to properly collaborate requires a structured, planned, long-term approach based on data and customized communication. Right now, data and technology are the big “blind spots” in this process, says Frédérique. “Although most program managers have a stakeholder map available that tells you how the key players relate to the objectives, it still leaves you in the dark about how those different groups interact, which themes and efforts actually produce results, and whether you are moving in the right direction. Deloitte has the technological know-how and tooling to not only map that very complex and dynamic field, but also to monitor the impact of what you are doing.”

When you know which efforts are effective and where to intervene when things start going wrong, that’s when you can act. Tooling and technology enable decision makers to map and understand an increasingly intricate stakeholder landscape more quickly and easily. It also means prioritizing stakeholders’ issues and interests, because “you can’t make everyone happy at the same time. This information allows you to create a more efficient approach, from communications, your storylines and nudges, to programs and process information,” says Frédérique.

SETTING OR FOLLOWING THE AGENDA

It’s also important to take care not to ignore the trend of large groups in the outside world determining the talking points for government, companies and NGOs.

Frédérique explains, “Waiting for them to set the agenda for you would already set you well back. Inviting everyone to join in to set the agenda and identify the obstacles early on is much smarter, more efficient and more valuable. Investing up front is also an insurance policy for when things threaten to go south during a project.”

“Many things can go wrong in major projects: materially or financially, or due to a poor time schedule or mismanagement. If that happens and you haven’t already secured the support of your stakeholders, you’re far too late,” advises Frédérique.

STAKEHOLDERS ARE ALWAYS STRATEGIC PRIORITIES

Stakeholder engagement must be strategic, firm and well-founded. “It should be one of the core issues of a management board, discussed at the tables where decisions are made. Assigning stakeholder engagement to someone with the appropriate mandate and decision-making powers, as well as tooling, increases the chances of a project’s success,” says Jorien.

That strategic priority is also an indication of a project’s long-term value. Projects don’t end when they are over. When a project is realized, new challenges appear on the horizon, so stakeholders still need to be supported. A key lesson is that the project team owns the long-term impact of all stakeholders and this realization proves the great importance of investing in all those relationships – a clear task for senior management.

Contact Frédérique Demenint
✉ fdemenint@deloitte.nl

Contact Jorien Douma
✉ jdouma@deloitte.nl



READ THE FULL DELOITTE ARTICLE

LOOKING AT THE ROLE OF STAKEHOLDERS REQUIRES A NEW LINE OF THOUGHT

Ideally, stakeholder engagement is about actively involving everyone who has an interest in, is affected by – or can influence – reaching the objectives of an infrastructural or major project. Accordingly, this means that stakeholder input is actually heard and applied. Rather than treating stakeholder engagement as a sideshow, it needs to be the strategic priority “even when stakeholder engagement is a critical prerequisite for the success of infrastructural and major projects. It’s not something to be done on the side, it’s the main task,” says Frédérique.

THE ART OF STAKEHOLDER ENGAGEMENT

To avoid project delays, cost overruns and a disconnect with stakeholders and their issues, it is important to plan and develop a coordinated understanding of direct and indirect stakeholders and their agendas before the program is initiated. If stakeholder engagement is done later in the process – or not at all – Frédérique says this leads to issues that delay the process, such as reduced support, an increase of legal procedures, rising project costs, pressure on the organization carrying out the process and loss of credibility for project initiators. To overcome this, “we need to make the stakeholder groups and their agendas a strategic priority and embed them in the approach,” says Frédérique.

GOOD EXAMPLES AROUND

Jorien mentions the North-South subway line. “For a long time things didn’t go well, until the project team adopted a completely new environmental approach and communication strategy. The first newspaper ad carried the headline: ‘Allow us to introduce ourselves.’ The project started putting people, instead of technology, center stage. It was one of the main reasons why the project started moving forward again, and eventually it became a success.”

The SAA (Schiphol Amsterdam Almere) project – Rijkswaterstaat’s biggest road project, including the largest aqueduct under the river Vecht – is another remarkable example. Two of the program’s five projects were completed on time, two even earlier than expected, while the last one is ongoing, Jorien attributes this success to the emphasis on action and interaction between people and organizations. “This is about building trust together and about adaptive capability.

“The Netherlands faces major challenges: the healthcare and energy transition, the housing market and moving towards a more sustainable agriculture chief among them. Transitions are rapidly succeeding each other in an increasingly complex playing field.”

Frédérique Demenint, Partner, Team Resilience, Crisis & Reputation, Deloitte Netherlands

A first-of-its-kind design studio brings students and the corporate world together

THE WORLD'S MOST ELITE CREATIVE UNIVERSITY UNITES WITH DELOITTE

IN JANUARY 2023 DELOITTE UNITED WITH THE SAVANNAH COLLEGE OF ART AND DESIGN (SCAD) IN GEORGIA, USA, TO ESTABLISH THE DELOITTE FOUNDRY AT SCAD — A PREEMINENT DESIGN, RESEARCH, AND INNOVATION STUDIO AT THE WORLD'S ELITE UNIVERSITY FOR CREATIVE PROFESSIONALS.

WE TALKED TO THE TEAM INVOLVED TO FIND OUT MORE.

This exciting new design studio didn't happen out of the blue – it was established after several years of successful collaboration, which originally began by chance.

This remarkable and unique relationship isn't just delighting Deloitte clients and our customers, but also providing a rewarding experience for university students and Deloitte professionals alike.

Gregory Voytilla, Jr., a senior manager at Deloitte Consulting based in Washington D.C., is a member of Deloitte Digital's Unlimited Reality and Video Experience teams. He uses design thinking to drive measurable results for government and public services clients and first learned about SCADpro at a career fair in 2019. SCADpro is the university's in-house research and design studio that provides hundreds of SCAD students with opportunities to create design solutions for some of the most complex issues facing public-sector organizations. Gregory immediately related to its human-centric approach to design, and also recognized that SCAD students could offer a "fresh perspective that adds to our professional services expertise," he says.

Since then, Deloitte and SCAD have partnered to complete 25 projects, and a full pipeline of opportunities is ready to be explored at scale at the newly established Deloitte Foundry.

The collaboration has also created a career pathway for students, with over 40 SCAD graduates already employed by Deloitte as UX designers, service designers, media creators, and more.

Gretchen Brainard, Principal at Deloitte U.S. and also based in Washington D.C., agrees. "We knew that bringing our organizations even closer together could yield meaningful impact for years to come.

"Considering our client needs and Deloitte's commitment to attracting and retaining diverse designers, engineers and technologists, we decided the time was right to expand our relationship with SCAD and strengthen the bonds between our two organizations. We are building on a great track record of changing people's everyday lives. For example – enhancing resources and support for military families, effectively delivering services to children and families in need, expanding affordable housing in communities across the country and improving long-term care for seniors," says Gretchen.

COLLABORATION IN ACTION

We work with SCADpro – the collaboration innovation studio at

SCAD – where current and future creative leaders generate new business concepts and solutions for the world's most influential brands. This means the university's esteemed faculty shares a particular client challenge and explains the assignment brief and desired outcomes to a team of students from an array of SCAD's top ranked degree programs. All students present their portfolios, are interviewed, and then selected by SCADpro leadership to take part in these quarterly assignments and receive university course credit.

The SCADpro student and faculty team then spend 10 weeks creating design solutions and strategies for the client challenge. During the course, students attend a kick-off event with the client leadership to learn details about the design challenge. Following the kick-off, students work together to create innovative strategies, then at the end of the 10-week course present their final solutions to the client leadership.

Deloitte has developed a wonderful relationship with SCAD, demonstrated by the number of students who request to work on the new SCADpro assignments each quarter knowing that many of the design challenges center around human service missions.

Gretchen explains that the collaboration does not just benefit Deloitte and its clients, the ongoing assignments are a major benefit for students too. "Business acumen is not fully baked in academia. We know students at other universities are not learning this first-hand industry experience like they are at SCAD and this has been a game changer. When students work on Deloitte projects it helps them become well-rounded consultants, able to hit the ground running when they graduate."

2023 PRIORITIES

The Deloitte Foundry will launch several new initiatives in 2023 to spur innovative research, design thinking and business solutions to benefit Deloitte clients and SCAD students, including:

1. Deloitte Rapid Implementation Studio where multidisciplinary teams of SCAD students and faculty will immerse themselves in real-world business challenges and develop ground-breaking, actionable solutions rooted in human-centered design

2. Digital Frontier Studio, which will focus on research, design, and implementation strategies around digital frontier topics such as immersive reality, the metaverse, artificial intelligence, blockchain, and more

3. Deloitte Concierge Recruiting Center, a dedicated, on-site resource to mentor and recruit high-performing SCAD students and alumni, establishing an innovative new model for attracting top creative talent.

Contact Gregory Voytilla, Jr.
✉ gvoytillajr@deloitte.com

Contact Gretchen Brainard
✉ gbrainard@deloitte.com



SCAD Deloitte Foundry campus. (Image: courtesy of SCAD)



SCAD is a private, non-profit, accredited university, offering more than 100 graduate and undergraduate degree programs across locations in Atlanta and Savannah, Georgia, Lacoste, France, and online via SCADnow. SCAD enrolls more than 16,000 undergraduate and graduate students from more than 120 countries. Its curriculum is future-minded and the university was ranked number one in the U.S. by Art & Object's 2023 Best Art Schools. For more information, visit scad.edu.

"Deloitte understands that SCAD graduates are the world's most inventive, creative talent – and that every organization in the world needs SCAD brilliance to stay competitive."

Paula Wallace, Founder and President, SCAD

"Companies come to us for unconstrained thinking, Gen Z mindset and fresh creative ideas – as well as to be able to break through some of the stagnant ideas they have."

Paul Stonick, Vice President, SCADpro

"Deloitte and SCAD have worked together to address some of the country's most challenging organizational and societal issues – including how to enhance resources and support for military families, how to effectively deliver critical services to families, how to tackle homelessness, and how to enhance long-term care for seniors. The Deloitte Foundry will take our relationship with SCAD to new heights and provide students with even more exciting career opportunities in the public sector."

Mike Canning, Principal, Deloitte U.S. Consulting

SCAD students. (Image: Courtesy of SCAD)

Mobilizing funding to improve national highways

HARNESSING BROWNFIELD ROAD ASSETS FOR GREENFIELD INVESTMENTS

ROADS AND HIGHWAYS ARE THE LIFELINE OF INDIA'S ECONOMY, CONNECTING RURAL AND REMOTE AREAS AND ENSURING EFFICIENT TRANSPORTATION ON BOTH A REGIONAL AND NATIONAL BASIS.

India has about 6,000,000 km of road network, the second longest in the world after the U.S. Although the national highways only constitute 2.3 percent of India's total road network, they carry about 40 percent of overall traffic – and about 60 percent of the

total goods traffic. Any improvements to these extensive national highways has a multiplier effect in terms of facilitating trade and enhancing the overall economic development of a region.



Cherrapunji, India. (Image: Getty Images)

NATIONAL HIGHWAYS AUTHORITY OF INDIA (NHAI)

The NHAI is an autonomous agency responsible for managing the majority of India's national highways network. The authority plays a vital role in the economic and infrastructural development of the nation and has established a foundation for sustainable growth for the future of roads and highways in the country.

Since 2014, the national highway network has grown by 55 percent. The pace of highway development has also increased significantly, with the average daily construction increasing by more than 2.5 times (from 13 km/day in 2009–14 to 33 km/day in 2020–22).

To maintain this pace of construction and avoid linking development plans with the availability of funds, the NHAI has to explore alternative financing options.

Kushal Kumar Singh, Partner, Deloitte India, has been working closely with the authority for the last decade. He says, "This year, the government of India has committed over USD 34 billion to develop its national highways. However, the government realizes the importance of exploring alternative and more innovative financing solutions to ensure that highways continue to be developed and maintained according to global standards."

The Indian government's National Infrastructure Pipeline (NIP) envisages USD 1.4 trillion of infrastructure spend from FY20 to FY25.

Approximately 18 percent is expected to be allocated to the roads and highways sector.

With the average annual spending envisaged in the NIP to be more than twice the government's historic levels of spending, the availability of adequate capital is one of the major prerequisites to set the NIP in motion. While it is estimated that 83-87 percent of the capital requirement can be met from traditional sources, the remaining 13-17 percent must rely on alternative methods, such as asset recycling.

The NHAI has pioneered the concept of asset recycling (AR) in India and has created three different types of AR to attract investment: TOT (Toll-Operate-Transfer) model, InvIT (Infrastructure Investment Trusts) model and Asset Backed Securitization (ABS)/SPV-based Off Balance Sheet Financing.

B.M. Rao, Chief General Manager Finance, NHAI, explains that the authority is keen on exploring different financing options and possibilities to ensure it can achieve the lofty objectives of the Indian government. He says, "Most highway development has been funded by the government, so we need to be more creative in finding suitable financing solutions."

The NHAI has already begun an AR program in order to generate more resources for construction of future highways. The program leverages existing infrastructure assets and uses the proceeds to fund the creation of new infrastructure. In its first five years, the NHAI's AR program has generated more than USD 8 billion for investment in India's roads sector. Kushal adds, "Deloitte is proud to have provided continuous strategic support to NHAI for its asset monetization program over the last five years. This has included the operationalization of the TOT program, and conceptualization and operationalization of NHAI InvIT."

InvITs AS AN INNOVATIVE ALTERNATE FINANCING MECHANISM

InvITs are akin to mutual funds, enabling direct investment of small amounts of money from individual and/or institutional investors in large infrastructure projects. The NHAI has set up an InvIT to monetize its completed and operational national highways projects, with the objective of raising additional funds through capital markets.

According to Kushal, "InvIT has become the preferred mode of asset recycling for NHAI, owing to its competitive returns and ease of monetization. It is no wonder NHAI is planning its third round of asset recycling through InvIT in such a short timeframe."

InvIT provides a diversified investment tool offering stable yields, consistent growth and a tax efficient structure for investors.

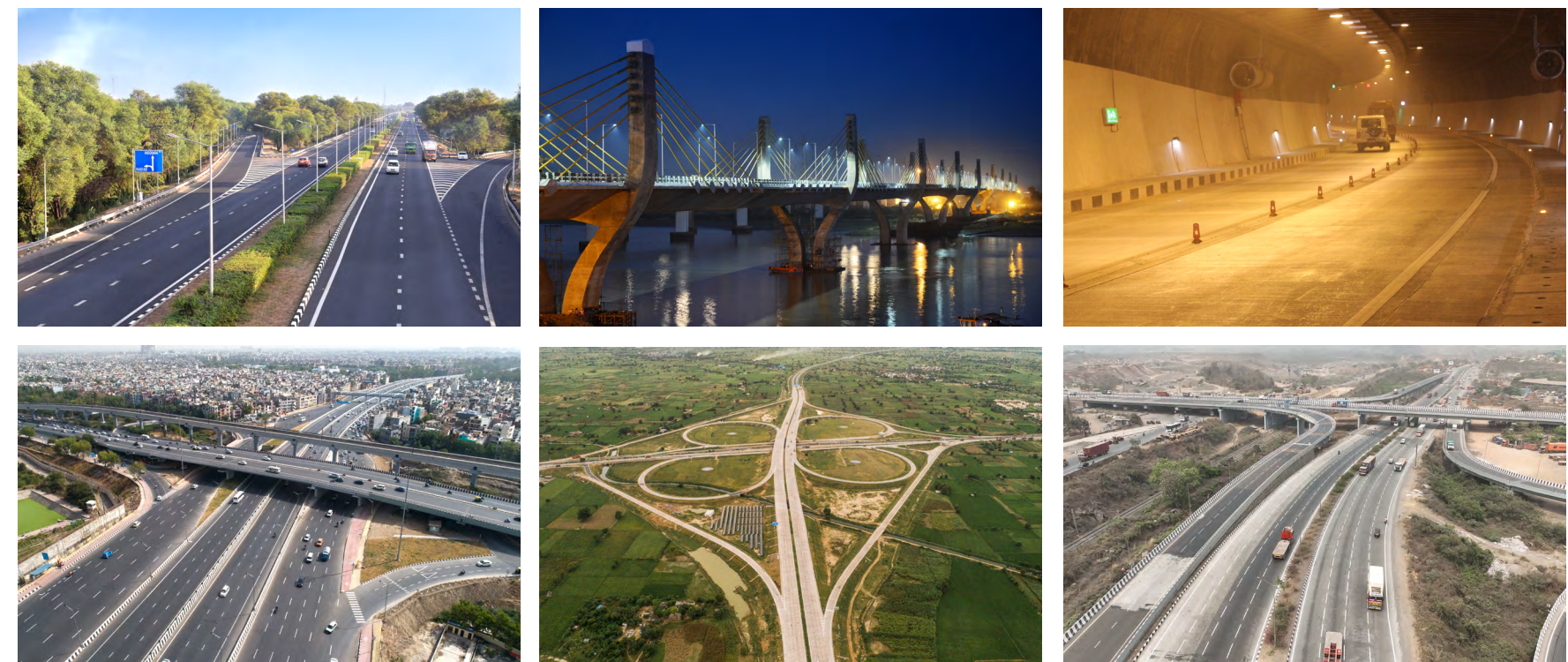
For the NHAI, InvIT is also one of the quickest modes of monetization: its simple transaction structure combines with the increased interest from institutional and domestic investors towards the country's national highways. So far, road InvIT transactions have offered the most market premium to NHAI when compared to other asset recycling models.

But the NHAI's vision for InvIT goes beyond revenue generation. As B.M. Rao explains, "We want to offer the general public a way to invest in India's growth story. NHAI InvIT has issued bonds to retail investors, which were subscribed seven times in just seven hours. This shows that retail investors place their trust in the hands of NHAI."

The infrastructure industry is a driving force for India's economy. The InvIT and TOT models through a public-private partnership (PPP) route are paving the way for reducing government debt while retaining ownership.

The introduction of InvIT in developing road and highway infrastructure of the country has provided an insight for investing accurately for the future. With predictable cashflows and a stable financial model led by professionals, InvITs are laying the foundation for asset monetization. The success of the NHAI InvIT is likely to be studied by other sectors in India and replicated in the near future.

Contact Kushal Kumar Singh
✉ kksingh@deloitte.com



Highways in India. (Images: National Highways Authority of India website)

Cost efficiency for infrastructure clients

FIVE GOLDEN RULES OF GOOD PRACTICE

EVERY YEAR, AN ESTIMATED USD 5+ TRILLION IS SPENT GLOBALLY ON INFRASTRUCTURE TO CONTINUALLY TRANSFORM GLOBAL ECONOMIES AND MAKE SOCIETIES SAFER AND BETTER FOR EVERYONE.

Although infrastructure investment funding has gradually increased over the last decade, there has been a revenue decline since the COVID-19 pandemic, along with rising costs due to inflation. These challenges are putting pressure on infra-organizations to remain financially sustainable.

In fact, it's becoming unaffordable for infra-organizations to continually maintain the performance and service levels expected by their customers and regulatory

bodies. They're constantly faced with having to do more work for less money - all while being more cost efficient when it comes to maintaining and growing their asset base.

Based on its experience of working with infrastructure clients across the globe, Deloitte developed five golden rules of good practice to help infra-organizations realize cost efficiency savings in the delivery of their assets and capital portfolio.

Deloitte UK Financial Advisory Director, **Florence Julius** is based in London and shares her five golden rules here.

1 FOLLOW THE MONEY: Establishing the cost base of the total expenditure and big spend buckets is the first step toward understanding where to find cost efficiencies. Overheads will no doubt vary across different spend buckets, with the biggest costs typically being staff and procurement. Understanding where and with whom money is being spent provides a good indication of the areas to look at for cost savings opportunities.

2 SIZE THE PRIZE: It's not feasible to drive cost efficiency savings across all areas of spend. So, it's important to understand what spend is addressable and non-addressable. Focusing on the addressable spend will maximize potential cost savings. Deloitte has deployed a Cost Efficiency Framework that is designed to help infrastructure clients establish their addressable spend and identify which cost levers to pull to realize savings, along with the potential size of the savings prize.

3 GET PEOPLE BUY-IN: Identifying benefits requires engaging the right people early in the process. It starts at the top with the executive leadership team taking accountability for the cost savings - supported by one executive member responsible for specific cost savings in each opportunity area. This should filter down to the rest of the business to ensure clear responsibilities for cost savings opportunities are agreed to so they can be realized.

4 SET UP FOR SUCCESS: Realizing cost saving opportunities often leads to big shifts in the way an organization operates, which in turn requires capability changes to achieve the desired savings. Taking the path of an efficiency transformation journey needs a robust transformation framework. It's important to recognize whether in-house capabilities are mature enough to deliver the scale of change - or whether additional subject matter experts are required to support the transformation journey.

5 REALIZE COST SAVINGS: Evidencing the cost efficiency savings is a key step and one that is often overlooked. Infrastructure clients, particularly in the UK, are obliged by their regulatory bodies to demonstrate a certain level of cost efficiency savings as part of their strategic business plan. Having a clear set of performance metrics to track cost efficiency should be established once opportunities and the size of the prize have been agreed upon with the accountable business owners. Tracking of cost efficiency realizations should then be done as part of normal business governance, with stock points to confirm the actual realization of the cost savings.

Contact Florence Julius
✉ fjulius@deloitte.co.uk

Contact Luke Dirou
✉ ldirou@deloitte.co.uk

Contact Charlotte Warburton
✉ cwarburton@deloitte.co.uk

Contact Tim Jones
✉ tjones@deloitte.co.uk



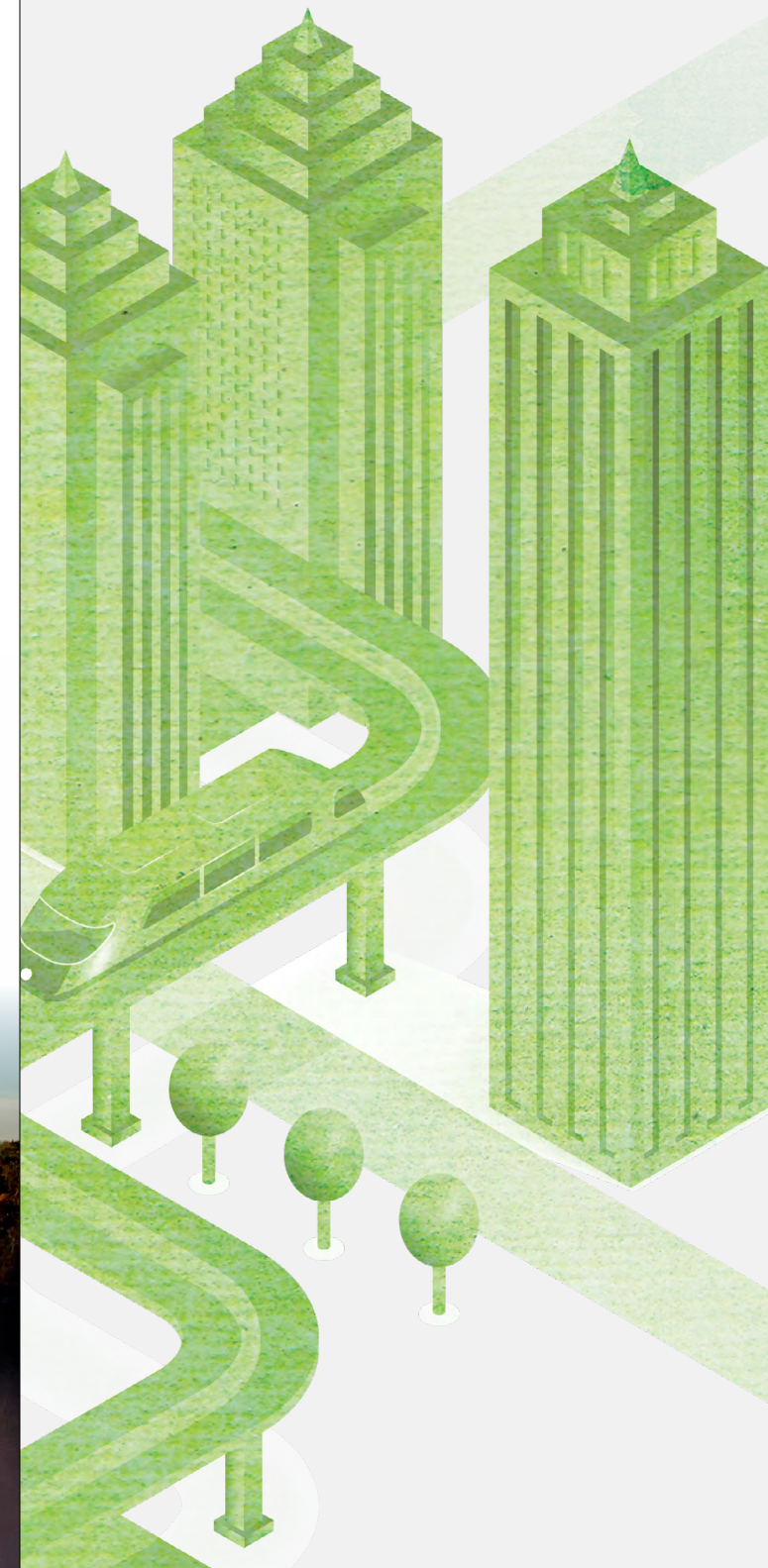
The Clifton Suspension Bridge, United Kingdom. (Image: Getty Images)

NEW DELOITTE THOUGHT LEADERSHIP

It's time to look beyond cost-benefit analysis

GOVERNMENTS ALL OVER THE WORLD HAVE HISTORICALLY RELIED ON COST-BENEFIT ANALYSIS (CBA) TO PRIORITIZE THEIR INVESTMENTS IN MAJOR INFRASTRUCTURE PROJECTS. HOWEVER, TAKING THIS APPROACH IS LIMITED AT BEST—AND MISLEADING AT WORST

WITH INFRASTRUCTURE STIMULUS INVESTMENT ON THE RISE, IT'S TIME FOR A NEW APPROACH. DELOITTE AND OXFORD GLOBAL PROJECTS RECENTLY CO-CREATED THREE PRINCIPLES TO GUIDE GOVERNMENTS ON EFFECTIVELY PRIORITIZING THEIR INFRASTRUCTURE INVESTMENTS. WHEN ADOPTED, GOVERNMENTS WILL MAKE LESS BIASED AND MORE INFORMED RESOURCE ALLOCATION DECISIONS. AND DONE RIGHT, ACCURATE INFRASTRUCTURE PRIORITIZATION WILL STRENGTHEN ECONOMIC HEALTH AND ACCELERATE PROGRESS IN ADDRESSING OTHER ISSUES, SUCH AS RESPONDING TO SOCIAL NEEDS AND CLIMATE CHANGE.



1 ENGAGE THE COMMUNITY

Take meaningful action to incorporate the views of the wider community, not just the most vocal or privileged, at an early stage to shape the project. In addition to mitigating against community action, this will allow project recipients to access the infrastructure that serves them best.

2 THWART THE COST-BENEFIT FALLACY

Don't rely solely on CBA; governments can get more robust estimates by using data-driven methods such as reference class forecasting. Similarly, forecast communications should reflect an appropriate level of uncertainty and potential variation (e.g. there is a 40 percent to 60 percent chance that this bridge will cost USD 35 million - USD 50 million, rather than 'this bridge will cost USD 35,131,879'). Combining these measures will provide a more realistic forecast against which different infrastructure projects can be compared.

3 EMBED SOCIAL IMPACTS THROUGHOUT THE PROJECT LIFECYCLE

These should not be tacked on as an afterthought, but woven throughout the project from inception at the portfolio level to the ultimate day-to-day operations. Infrastructure projects can be used to effect social good and change, as well as physical transformation.

Luke Houghton, Deloitte Global Infrastructure Leader - Advisory, and sponsor of the report, says, "While there is a way to go before all infrastructure investments are properly prioritized, adopting these strategies can position governments to make less biased, more informed resource allocation decisions."

Contact Luke Houghton
✉ lhoughton@deloitte.com.au

Tokyo is making waves in smart city innovations

START-UPS PLAY A CRITICAL ROLE IN MODERNIZING CITIES

JAPAN'S CAPITAL IS HOME TO ALMOST 12 MILLION CITIZENS AND KNOWN FOR MANY THINGS – RANGING FROM ITS FAMOUS SUMO WRESTLING FESTIVALS, THE WORLD'S BUSIEST PEDESTRIAN CROSSING (SHIBUYA), BEAUTIFUL SAKURA-LINED STREETS, GLORIOUS TEMPLES, EXCEPTIONAL CUISINE AND WORLD-CLASS TRANSPORT. MOST RECENTLY, IT HAS ALSO BECOME A CENTER OF INNOVATION AND SMART CITY MODERNIZATION IN ASIA.

Yuma Saito, Innovation Consulting Partner, Deloitte Japan, is passionate about exploring the role that domestic and international start-ups can play in creating a strong innovation ecosystem in Tokyo – and he's not alone. Yuma and his team are working closely with **Yuriko Koike**, Tokyo's longstanding governor, who is committed to elevating Tokyo to its full potential as one of the world's most innovative smart cities.

COLLABORATION DRIVES CHANGE

To accelerate the city towards using more smart city infrastructure solutions, collaboration platforms are required to encourage genuine connectivity between start-ups, investors, corporations and governments from different countries and cultures. One way Yuma's team is fueling collaboration is by helping to host in-person

events (which can be accessed virtually by those who can't attend in person) such as the recently launched *City-Tech Tokyo Expo* held on 27-28 February 2023. Deloitte was commissioned by the Tokyo Metropolitan Government to plan the entire event, attract customers and smoothly run its operations.

Yuma says, "The Expo was a great success and attracted over 10,000 people in person – all ready and willing to collaborate. Its aim is to bring 'open innovation' from Tokyo to the rest of the world by facilitating free-thinking collaboration between start-ups and investors. From climate change, infectious viruses and changing geopolitics ... the world is facing a significant turning point. Right now, we're being called to bring all our diverse ideas and technologies together to create a new city model that fits our transforming world."

"SMART CITY" – EASIER SAID THAN DONE!

So, how can we build a smart city that is resilient and forward-thinking? One that is sustainable, convenient and rich in culture and entertainment? Those who wanted to discover the answers came to Tokyo to find or co-create the answers. The Expo showcased cutting-edge technology and ideas to develop impactful and resilient city infrastructure. A great example was the launch of *Tokyo Upgrade Square*, a collaboration facility designed to support start-up technology and ideas to solve the city's most complex social issues. Start-ups explored innovative ways to improve the city's attractiveness, tourism and livability. These included combining Tokyo's unique and lasting traditional culture with new digital technologies to produce exciting entertainment possibilities, such as building digital art infrastructure

and public exhibitions to help people rediscover the city's many charms.

When reflecting on the Expo and its potential, Yuma says, "We aim to bring Tokyo to the world's leading edge of technology and culture at a high level, so it becomes the world's most start-up-friendly city. Deloitte contributes to this realization with its global innovation network, knowledge, and above all, the ability to execute."

With innovators like Yuma and his team of developers, Tokyo is steadily becoming one of the world's leaders in smart-city modernization and meaningful infrastructure solutions.

Contact Yuma Saito

✉ yuma.saito@tohatsu.co.jp



Delegates at the City-Tech Tokyo Expo 23. (Image: Deloitte)



Shibuya Crossing, Tokyo, Japan. (Image: Kotaro Maruyama, Unsplash)



City-Tech Tokyo Expo 23 signage, Tokyo. (Image: Deloitte)



"The Expo was a great success and attracted over 10,000 people in person – all ready and willing to collaborate."

Yuma Saito (pictured),
Innovation Consulting Partner,
Deloitte Japan

The Embassy Effect

THE U.S. DEPARTMENT OF STATE CONTINUES TO STRENGTHEN DIPLOMACY BY CONNECTING THROUGH INFRASTRUCTURE



We the people by Mark Bradford, U.S. embassy, London, UK. (Image: OBO)

THE DEPARTMENT'S OVERSEAS BUILDINGS OPERATIONS (OBO) HAS A CLEAR MISSION: TO PROVIDE "SAFE, SECURE, FUNCTIONAL AND RESILIENT FACILITIES THAT REPRESENT THE U.S. GOVERNMENT TO THE HOST NATION AND SUPPORT THE DEPARTMENT'S ACHIEVEMENT OF U.S. FOREIGN POLICY OBJECTIVES ABROAD." WHILST NO DOUBT IMPORTANT, ITS COMMITMENT TO USING IMPACTFUL INFRASTRUCTURE TO EMPOWER DIPLOMACY AND ENRICH COMMUNITIES AND CITIZENS' LIVES IS EQUALLY VITAL.

As one of the world's largest real estate developers, OBO currently has over 25,000 assets in its portfolio - including 16,562 residences and 915 office buildings. The bureau manages U.S. embassies and consulates in over 280 locations worldwide and has a portfolio replacement value of USD 75 billion. OBO employs America's

best engineers, architects and other design and construction professionals to support over USD 20 billion in ongoing construction. All of this vast experience comes with rich insights and best practices which are actively shared with locals.

WORLD-CLASS SAFETY STANDARDS FOR EVERYONE

Eric Bielby, Senior Manager, Deloitte U.S. Infrastructure and Capital Projects, has worked with OBO for several years across multiple strategic initiatives. He says, "OBO is creating an ongoing positive effect on local communities. This "Embassy Effect" can be seen through positive economic, environmental and social impacts that OBO has made on the host communities across the world."

OBO brings world-class standards to every project - benefitting local environments, cities and people. It requires adhering to the International

Building Code and to the OBO supplement to that code. Prior to construction, the OBO supplement requires a site study to determine stronger design requirements for wind, flood, and earthquakes. Abiding by these standards boosts the resilience of every building across its expansive portfolio covering diverse climates. For example, the U.S. embassy in Port-au-Prince, Haiti was one of the only buildings undamaged after an earthquake hit Haiti in 2010 and 2021. This was due to the OBO building's world-class design and structural integrity.

BREAKING DOWN BARRIERS WITH A UNIVERSAL LANGUAGE, ART

Art plays an integral role in nurturing connectivity and encouraging collaboration across different cultures and languages. OBO's *Art in Embassies* program works alongside artists, museums, universities and private collectors to commission

new work, develop exhibitions and create interactive events and experiences. The program facilitates community engagement, artist exchanges and collaboration with local artists - showing how art can transcend national borders and build connections among people from all countries and walks of life.

Lincoln Schatz, artist contributor, says in the OBO Embassy Effect video, "What's always impressed me is that Art in Embassies' works touches on common threads and create dialogues within these countries. And the works themselves become the public face of these buildings - they humanize the embassies to the host countries."



WATCH THE EMBASSY EFFECT VIDEO, 2021



THE BEGINNING OF A LOCAL COMMUNITY IN LONDON

The U.S. embassy in London has contributed toward an emerging local community in the Nine Elms neighborhood. OBO's local redevelopment effort included the construction of public amenities such as a plaza, park, bicycle passes and a new pedestrian greenway connecting the embassy to the nearest public transport station. The new community precinct includes over 18,000 units of residential development, creating the foundations for a thriving local hub.

U.S. embassy in London's Nine Elms. (Image: Kieran Timberlake Architects)

Richard Maimon, Partner at Kieran Timberlake Architects, says in the OBO Embassy Effect video, "We collaborated extensively with the city's government, adjacent developers, neighbors and community organizations to connect the landscape of the River's Edge to the new linear park that runs from Vauxhall to Battersea. In creating the new embassy, we helped provide an actual landscape and public park that is open to all citizens to enjoy."

HONORING HERITAGE AND REMEMBERING MILAN'S HISTORY

Avi Schwartz, Principal, Deloitte U.S. Infrastructure and Capital Projects, says, "OBO establishes a lasting social impact through stewardship of culturally significant sites and by fostering cross-cultural dialogue through the art of historic restoration."

An excellent example is the U.S. consulate in Milan, Italy, where OBO revived a heritage site which had a significant role in Italian history. The iconic Liberty Building was built in 1943 following the destruction of the Teatro Milanese during the Allied bombardment in the Second World War. The consulate reconstructed

its popular pavilion and pedestrian square, whilst maintaining the historic architecture of the building - offering a modern public gathering space for locals and foreigners to collaborate and celebrate the site's legacy.

Bill Sharples, Principal at Shop Architects, says in the OBO Embassy Effect video, "The consulate in Milan, which we began with OBO a few years ago, has been a unique experience. In fact, it is a heritage site - it has history to it that is uniquely Milan. As you move through these building and landscapes, you really take in the history of what was there, and what is to come in the future."

U.S. Consulate General campus in Milan. (Image: U.S. Department of State)



Avi says, "OBO develops facilities with sustainable features, designed to reduce local resource consumption and generate renewable energy with consideration of local climates and environmental conditions."

CONSTRUCTING A SUSTAINABLE IMPACT IN NIAMEY, NIGER

The new U.S. embassy in Niamey has been certified LEED Platinum by the United States Green Building Council (USGBC). USGBC's LEED program evaluates the environmental impact of the design, construction and operations of high-performance buildings. This certification marks the first ever Platinum project in West Africa, and one of OBO's 57 LEED certifications.

Several energy and water-saving methods are integrated into the project's design and construction; such as the exterior sunshades which reduce the demand for air conditioning and the solar panel covered walkways which produce more than half of the embassy's power needs. The facility also manages 100 percent of its sewage through an on-site wastewater treatment. This wastewater is then recycled into irrigation systems, lessening the burden on local utilities.

U.S. embassy in Niamey, West Africa. (Image: blharbert.com)

A NEW WAY OF THINKING ABOUT INFRASTRUCTURE IN COMMUNITIES

OBO is changing the way the world thinks of not just embassies and consulates, but the way they build connectivity with local culture and communities. As Eric states, "Given the lessons from our past work and OBO's extensive real estate portfolio, we have learned that all infrastructure must stand for something greater."

"Ultimately, OBO's work is about connection, with architecture being a language of diplomacy," says Eric.

Contact Eric Bielby
ebielby@deloitte.com

Contact Avi Schwartz
avschwartz@deloitte.com

Women in infrastructure

THESE 15 GLOBAL LEADERS ARE UNITED IN THEIR PASSION TO INFLUENCE, ADVISE AND DELIVER INFRASTRUCTURE WITH LASTING IMPACT

TAKEN TOGETHER, THEY HAVE HUNDREDS OF YEARS OF EXPERIENCE ACROSS A MYRIAD OF COUNTRIES AND CULTURES. THESE 15 INSPIRATIONAL FEMALE DELOITTE LEADERS SHARE AN INNATE PASSION TO LEAVE A LASTING LEGACY FOR THE NEXT GENERATION, BY CHALLENGING THE NORM AND BEING ACTIVE ROLE MODELS.

We asked each leader – from Bola in Lagos, Nigeria, to Eileen in Singapore – why they chose to develop their careers as experts in the complex world of infrastructure. They told us about their visions for the future, some of the challenges they see, how they're helping clients, and what impact they would like to make.

These women showcase the importance of inclusion in all its forms in tackling infrastructure's most complex and tricky issues to generate the best outcomes. Diverse minds, backgrounds, gender and mindsets all have a role to play in designing and delivering "infrastructure with impact".

To celebrate our female leaders, we commissioned illustrations of each of them to be featured along with an example of infrastructure with impact from their home city.

The cities they live and work in boast unique and different infrastructure assets that are improving everyday lives. In brief descriptions of each asset, you'll learn, for example, how light rail, train stations, and bridges have been designed to improve access and connectivity; how modern multi-purpose power plants are serving local population needs; or read about iconic buildings and structures that either herald future-focused sustainability excellence or mark deep-rooted culture.



DR. BOLA ADIGUN
FINANCIAL ADVISORY PARTNER
LAGOS, NIGERIA

Dr. Bola Adigun is a Deloitte West Africa Infrastructure and Capital Projects, Real Estate and Economic Advisory Leader. She is an experienced transaction advisor who has a keen focus on making sure infrastructure enhances the livelihood and wellbeing of everyday citizens. She is enthusiastic about delivering a lasting impact in both qualitative and quantitative ways.

When thinking about her area of specialty, her answer is immediate. "There is a significant infrastructure deficit in West Africa, especially Nigeria. So my focus has been on addressing this through public-private partnerships (PPPs) – road infrastructure projects, in particular. A significant number of our projects are with the Nigerian government at the federal and state level. For example, some of our road infrastructure projects have substantially improved

"Infrastructure can significantly improve the standard of living of the average citizen of any country, whether developing or developed. For example, a good road network and communication architecture will help connect people, goods and services faster and in a more efficient manner."

Contact Dr Bola Adigun
✉ badigun@deloitte.com.ng

the livelihood of local citizens, as well as their income-earning capacity, by connecting rural areas and farmlands to the city centers and markets."

As a Lagos resident herself, Bola is concerned about Nigeria's considerable infrastructure shortage, coupled with a sizeable budget deficit that has impacted the government's ability to finance the infrastructure deficit. An imminent presidential election is also causing organizations to wait and see what will happen next, which has slowed down much needed economic activity. "Nigeria's infrastructure deficit is estimated at USD 100 billion annually. This is coupled with the challenge of meeting the needs of a large population of over 200 million people. The unstable power supply is also increasing the cost of doing business, so making progress is complex," she explains.

Drawing on global best practice to inspire local action

Bola is proud of Deloitte's thought leadership materials that focus on

addressing local client concerns. "Also, we're constantly advising our clients on global best practices that are customized to our local nuances. For example, we have helped clients source experienced technical partners to address some of the infrastructural concerns they have, so they really benefit from working with a global firm," says Bola.

Maintaining momentum during times of uncertainty is high on Bola's agenda. In the next few months, she will continue to provide high quality technical support and advisory services to clients and across multiple infrastructural subsets such as power, housing, and road networks. "Throughout, I will make sure that we take an inclusive approach to making infrastructure improvements as that is when we achieve true ingenuity," she concludes.

Illustration: Lekki-Ikoyi Link Bridge, Lagos is a 1.36 km cable-stayed bridge and the first of its kind in Nigeria, commissioned to relieve the loads on other bridges. Since 2013, it has been used by vehicles to cross the Five Cowries Creek, and by joggers and runners as a recreational facility.



RIKKE BECKMANN DANIELSEN
FINANCIAL ADVISORY PARTNER
COPENHAGEN, DENMARK

Rikke Beckmann Danielsen is an industry award-winning leader, responsible for the Public Sector and Infrastructure team in Denmark and the Global Financial Advisory, Government and Public Services industry for Deloitte Global.

She thrives on helping infrastructure deals come to life. "The projects we do, and the deals we structure, impact society in the long run. It's hospitals, roads, airports, sewage systems and energy transformation ... the all-encompassing subject of infrastructure that's critical for a modern society to function," she explains. This long-lasting social impact is what makes Rikke so passionate about the work she does.

Rikke works across transport, social, and digital infrastructure. She is primarily involved in helping clients prepare for, and implement, real estate, infrastructure, and public-private partnership (PPP) projects. Over her 12-year tenure with Deloitte, she has advised many clients, including the Danish Government, the Government of Greenland, and public clients in Iceland, Danish municipalities and regions.

In her recent work on new airports in Greenland, Rikke appreciates the immense impact this project has already had and how it will continue to impact people's lives in the future. "There's long-term sustainable infrastructure in place that will benefit many companies and many people—not only from the Nordic region, but from around the world."

Rikke is also experienced with delivering financial advisory services to private companies, developers, entrepreneurs, operators, pension funds, and infrastructure funds in

"I am intrigued by the long-lasting impact infrastructure has on modern society, underpinned by digital infrastructure. For the best results, we try to include diversity of thinking in every aspect of the decision-making process."

Contact Rikke Beckmann Danielsen
✉ rdanielsen@deloitte.dk

the public bidding process. "I have carried out several projects that focus on developing integrated business models and solutions between the public and private sectors to drive better infrastructure outcomes."

Finding a new balance

She cites cyber and general attacks on critical infrastructure as particular challenges for the industry. Rikke says, "In 2023 public sector clients' attention is on the energy outlook with respect to the geopolitical challenges, while balancing the effects of climate change." She adds, "Lack of trust in general can also worry clients, so we structure deals and contracts that cater to these concerns."

Rikke quotes Enrique Peñalosa, a former Mayor of Bogotá, Colombia, when thinking about a better future: "A developed city is not a place where the poor use cars, it's where even the rich use public transportation." To her, this shows a highly efficient, all-inclusive public infrastructure system.

Illustration: Opened in 2019, Copen Hill houses what is said to be the cleanest waste-to-energy power plant in the world. It incorporates a year-round ski slope, a hiking and running trail and an 85 m high climbing wall.

CYNTHIA CORBY
AUDIT & ASSURANCE PARTNER
DUBAI, UNITED ARAB EMIRATES

Cynthia is a highly regarded change agent and leader, wearing multiple hats – including one as the Construction Industry Leader for Deloitte Middle East.

Reflecting on the nature of infrastructure, Cynthia says, "It refers to capital assets that are essential to the everyday functioning of an economy. Infrastructure and capital spend is usually used by governments to stimulate the economy and is often seen as a key component of driving growth and inward investment."

Cynthia joined the Middle East firm 17 years ago and since then has been witness to a fascinating evolution of the region's fast-paced infrastructure industry, including the development of iconic global projects like the One Za'abeel (illustrated). She says, "It has been an absolute privilege to play a small role in bringing some of these landmarks to life, from initial design and concept stages to reality."

Cynthia is inspired by the role infrastructure plays in sustainable living. From Masdar City, which is creating communities within a walkable environment, to NEOM's The Line in the Kingdom of Saudi Arabia and Lake Nona in Orlando, FL, U.S. – she believes infrastructure can be good for citizens, the environment, and the economy.

A new Construction Playbook

Cynthia has been leading an industry conversation around creating a Construction Playbook to align all stakeholders throughout the capital project life cycle. It has huge potential to change stakeholder behaviors and ensure assets are delivered on budget, on time, and with a sound plan for asset management with

sustainability considered at the outset. She says, "This will produce capital assets and infrastructure that will offer investors a reliable ROI and create a platform to drive foreign direct investment (FDI)."

To deliver mega and giga projects successfully in the future, Cynthia believes all stakeholders need to take a holistic approach while keeping up with the rapid pace of change in the industry and region. "Shifting the mindset to a whole-of-life approach for capital assets – from the feasibility of a project, incorporating all the sustainability goals throughout the life cycle of the project upfront – is a critical and much needed change to avoid wasting time, resources, and cash. It will also increase stakeholder satisfaction," she says.

Despite a challenging environment, Cynthia says the region remains resilient and leads from the front on realizing iconic and ambitious infrastructure and capital programs. "We're hosting COP28 and ambitious national agendas, embracing all that new technology has to offer. With hyper collaboration we can deliver unimaginable potential for the industry and region."

Illustration: One Za'abeel, represents the ultimate address for the modern urban citizen, located at the heart of one of the most dynamic cities in the world.

"Infrastructure and capital projects are at the center of how society functions and can influence our overall quality of life. We need to continually explore new projects that will truly create a more sustainable and happy way to live and work, especially given our rapidly growing populations."

Contact Cynthia Corby
✉ ccorby@deloitte.com





“Well-designed and executed infrastructure can have a profound, tangible impact on our communities. It gives me a great sense of pride to see projects I’ve been involved in completed, operational and providing much needed services to citizens.”

Contact Kim Curtain
✉ kcurtain@deloitte.com.au

KIM CURTAIN
FINANCIAL ADVISORY PARTNER
SYDNEY, AUSTRALIA

Kim Curtain is an Infrastructure and Capital Projects Partner with over 25 years’ experience in developing and shaping effective partnerships between the public and private sector. She specializes in infrastructure procurement and contract management across various industries and is passionate about maximizing efficiency and outcomes.

The tangible side of infrastructure has always appealed to Kim. She says, “I love working on projects that have a clear outcome, where there is a greater purpose – like using renewable energy – than just generating financial benefit.” Kim enjoys delivering social infrastructure solutions which she describes as, “anything that helps makes citizens’ lives better.”

Kim’s hope for the industry is that every infrastructure project starts with a clear vision and consideration of broader societal outcomes. “A well-designed hospital will facilitate efficient operations. A road designed well – with thought given to connections and flow – will be more efficient and useful for users. A prison designed with operations, education, and training in mind will have a greater impact on reducing the number of people who reoffend.”

Availability of skilled labor has been a key challenge in the wake of Australia’s infrastructure boom over the past 10-15 years. Kim believes a change in culture could be the key to solving this problem. “The majority of employees are male. Culture on work sites is often referenced as a reason why females don’t seek employment in infrastructure. Improving inclusivity would tap into another 50 percent of the population as potential

JORIEN DOUMA
RISK ADVISORY DIRECTOR
AMSTERDAM, THE NETHERLANDS

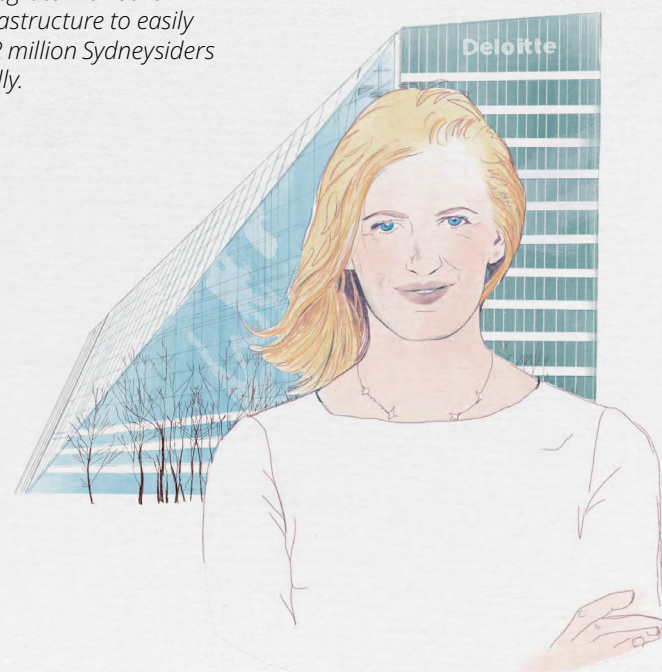
Jorien Douma is passionate about tackling complex societal challenges, including infrastructure and capital projects in flood protection, dyke improvement, and mobility enhancements. Before joining Deloitte, she spent 15 years working for the Rijkswaterstaat, part of the Dutch Ministry of Infrastructure and Water Management.

She says, “Increasingly, private and public parties have to work together in a different way to collaborate on social issues that involve many parties with different focus areas (like accessibility over sustainability), interests and power. I’m convinced that a complex infrastructure project can only succeed if its project control side is combined with its social side, internally and externally. It is, and remains, people work.”

Jorien believes large infrastructure projects are often designed to change the structure of society or organizations – and varying levels of ambition, lead times, high complexity, and extensive stakeholder involvement make success tough to achieve. The Deloitte team supports clients and contractors in the development, design and realization of truly complex capital projects.

“We focus on projects that lead to improved infrastructure, well-maintained waterways, reliable energy supplies, and industrial structures that meet the highest safety and environmental standards. We create much needed structure and flow in projects and transform dry data into useful visualizations to inspire confidence in stakeholders and make sure they are fully engaged,” she says.

Illustration: Sydney Light Rail (illustrated) was introduced in 2019 to reduce bus congestion and integrate with other existing transit infrastructure to easily transport over 14.2 million Sydneysiders and visitors annually.



Jorien most enjoys working on transformative projects. “For instance, a city can be made healthier, or more accessible, so that people living there have better chances of prosperity. Or it can minimize flooding with wind farms or strong dykes.”

According to Jorien, the infrastructure industry faces three key challenges – high nitrogen levels emitted by large construction equipment are causing projects to be put on hold the country’s aging bridges, frames, and locks need to be replaced; and working towards successful climate adaptation.

Raising the Netherlands’ most iconic dam

For 90 years, the Afsluitdijk has been protecting the Netherlands from the sea, but it no longer can. “Our team is proud to make this dam ready for the future through our contract management and system-oriented contract control expertise,” she says.

In late 2022, the team acquired PACER, an engineering and consulting firm, to grow to 50 people. Together, “we focus on all the preconditions necessary to maintain momentum in a successful project – program control, contract management, risk management, system engineering, security, and so on,” she says.

Working internationally, with a focus on keeping parts of the world safe from flooding, is next.

Illustration: Deloitte’s head office since 2015, The Edge has been acknowledged as the most sustainable and most likely smartest office building in the world, as it embraces technology to generate more energy than it consumes.

“I have always had a real heart for water, so it’s no surprise my first job was in water management. I learned the most during the 10 years I was deep in a project, standing with my boots in the mud, in direct contact with local residents and users to focus on how we could improve their lives.”

Contact Jorien Douma
✉ jdouma@deloitte.nl



“Infrastructure projects need to connect populations, impact citizens’ lives in a positive ways, and improve the competitiveness of Latin American countries – not to mention the massive creation of jobs.”

Contact Astrid Fernández
✉ asfernandez@deloitte.com

ASTRID FERNÁNDEZ
FINANCIAL ADVISORY PARTNER
BOGOTÁ, COLOMBIA

Astrid Fernández is the Lead Partner of Deloitte Infrastructure Advisory and Capital Projects in Spanish Latin America and also leads the firm’s public sector industry for the region in 16 countries.

As a leader, Astrid believes consultants can help transform Latin America’s infrastructure to become more efficient, modern, transparent, and sustainable. “My passion is to contribute by delivering exceptional work to my clients across the entire project life cycle, so they understand what it takes to succeed every step of the way – especially for public sector infrastructure programs.”

For Astrid, infrastructure is a key economic sector that requires depth of understanding and specialization. “I am a specialist in helping clients convert their ideas into concrete, financially feasible, and socially impactful projects. Our teams work a lot in helping public sector professionals build their capabilities so they can approach and develop complex infrastructure projects with confidence. This includes defining their scope and conducting financial modeling for alternative solutions so the best investment decisions are made for a better future,” she says.

Astrid believes infrastructure has a pivotal role to play in social and economic development – and creating conditions that really impact day-to-day lives. For example, in Latin American cities, this means building a bus rapid transport system to replace old bus transport fleets, which instantly impacts millions of commuters by reducing their travel time by several hours every day.

“This means citizens spend more time with their families at home, gain more leisure time, and improve their quality of life,” she says.

The Colombian infrastructure industry faces a number of unique challenges, ranging from a growing population coupled with historically underdeveloped systems, limited long-term planning, capabilities and resources to deliver successful projects, and political instability. This makes the role of external advisors so important for success.

Improving everyday lives on the ground

Astrid has led several innovative projects, including the design and creation of the Metro Agency of Bogotá, the financial structuring of a 4G program in Colombia, and designing a blended finance strategy for rural productive projects.

When reflecting on the importance of embracing diversity in design, Astrid says, “In an obvious and naturally diverse world, it seems odd not to include diversity and sustainability as basic principles of work. Inclusive infrastructure is not a goal, it is a mandate in the context of a rapidly changing world where citizens’ expectations need to be fulfilled with faster, smarter and flexible solutions.”

Illustration: The National Shrine of Our Lady of Carmen, Bogotá, is a colorful Catholic landmark that has been towering over the historic La Candelaria neighborhood since its completion in 1938.

SIMA GUPTA
FINANCIAL ADVISORY PARTNER
TORONTO, CANADA

Sima Gupta is a Senior Infrastructure and Capital Projects Partner based in Toronto, Canada. A qualified aerospace engineer by trade, she has over 25 years’ experience of working as a consultant and in industry. Since joining Deloitte in 2016, Sima has focused on delivering projects with a lens on lean principles to maximize value for money for every dollar invested in infrastructure. Among other things, she specializes in public sector transportation, and in mining and power generation.

When thinking about her passion for the industry, Sima says, “I love infrastructure because of the impact we are making to the public. Specifically around transportation, Toronto continues to be a rapidly growing city and we need all aspects of infrastructure to function well, connect, and support our communities. Transportation projects in the Greater Toronto Hamilton Area continue to be a priority for that very reason.”

Like many countries around the world, Canada is experiencing a growing population in and around city centers, while its infrastructure is aging across the country, including key roads and hospitals. These competing forces are accelerating both modernization and new-build agendas.

Collaborative contracts are changing how work gets done

When reflecting on recent client work, Sima has been advising public sector clients on their infrastructure investments and spend. “Many clients have recently adopted collaborative contracts and are looking to deliver

effectively under this new model. It’s very exciting to be on this journey of helping them work with a new delivery model.” Specifically, the team advises on commercial acumen and assurance to make sure collaborative contracts are successful.

Several clients are relying on the team for their holistic perspectives on “Day 1 Readiness” as they approach operations; while others are asking for the team’s specific thinking on operations from the start of the project lifecycle.

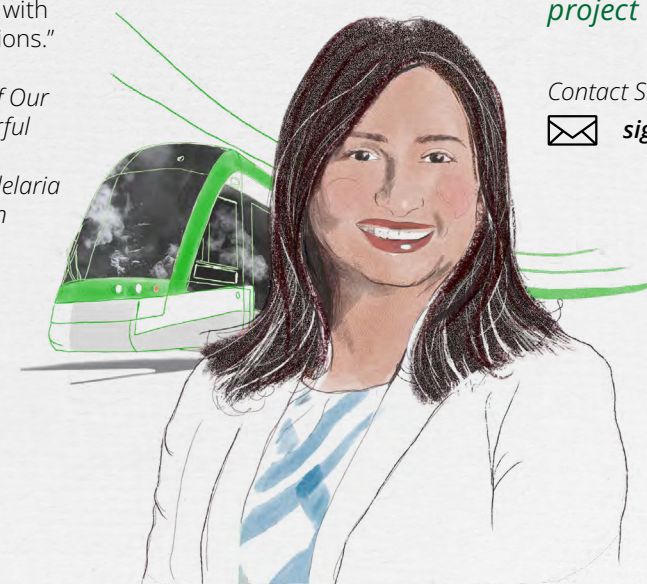
Sima is passionate about creating great opportunities for the next generation of leaders inside and outside Deloitte – and she particularly enjoys mentoring women in STEM, helping them reach their full potential. Likewise, she is driven to make sure that, “no individual, community, or social group is left behind or prevented from benefiting from all forms of existing and future infrastructure.”

Sima strongly believes that the public and private sectors have important roles to play to make sure infrastructure projects are inclusive and improve the lives of all Canadians – especially in her sweet spot of effective transportation and the many benefits this brings in connecting communities across Toronto.

Illustration: With a train ridership of about 9 million people per year, Metrolinx’s GO Transit rail fleet is rapidly growing to support 6,000 trips per week by 2025.

“I love consulting because of the breadth of clients and projects I work on and the broad impact I can make to their mega projects – at the end of the day, I still feel connected to a ‘physical’ project that’ll transform lives.”

Contact Sima Gupta
✉ sigupta@deloitte.ca



Inclusive infrastructure can support a climate resilient future

A NEW UNOPS REPORT ADVOCATES FOR INCLUSION

Not only is inclusive infrastructure the right thing to do for our society, particularly for women and marginalized groups, it provides essential services to people, enables the proper functioning of society, and protects people from risks such as climate-related hazards. It is critical in enabling inclusive development for all, as it influences the achievement of up to 88 percent of the targets of the Sustainable Development Goals (SDGs) related to inclusive outcomes for women and marginalized groups, who constitute around 81 to 88 percent of the global population.

To develop the report, UNOPS consulted with representatives from 10 non-government entities across the globe who work closely with women and marginalized groups to inform how infrastructure that does no harm, is equitable, accessible, affordable and empowering should be built.

Jens Wandel, Acting Executive Director, UNOPS, who is based in Copenhagen, Denmark, says in his foreword, "To be truly inclusive, the design and implementation of infrastructure should take into account the diverse needs

of everyone, especially the most marginalized. When infrastructure is inclusive, it empowers all people to have a good quality of life, fully participate in society and be more resilient to climate change impacts. This publication is a positive step towards promoting infrastructure that leaves no one behind, for a better future for us all."

For females and marginalized communities across social dimensions including economic status, ethnicity and legal status, current infrastructure options fall short of satisfying their requirements

for structures that are climate resilient, safe, of good quality and low cost. The need to address this gap is compelling: These groups comprise over 80 percent of the world's population, making them the largest global users of infrastructure.

FIVE BARRIERS TO SOCIAL EQUALITY

The research identified five main barriers to social equality that prevent people from accessing the infrastructure they need, listed below.

THE UNITED NATIONS OFFICE FOR PROJECT SERVICES (UNOPS) RECENTLY LAUNCHED AN IMPORTANT REPORT AT THE 27TH CONVENTION ON CLIMATE CHANGE (COP27) IN EGYPT. *INCLUSIVE INFRASTRUCTURE FOR CLIMATE ACTION* SHARES RICH INSIGHTS AND OUTLINES THE ACTIONS THAT WE NEED TO TAKE TO CREATE A SUSTAINABLE AND CLIMATE RESILIENT FUTURE FOR ALL.



SEVEN ACTION AREAS TO DEVELOP INCLUSIVE INFRASTRUCTURE

The report outlines seven action areas and 24 recommendations that the public and private sectors can adopt to develop infrastructure that is climate-compatible, and inclusive for all, listed below.

These important insights, based on careful research, should play a key role in informing decisions about enhancing infrastructure so it can meet the needs of different people everywhere.

BARRIERS

- 1. Discrimination and social exclusion**, reducing access to essential infrastructure services
- 2. Physical obstacles and an absence of protection**, making infrastructure services difficult or unsafe to use
- 3. Excessive costs and constraints**, resulting from financial, legal or ethnic status
- 4. Inadequate knowledge**, regarding the issues of sustainability, the climate crisis or infrastructure services
- 5. Limited autonomy**, from inequality or a lack of control.

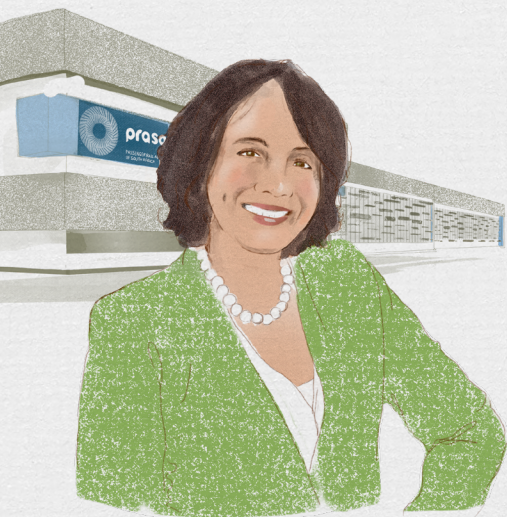
- 1. Including women and marginalized communities** during all phases of the infrastructure life cycle
- 2. Educating the infrastructure industry** on the need for inclusive infrastructure
- 3. Using citizen-centric statistics** to guide infrastructure design and development
- 4. Enabling delivery of inclusive infrastructure** through the transformation of existing frameworks
- 5. Incorporating inclusive and climate conscious standards** during every stage of project planning
- 6. Developing business models and finance structures** that support inclusive infrastructure
- 7. Guaranteeing infrastructure designs** that consider climate change and inclusivity by advocating for responsibility and transparency during infrastructure planning.

ACTIONS

To be truly inclusive, the design and implementation of infrastructure should take into account the diverse needs of everyone, especially the most marginalized. When infrastructure is inclusive, it empowers all people to have a good quality of life, fully participate in society and be more resilient to climate change impacts.



READ *INCLUSIVE INFRASTRUCTURE FOR CLIMATE ACTION* BY UNOPS



“Over the years of my career, I have felt vindicated in focusing on infrastructure as the opportunities to make a difference in people’s lives are plentiful.”

Contact Laila Horton
✉ lahorton@deloitte.co.za

LAILA HORTON
FINANCIAL ADVISORY
ASSOCIATE DIRECTOR
JOHANNESBURG, SOUTH AFRICA

Laila Horton is an Associate Director, Infrastructure and Capital Projects who recently joined Deloitte South Africa in Johannesburg. She has over 25 years’ experience in the infrastructure space across geographies ranging from South Africa to South and Southeast Asia. Her enduring focus has been on public-private partnerships as a method of delivery while working in various capacities for government, donor agencies and management consulting firms to do just that.

When thinking about infrastructure and its remit, she says, “Due to my degrees in environmental engineering and urban planning, my area of specialization by default became water supply and waste management. In recent years, because of the PPP angle, I’ve also been focusing on other sectors such as hospitals and office accommodation.”

Overcoming power supply challenges

“We’ve had intermittent power supply for the last 15 years. Outages of up to 6 hours a day have become common, affecting many aspects of life – transport of perishable goods, deteriorating security, traffic congestion, reduced cell tower reliability and reduced productivity in the industrial sector – all of which erode economic growth,” says Laila. In addition, the looming problem around water quality and security is also on stakeholders’ minds. More treatment plants are failing effluent standards, polluting water sources and putting South Africa’s resources – already scarce due to low rainfall – at further risk.

These challenges affect citizens and clients alike. “For many clients, from national government to municipalities to large power users, it’s about finding ways to rapidly increase power generation. Attracting private sector capital and expertise, and using scarce public funding wisely, is also key,” explains Laila.

In her new role, Laila is committed to adding lasting value to clients in the power and water sector. Equally, she wants to help make public transport more affordable and safer for locals while addressing the spatial legacies of apartheid where people lived far from their places of work.

Illustration: Johannesburg Park Station is the second largest railway station in Africa and a local commuter hub. It’s being redesigned to become a more modern, secure and attractive “destination station”.

HEIDI ISREB
CONSULTING PARTNER
SYDNEY, AUSTRALIA

Heidi Isreb serves as both Global Capital Projects Co-Lead and Australian Capital Projects Lead for Deloitte. She has a reputation for active and deliberate collaboration to deliver the best infrastructure outcomes. Heidi finds ways to combine the right people, with the right capabilities, with advanced digital technology to effectively transform the way work gets done – and the way projects are delivered.

Her deep passion for good infrastructure goes back to her childhood. “I grew up on a farm in rural Victoria. I could see how truly life-changing new infrastructure was to our community. To this day, I find this deeply motivating.”

Her vast experience spans diverse sectors including defense, transport, mining and social infrastructure. She has ventured into multiple pathways throughout her career but has “always been drawn back to infrastructure due to its tangible nature and positive impacts on society and the world around us,” she says.

Heidi is currently focused on forging a new pathway for organizations to make significant advancements through adopting digital techniques that enable smarter, faster and more effective project outcomes. This is especially important since Australia is in the middle of an infrastructure boom. Bigger, more complex projects need to be executed successfully to produce long-term value. “Deloitte’s Intelligent Major Capital Projects is an advanced digital solution that helps implement projects more efficiently and with more certainty. We use state-of-the-art technology to combine project data with industry insights to track performance across the entire life cycle in real



time. This will empower better and more informed decisions, anytime, anywhere,” she says.

Architecting giga projects

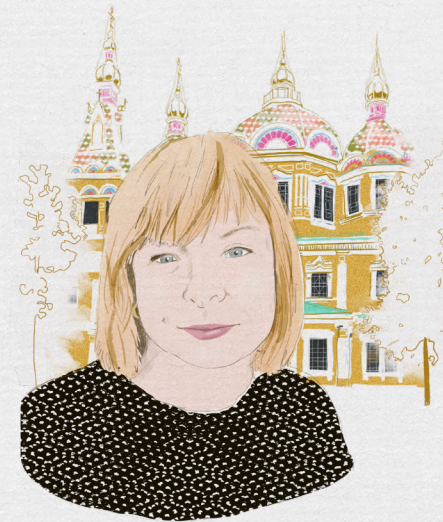
Another pioneering project Heidi recently worked on was Deloitte’s global *Architecting Giga Projects* report. Giga projects are infrastructure investments of such scale and ambition that they can be considered “once-in-a-lifetime - like Sydney Metro in New South Wales and the Major Transport Infrastructure Authority-led Big Build Transport Program in Victoria. Their sheer size and complexity present significant challenges in how they are managed and integrated,” Heidi says. The report provides guidelines on taking a holistic approach and shares a trailblazing framework that combines digital capabilities with leadership strategies to create the conditions for success of the world’s largest and most complex projects.

Heidi enjoys contributing to an industry that is so innovative and everchanging. “I will continue to champion this industry and my clients with the opportunity for change. In an industry where the resulting assets last for over 30 to 50 years, it is essential that we’re planning – and delivering the benefits – for the future of our workforce, environment and generations to come.”

Illustration: Sydney Harbour Bridge is nicknamed ‘the coat hanger’ for its shape. This famous 134 m tall and eight-lane wide bridge opened in 1932 and remains the tallest steel arch bridge in the world.

“The world is changing, and infrastructure needs to change with it. We need to adopt newer, more innovative digital solutions to drive lasting value in our evolving industry.”

Contact Heidi Isreb
✉ hisreb@deloitte.com.au



MARINA KOSTANIAN
FINANCIAL ADVISORY PARTNER
ALMATY, KAZAKHSTAN

Marina Kostanian leads Deloitte’s Caspian Region Construction Advisory practice from Almaty in Kazakhstan, a transcontinental country located mainly in Central Asia and partly in Eastern Europe. She has a long career in engineering and construction, and now excels in infrastructure project management to drive change for the better.

“I believe it takes a professional project management approach to enable the performance of infrastructure and construction projects in an orderly manner, so they achieve their intended project goals. Mentorship and leadership are also vital – I hope the teams I work with have a clear understanding of their projects’ bigger purpose to make them proud of their gradual achievements,” she says.

Marina is committed to imparting her extensive knowledge to others in the same way it was bestowed upon her. After completing a few degrees, she discovered the area of project management under experts in their field. “The passion and intellect of my mentors inspired me to continue. The best part, and close to my heart, is that the project management profession requires you to share the knowledge with others,” she says.

Overcoming common public-private partnership risks

With project management comes careful risk allocation. Marina advises government entities to use a public sector comparator tool to analyze the best procurement models before embarking on infrastructure projects. This step minimizes errors and maximizes value for money. She recognizes that, “Risk allocations are

“I’m passionate about using professional project management disciplines to build infrastructure and capital project practices from zero to a sustainable state in challenging locations.”

Contact Marina Kostanian
✉ mkostanian@deloitte.kz

complex and require consideration of common mistakes such as the Goldilocks Syndrome – when too much or too little risk is transferred to a party in the partnership, or the Beetle vs. the Ferrari – when the public sector favors the private sector in the hope of achieving high quality service levels for less costs, which is unrealistic. Whatever the challenge, risks need to maximize public value while navigating competing public policy goals, the finite risk capacity of the marketplace and the difficulty of holding a risk allocation fixed throughout a negotiation. In short, risk allocation is the search for optimality.”

In Kazakhstan, new requirements in construction and infrastructure project management are still being defined, including fee and project structure guidelines. “We need more coordination between working groups and access to best practices to standardize efficient performance and quality,” she says.

Marina is confident progress will be made in the future. “Developing markets like ours are challenging but open to opportunities to make a difference. We need to share knowledge while respecting local customs. We all want to achieve success and this will come with increasing organizational maturity,” she concludes.

Illustration: Zenkov Cathedral was originally completed in 1907, renowned for its Russian Orthodox design. Recently reconstructed, the wooden architecture was built without using any nails and is the second-tallest wooden building in the world at 56 m tall.

GLADYS MAKUMI
FINANCIAL ADVISORY PARTNER
NAIROBI, KENYA

Gladys Makumi leads the Advisory function for Deloitte in Kenya with over 15 years of professional experience, advising both private and public sector players on how to solve complex infrastructure problems. “I really enjoy advising my clients on making bold decisions that factor in the sustainability of solutions in the long-term, so future generations can enjoy a better world. This ensures that I’m part of an ecosystem that enables optimal allocation of resources, better use of renewable energy and delivers access for everyone,” she says.

Working predominantly in infrastructure financing, Gladys assists clients who need to raise money to develop or operate infrastructure projects in East Africa – including Kenya, Ethiopia, Uganda and Tanzania – covering a population of around 260 million. Gladys particularly enjoys working on projects that utilize natural resources that are good for the environment and present a more stable source of power.

Infrastructure for all

Her impactful work is making a huge difference in the lives of people in the region. “The renewable energy projects I have been involved in ensure that we use more climate-friendly resources to power our world. Telecom projects have led to better access to the internet, which leads to improved access to both information and entertainment. And road infrastructure projects have enabled better movement and connectivity between cities and reduced traffic flow.”

Reflecting back on her career, Gladys developed a passion for

infrastructure when on secondment to Deloitte’s Toronto office. She worked on a toll road and railroad project, which sparked the realization that she could help the African continent tackle its infrastructure deficit. Gladys notes, “A growing East African population is putting a strain on key infrastructure facilities including health care, education and housing. In addition, due to the capital outlay and financing structures offered, affordability becomes an issue. This is particularly true in the power sector.”

Gladys is an advocate for infrastructure being functional, sustainable and versatile – something that ultimately improves citizens’ lives. She says, “Each and every one of us deserves access to infrastructure that works for us, and provides what we require as individuals. Infrastructure should assist people who are differently abled, so that they have improved independence. We need to consider how technology can be used to assist with this.”

Illustration: The new Nairobi Expressway is an excellent example of public-private partnership to ease heavy traffic and improve commuter access between the international airport, Nairobi and environs. Attractive floriculture on the CBD road beams absorb the carbon dioxide emitted by vehicles.

“We live in a beautiful world and each of us can contribute to making it better for future generations by being responsible in the way we use the resources that nature has entrusted to us.”

Contact Gladys Makumi
✉ gmakumi@deloitte.co.ke





NIK ANIRA
FINANCIAL ADVISORY PARTNER
KUALA LUMPUR, MALAYSIA

Nik Anira, based in Kuala Lumpur, Malaysia, is an Infrastructure and Economics Advisory expert with over 25 years' experience.

Anira specializes in large-scale infrastructure projects involving both the public and private sectors across three main areas of focus: crafting master plans, developing feasibility studies and structuring investment opportunities of public-private partnership projects. "For example, assessing the viability of an idea, a development, or a new infrastructure asset and ascertaining how they connect with economic and socio-economic transformation," explains Anira.

In particular, Anira has a special calling for nation-building. To her, infrastructure is a key catalyst for economic transformation and long-term growth. "Infrastructure shapes and underpins our quality of life and how we live. It stimulates economic development and promotes social inclusion, like good roads or rail that enable physical connectivity and access to reliable telecommunication, electricity and clean water... these are all critical components to a nation's development and growth."

Like its neighbors, Malaysia faces a growing population and increasing urban migration. The infrastructure industry needs to get the right investors for infrastructure development projects, and navigate concerns about the impact of deforestation (e.g. for mega projects). "The country will need to strike a balance – progressing national infrastructure development without compromising environmental aspects. Sustainability remains a core consideration in our feasibility assessments for clients; from

"There's an art to developing master plans and reviewing policy that ensures infrastructure directly enables economic growth and indirectly impacts people and the community as a whole. That's why I specialize in infrastructure development."

Contact Nik Anira

✉ nikanira@deloitte.com

incorporating green elements in developments, to adhering to green standards; finding ways to reduce carbon emissions; and emphasizing the government's role in governing green infrastructure development," Anira says.

Her clients are mostly focused on designing attractive funding models to secure investors and making sure new infrastructure developments such as industrial parks, road, rail, and ports benefit the broader community. "Finding the right balance between public and private interest for the purpose of financing, building and operating infrastructure projects – and with the objective to create a better and more efficient infrastructure network – is key."

A federal masterplan for PPPs

Anira is proud that Deloitte Malaysia is assisting the Malaysian Federal Government in developing its master plan for public-private partnership (PPP) for the next 10 years (2023-2032). "It will serve as a critical guide to all relevant ministries and agencies on the way forward for successful PPP initiatives in Malaysia," she says.

When reflecting on the importance of equity and inclusion, Anira concludes, "Inclusive infrastructure promotes quality of life, creates jobs and drives the efficiency of economic development. It helps to reduce socio-economic disparities between urban and rural development."

Illustration: Opened in 1999, this twin pair of 88-story supertall skyscrapers stand at 451.9 m and were largely constructed from reinforced concrete. Known as the Petronas Twin Towers, their steel and glass facade resemble motifs found in Islamic art, a reflection of Malaysia's Muslim religion.

DANA SPATARU
RISK ADVISORY PARTNER
AMSTERDAM, THE NETHERLANDS

Dana Spataru is Deloitte's Global Emerging Technology Cybersecurity Leader and describes herself as a cyber specialist who – like the proverbial moth to light – was naturally drawn to infrastructure. In her case, to use her technological nous to make infrastructure smarter, more responsive to users and resilient for the long term.

Dana shares some insights into her career transition. "While working on building more resilient IT systems, the world started realizing that securing systems must go far beyond IT – especially if we want to protect the physical world as we know it. That's when I started focusing more on securing Operational Technology (OT) as well as all the incredibly vast amount of new devices connected to the Internet of Things (IoT)," she says.

When thinking about what she's hearing in the market lately, Dana says, "Many governments are focusing on protecting their core assets and defining the supporting regulation for this, while private sector operators are interested in building additional security capabilities for the essential services they run," she says.

Cyber resilience protects critical infrastructure

Dana's team of hackers and engineers have been looking into protecting cyber as well as IT systems. "What began with testing the security of individual elements for vulnerabilities – such as single buses, cars, planes and trains – ended up with defining a broader strategy and helping to implement better security measures for entire segments of the critical infrastructure that supports complex mobility ecosystems," says Dana.

Dana envisions infrastructure that is flexible, agile and inclusive and actively understands and responds to

user needs. Such infrastructure relies on trustworthy technology (mindful of users' data privacy) that can also deal with digital ethics dilemmas. "Imagine Amsterdam city, in different weather and traffic conditions, having a public transport network that is optimized to allow for the best traffic flow with the lowest impact on air and noise pollution. I dream of fully electric self-driving buses that can understand the road infrastructure, and minimize delays and impact to traffic while squeezing through big groups of electric bikes," she says.

Dana wants to "work with organizations that are vital for our economy and society, and rely heavily on ICT (information communications technology) – such as energy, transport, water, banking, financial market infrastructures, healthcare and digital infrastructure," she says.

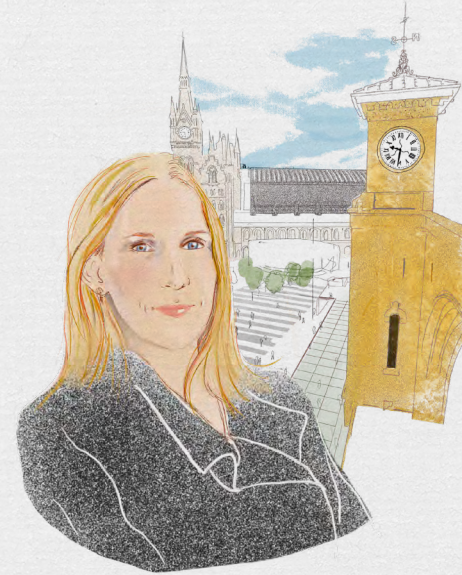
She is passionate about building capabilities around securing smart cities, connected vehicles and operational technology for critical infrastructure. "The world has a shortage of security, privacy and digital ethics skills required in this space. Technology is part of the future of infrastructure, but are we ready to manage the security, privacy and digital ethics risks coming with it?" she muses.

Illustration: Amsterdam's public transport network is efficient and includes 30 bus routes, 16 tram lines, 8 ferry links and 4 metro lines. Its distinctive white and blue trams are one of the best ways to get around in the city center.

"Society needs infrastructure to operate well. My job is to help organizations that enable or operate in physical infrastructure be more resilient to cyber attacks, provide more secure services and products, and thus enable technology to better serve citizens."

Contact Dana Spataru

✉ dspataru@deloitte.nl



CHARLOTTE WARBURTON
CONSULTING PARTNER
LONDON, UNITED KINGDOM

Charlotte Warburton is Deloitte's UK Transport Leader. She is passionate about harnessing the power of transport infrastructure to unlock triple bottom line benefits to the planet, people and profit. Based in London, Charlotte specializes in using technology and innovation to encourage industry-wide transformation and change. Her ambition is to deliver seamless customer journeys by bringing the services they need together through modern, disruptive business models.

The turning point in Charlotte's career that drove her to focus on complex transformation across the transport sector was when she transitioned from large scale transformation in health to address comparable challenges in rail. Like the health sector, Charlotte predicts that future infrastructure will need to be responsive, resilient and adaptable – and have the flexibility to be repositioned for different services based on demand. She speculates, "For example, road infrastructure will need to be updated to include built-in charging as citizens or autonomous cars are driving, train timetables will need to be reconfigured for different user patterns and car parks will need to be repurposed for different uses – as EV charging points, bike parks or carbon regeneration sites."

Charlotte says clients are concerned with economic sustainability. "There's currently a significant funding gap in the public purse to fund railway operations, and a reluctance from citizens to return to train travel. The cost-of-living crisis is also impacting use of the network and rising inflation means that some previously funded transport schemes are no longer viable over extended timescales."

"Transformation of the transport sector requires both the public and private sectors to align behind a common vision, leveraging diversity of skills and thinking to deliver better outcomes for all."

Contact Charlotte Warburton

✉ cwarburton@deloitte.co.uk

Charlotte and the Deloitte teams globally have been collaborating with clients to deliver successful infrastructure projects in a variety of ways. Deloitte is supporting rail sector transformation from recovery to reform, optimizing the infrastructure's capacity and enabling the delivery of better services for customers. They are supporting the design and establishment of the future operators for some of the globe's most innovative, high-speed rail, metro and freight lines to optimize rail and active travel while minimizing the reliance on road networks. The team also implemented, in partnership with Costain, a shared digital carbon architecture within the UK's Department for Transport, which enabled the organization to measure the carbon footprint of all its infrastructure build programs.

Delivering on national net zero commitments

Charlotte's focus is on helping clients reach their net zero targets. She will do this by, "measuring, defining and delivering impactful transition plans to achieve net zero across road and rail infrastructure." She believes public and private sector collaboration is essential to accelerate infrastructure transformation while delivering on national net zero commitments.

Illustration: King's Cross St Pancras Station, London, is a 19th century station that delivers a 21st century regional, intercity, continental and high speed railway to London. The station first opened in 1863 and is now a key London interchange and the very definition of a "destination station".

EILEEN YAN
FINANCIAL ADVISORY PARTNER
SINGAPORE, SINGAPORE

Eileen Yan is an experienced Global Infrastructure Advisory leader who joined Deloitte Southeast Asia in Singapore in 2018.

After a well-established 17-year career in debt finance, Eileen decided in 2015 to hone her focus and pursue her calling to improve infrastructure. She says, "I saw a pressing need for infrastructure experts in Southeast Asia to help support new projects in our region. This was an opportunity for me to expand my career and bring more purpose to my professional life."

Her mission is to contribute toward life-changing infrastructure for developing countries in the region, where she enjoys working closely with public and private sector clients to deliver sustainable infrastructure developments that promote connectivity, equality and innovation.

In many developing countries in Southeast Asia, citizens have limited access to public and social services as a result of poor infrastructure. These countries are looking for private sector investments in power, water and public transport to fill the gaps in underdeveloped infrastructure to meet the needs of their growing populations. Eileen says, "Fiscal economic constraints, poor regulatory governance and lack of resources have hindered the advancement of infrastructure developments. Financial markets need to come up with more innovative solutions for the investment of new infrastructure projects to support our developing nations."

Eileen advises clients on the overall strategy of their investment decisions, including the financial impacts of their entire infrastructure project life cycle.

"Our unique advice and solutions are tailored according to circumstances, market environments and our clients' requirements. Each time, we focus on the asset's entire lifespan to ensure a positive impact on people, the local community and the environment," she says.

Government-funded infrastructure for good

The team recently worked with a prominent government agency to assess the financial strategy for funding energy projects in the region. Eileen says, "We bring financial acumen and accountability into the creation, construction and performance of these projects. As an advisor, I'm proud to play a part in developing infrastructure-focused talents, capabilities and skills in this area."

Eileen is hopeful for a prosperous future for Southeast Asia's evolving infrastructure. She says, "The industry is becoming more human-centric, inclusive and forward-thinking – to create an equitable society where infrastructure is accessible for everyone. No matter who you are or where you live – infrastructure should empower and rejuvenate all people, businesses and nations. This drives me every day."

Illustration: Jewel Changi Airport opened in 2019 as part of a leading global air hub for travelers. This nature-themed entertainment and retail complex attracts 300,000 visitors per day.

"We want to create an equitable society where infrastructure is accessible for everyone. No matter who you are or where you live – infrastructure should empower and rejuvenate all people, businesses and nations."

Contact Eileen Yan

✉ eilyan@deloitte.com



Freight tanker. (Image: Getty Images)

Five forces are shaping the future of freight

RESEARCH WITH U.S. AND EUROPEAN EXECUTIVES REVEALS FIVE MAJOR FORCES ARE AT PLAY



In the last few years, moving goods through ports and on planes has become far more complicated. The concurrent rise of e-commerce and consumer expectations has placed unprecedented pressure on global transportation networks and logistic providers – with manufacturers and retailers responded by pushing their existing systems harder. Their wide-ranging global networks of tightly coordinated, just-in-time production

and fulfillment operations have been pushed to their limits.

The consequences? Nearshoring to shorten and bolster supply chains, for one, especially in agricultural, apparel and consumer electronics. Revolutions in data science (Internet of Things, analytics and artificial intelligence), material science (electric vehicles), and engineering (autonomous vehicles)

are also causing shifts in freight. And all of these shifts represent an opportunity for new competitors to enter the market as startups, megaretailers, and hyperscalers all vie for a piece of the trillions of dollars at stake.

To better understand how freight systems are responding to short-term shocks and preparing for longer-term transformation, Deloitte

surveyed 305 executives in late 2022 as part of its 2022 Future of Freight Survey. Survey participants were from transportation and manufacturing companies in the U.S. and Europe with annual revenues ranging from USD 500 million to over USD 50 billion. We also conducted a series of executive interviews for perspectives on the future of the broader industry.

Five MAJOR FORCES

OUR SURVEY RESULTS REVEALED A TRANSPORTATION INDUSTRY WHERE SUCCESS WILL BE DETERMINED LARGELY BY THE ABILITY TO DEFTLY NAVIGATE THESE FIVE MAJOR FORCES:

1

ONSHORING AND NEARSHORING TO REDRAW THE TRANSPORTATION MAP

Our research shows increased interest in moving manufacturing closer to the end consumer to mitigate disruption risk and the inflationary impact on the cost of goods. Even if this happens at half the rate our survey respondents expect, it will represent radical change, creating new opportunities for established leaders and openings for new competitors to enter the market.

2

WELL-CURATED DATA IS THE GREAT DIFFERENTIATOR

Companies with advanced, unified digital strategies are currently at a significant advantage, as an industry that still suffers from data fragmentation rushes to close the gap. Nearly half (48 percent) of survey respondents expect data to improve visibility into assets and goods in the next three years. Over the same time horizon, many say data will help improve customer relationship management (44 percent) and workforce optimization (35 percent). The ascent of data and analytics could pave the way for new competition from digital-native startups and hyperscalers to set their sights on transportation as a source of profits.

3

NEW COMPETITIVE DYNAMICS ABOUND

As the industry reconstitutes itself, cloud services providers, megaretailers, vehicle manufacturers, and tech startups are pursuing the transportation industry and its profit streams. As their interest and expertise grow, they are positioned to usurp territory and customers from legacy logistics companies while prompting new models of collaboration.

4

RESTRUCTURING WILL ALIGN CORE CAPABILITIES TO A CHANGING ENVIRONMENT

Transportation leaders recognize they need to change to meet this moment. Most survey respondents are in the process of reshuffling their structure and operations—59 percent are outsourcing non-core capabilities, and a similar share (59 percent) are actively seeking acquisitions to expand their capabilities. These trends are not mutually exclusive: Companies that are outsourcing are also building or acquiring new core capabilities.

5

NEW VEHICLES AND NEW INSIGHTS MEAN NEW COMPETITION

The coming wave of next-generation vehicles harnessing electric power, autonomous technology, and IoT data will not only alter the capabilities, efficiency, and sustainability of the transportation system, but will also potentially precipitate a power shakeup. Among our survey respondents, 60 percent believe it is inevitable that truck manufacturers will seek to become fleet managers as technology advances and lines of supply are redrawn.

Larry Hitchcock,
Principal and Deloitte U.S.
Transportation sector leader, advises,



“Leaders should plan for rapid acceleration of these five forces and configure their companies to win in a constantly evolving environment.

“Alongside these trends, the role of the public sector, in the form of state, federal, and international governments, is paramount. These bodies contribute by modernizing infrastructure, regulating or deregulating the transportation industry, and establishing incentives

FUTURE SUCCESS

The research team concludes that as the transportation industry continues to evolve in the context of short-term shocks and longer-term transformation, success will likely depend on strategies that account for the following:

- Nearshoring has been in the conversation for a long time without much true change. However, the lessons of the pandemic, advances in robotics, changes in labor markets and shifts in geopolitics could drive real change in the next few years. Navigating these newly drawn maps would require reconfiguring partnerships, supply lines, infrastructure, and relationships with the public sector
- The data revolution and the rise of modernized transportation fleets hold promise for established logistics leaders to boost efficiency and provide unprecedented insights. But these will also come with increased competition from newcomers to transportation who have deep competency in data science. Data fluency and transparency will be table stakes for tomorrow's transportation companies. Innovation and rigorous alignment with strategic priorities will set true leaders apart from the pack, along with the ability to partner and acquire wisely. The next few years could be critical as companies decide which of their operations are their core competencies and which are better handled by outside partners.

around emissions, nearshoring, EV, AV, and more. A new era of partnerships with governments and regulators will factor into the long-term success of the industry's incumbents and new entrants.”

When it comes to public policy, transportation companies should have both a broad aperture accounting for globalization and national economic strategies, and more targeted engagement at the state level. As public sector priorities and private sector opportunities continue to be closely intertwined, effective collaboration will likely take a variety of forms, ranging from tax incentives and workforce training to initiatives that involve federal- and state-funded organizations and research institutions. Together, government and industry leaders can help guide the modernization of infrastructure and practices to set the future of freight on a more stable and resilient path.

Contact Larry Hitchcock
✉ lhitchcock@deloitte.com



READ *FUTURE OF FREIGHT* BY DELOITTE UNIVERSITY PRESS

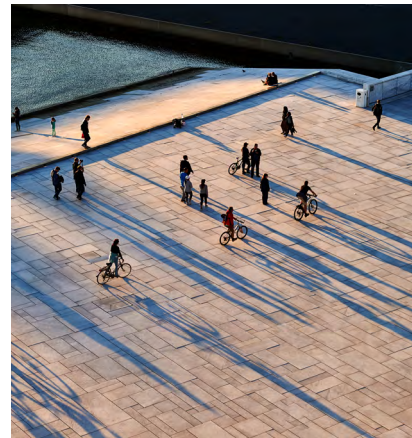
DID YOU KNOW?

Scandinavian female mayors lead the world's most sustainable cities

Corporate Knights's inaugural Global Sustainability Index revealed female mayors are running the world's most sustainable cities. We find out more.



Stockholm in Sweden is ranked the globe's greenest city and is led by Mayor **Karin Wanngård**. The city boasts open spaces, good air quality and residents who choose to use the extensive public transportation system instead of private vehicles. Mayor Wanngård is one of 16 women mayors leading major cities whose primary objective is to address climate change. She intends to create a "smart and connected" city through digitization and smart solutions and has allocated budget to make this happen.



Oslo in Norway, led by Mayor **Marianne Borgen**, is ranked second on the Index. Oslo intends to become a zero emissions city by 2025 and its sustainable mobility solutions – like its highest per capita ranking of electric vehicles in the world – will help achieve this target. Former car parks have also been repurposed into areas and facilities that benefit the community, such as bike lanes and open green spaces.



Copenhagen in Denmark, ranked third on the Index, is led by Mayor **Sophie Hæstorp Andersen**. Copenhagen is home to nearly 550 km of bike paths, a fleet of electric harbour ferries and more than two-thirds of the city's hotels hold an eco-certificate.

Scandinavian capitals. (Images: Getty Images)

"We have the ambitious goal that Stockholm should be the smartest and most connected city in the world. When it comes to connectivity we are far ahead, having established a company, Stokab, owned by the city that provides dark fibre—reaching 90 percent of households and 100 percent of businesses. The basic philosophy behind it is that access to fibre infrastructure is a strategic utility for the city—just like water."

Having solid infrastructure in place is, of course, a pre-requisite when building smart cities. But again, the crucial part lies within the process of application. There's no use in installing faucets in every home if the water is undrinkable. This is where political will and decision-making comes in."

Karin Wanngård
Mayor of Stockholm



Commuter riding electric push scooter on bridge in Stockholm. (Image: Getty Images)

"If cities can be made more sustainable, the effect on resources, emissions and society would be enormous. Investment in smart transportation, green buildings and data-driven technologies will help ensure viable economic growth ... making the urban environment inclusive, safe, resilient and sustainable."

INTERVIEW WITH DAMIAN REGAN, DELOITTE MIDDLE EAST'S SUSTAINABILITY REPORTING & ASSURANCE LEADER AND STEVE SEVERANCE, MASDAR CITY'S HEAD OF PROGRAM MANAGEMENT & INVESTMENTS.

READ THE 11TH EDITION, BUILDING A SUSTAINABLE FUTURE BY DELOITTE

Honoring the Māori way of life

DELIVERING LIFE-CHANGING ARCHITECTURE

Kaore te ki, patu te makere noa i te ngutu.
 He puoro waihoe i a TOA i runga.
 E matakau ana roto i te hau korero;
 Wareware i ahau te maru o Taramainuku.
 E herengia koia a Kaiwhare rakau ka whiria?
 Te ata whakarangona nga mahi a Tāwhaki.
 Ko to tinana ra te waiho atu i te hoa;
 Ko to pai waewae te tuku mai ki ahau,
 Kia huaina atu, e arotau ana mai.
 Ka te tiriwa te ripa ki Kinikini;
 Kua puawhea te rae ki Hikurangi,
 Ki nga tai omanga i te ipukarea o Mokau.
 Me ruku ware au te reinga tupapaku;
 Kei whakamau kau ki Muru-a-nuku,
 Ki taku tau tupu i awahi ai maua.

HARIATA TE HUIA RAPATA – WAIKATO/WAIOHUA

How oft do bitter words fall needlessly from ones lips;
 So echoes the clamor of the TOA paddle.
 Allaying the fears within the anxious tidings;
 For I was unmindful of the shelter of Taramainuku.
 Is the great Kaiwhare to be confined within the entangled nets?
 Unheeded were the accomplishments of Tāwhaki.
 You yourself remained always with your friend;
 And your kindly footsteps ne'er did come to me,
 As a token that you were inclined to see my way.
 The dividing line was the hill of Kinikini;
 And stormy winds blew upon the heights at Hikurangi,
 Where ends the trail of the treasures of Mokau.
 Let me, unsung, plunge into the hereafter of the dead;
 Rather than fix my mind on Muru-a-nuku,
 Where my true love of yesteryear awaits my resolve.

SBR TRANSLATION

IN AN EFFORT TO BETTER UNDERSTAND THE ART OF COLLABORATING FOR BETTER INDIGENOUS OUTCOMES, WE REACHED OUT TO OUR TEAM IN NEW ZEALAND TO EXPLORE WHAT IS HAPPENING IN THE HEART OF AUCKLAND AND BEYOND.

Anthony Ruakere, a partner at Deloitte Zealand and Hourua Pae Rau (Deloitte's Māori/Indigenous Services Group), is a Māori leader who is passionate about improving the lives of his people. Anthony says, "Growing up in the shadow of my ancestral anchor, Mount Taranaki, keeps me grounded in my sense of place. These roots also guide me in my work, which in part is focused on ensuring that infrastructure design positively represents us as a people and, via delivery, plays a part in addressing the inequities experienced by Māori. To that end, Māori-owned businesses continue to punch above their weight in contributing to New Zealand's economy." This often starts with casting a net far and wide to gather like-minded individuals who are equally committed to positive change for Māori New Zealanders.

karakia, the Māori spiritual incantation used "to draw the energies inside and around us, to bless our space and connect us at a deeper level."

In 2011, Nicholas founded TOA Architects, striving to create real change in the industry for and with Māori communities. In the past 12 years, he has grown the team to three offices with more than 30 employees and is proud to say, "What makes TOA different is that we are 100 percent Māori owned. Our team takes a special interest in the recruitment and retention of Māori within our field, leading the way for a pathway of difference."

Nicholas grew up in Mamaku, a tiny village where everyone knows one another by their first name. He says, "This community is what shaped my 'care factor'. It's where I learned to harness natural energy and work harmoniously with the people and environment around me – which is a key influence in the work my team and I aspire to produce today."

Nicholas is on a lifelong mission to build ground-breaking infrastructure that enriches Aotearoa. He says, "It is not just about protecting and improving its natural mountains,

lakes and rivers but also uplifting its indigenous Māori communities. We take our role seriously as 'kaitiaki' – or guardians – of our clients, Māori communities and mother nature."

As a young architect, working for some of the largest firms in Aotearoa, Nicholas developed a greater calling as he witnessed a substantial gap in the market. He says, "After reaching maximum frustration with how Māori projects were being handled, I wanted to create something that was bigger than me. That was enduring, that was about culture and whakapapa – our people."

DRAWING ON THE PAST TO INFORM THE FUTURE

Like many New Zealanders, Nicholas is worried about climate and weather catastrophes that will keep happening, like Cyclone Gabrielle, New Zealand's worst weather disaster in a generation. "We need to remember that this country was largely made up of wetlands ... so we need to look at different infrastructure responses. To restore the wetlands, we need to go back to old knowledge."

Nicholas continues, "When we are working for Māori, we involve their

descendants in the process ... that's the ultimate dream. For example, inspiring the next generation who are watching their 55,000 square meters of land being turned into 55 sections for various clusters of intergenerational living. Like the Rotoma project, which involved designing and building 483 bedrooms on-site. During the process, we made sure the wetlands were restored while introducing incredible modern-day buildings.

"When we go to any wetlands, we draw on specialists who live there, who know the land. And we also lean on experts of western science, who specialize in environmental monitoring such as air and water quality.

"It means that any work we do must enhance the life force of the surrounding areas and increase the health and wellbeing of the fish and animals that live there," says Nicholas.

Milford Sound in a mist. (Image: Getty Images)

REIMAGINING HOUSING WITH KŌTUKUTUKU KĀINGA

Kōtukutuku Kāinga is a social housing project in Ōtara that consists of 41 single-bedroom apartments and a Whare Manaaki. The collaborative design process for Kōtukutuku Kāinga involved the client, staff and Tangata Whaiora being present in a series of hui (meetings) to ensure the project stayed true to its values, and the

stories gifted to the project were embedded into the fabric of the buildings.

"The residents refer to Kōtukutuku Kāinga as a Whare Manaaki – an inclusive space where no one is judged, and everyone is welcome. Where they can come together and lay the foundations for a better life," says Nicholas.

Kōtukutuku Kāinga design. (Image: TOA Architects website)



Māori Modular Housing. (Image: TOA Architects website)

MORE HOMES FOR MORE NEW ZEALANDERS

To meet the needs of a growing population, the team at TOA Architects have given themselves a mission to build 1,000 Māori Modular Housing, or MMH, in Aotearoa by the end of 2023.

"Innovation is at the very core of MMH. One of the main differentiators is having all major components made in a factory and then assembled on-site by a highly trained team. This way, they don't have to have five builders in a house for six months. Instead, the house is completely finished on-site, within just a month," explains Nicholas.

MMH will also combat other social issues, like unemployment and waning economic growth. Nicholas says, "As much as we can, we are sourcing our products from Māori-owned businesses, particularly timber products. We are committed to rejuvenating timber production in our country. Creating 1,000 of these homes will have a knock-on effect of creating NZD 300 million of value in the Aotearoa market."

TOA'S VISION FOR THE FUTURE

By 2040, Nicholas aims to have all of his staff fluent in the Māori language, and other firms to have revised policies and practices to ensure diversity is embedded. "This way, all aspiring Māori architects will be able to go into any practice and feel safe and valued," he says.

"Currently, Māori only make up 3 percent of Kiwi architects. By 2040, our goal is to make this reach parity with the population of about 20 to 25 percent," he says.

One of the ways Nicholas and his team are achieving this is by holding group sessions at local high schools throughout the country. These sessions offer work experience opportunities, learning programs and guided career advice. He says, "Speaking at these schools allows Māori youth to see the opportunities available to them, which they may have never known were possible. We are standing on stage, putting it out there, saying 'Hey, we are successful Māori architects, you can do it too!'"

Nicholas is building an enduring legacy with TOA Architects, saying, "We're not a bricks and mortar architecture practice – we're helping individuals in our communities be good ancestors and live meaningful lives."

For organizations looking to work with the indigenous, Nicholas says, "Community-led design is everything – you need to ask the people what they need and take a collective approach, with as many voices at the table as possible (from youth to elders). Invest in the relationship – for the Māori, relationship balance is everything – you need to show your heart and be open to hearing our stories and truth."

"I want to be a great ancestor – and leave a legacy. Not just beautiful buildings ... But being careful with our interactions, healing the whenua and leaving it better than we found it." Nicholas Dalton

Contact Anthony Ruakere
 ✉ aruakere@deloitte.co.nz



Māori Modular Housing design. (Image: TOA Architects website)

Being inclusive isn't just good, it's the right thing to do

GUIDING PRINCIPLES FOR EMBEDDING INCLUSIVITY

Simon Moses, Principal, Infrastructure and Capital Projects for Deloitte Australia and Global Co-Lead, Infrastructure Diversity, Equity & Inclusion for Deloitte, lives and breathes inclusivity in everything he does. This makes him a natural choice to help drive this vital agenda across Deloitte as it takes care of its people. When people feel psychologically safe and comfortable to bring their whole selves to work (if they want to), they can make a better impact.

Simon adds, "In 2023, we are well on the way to driving the change that we want to see in the world. At Deloitte, we believe in authenticity. When we bring our true selves to every aspect of our lives, we invite others to do the same, creating a butterfly effect of powerful and vibrant change. It is wonderful to be part of this movement of positivity and to be joined by colleagues across Deloitte offices on this rewarding journey."

BOLDER, BRAVER AND BETTER

Derek Lai, Vice Chair of Deloitte China and based in Hong Kong, is one of those global colleagues and a loud advocate for all forms of inclusion. "From my own experience with a physical disability, I truly understand and feel the necessity to embed inclusivity in our lives. All individuals, regardless of ability (whether visible or invisible), gender, race, nationality and sexual orientation, deserve to be treated equally, and recognized for the unique perspective that they contribute to the workplace and society. We should all have the opportunity to feel valued and appreciated – not in spite of our differences, but including our differences. Our clients get a better outcome when they are served by diverse teams, and when our teams reflect the communities they serve, we deliver the very best advice," says Derek.

UNDERPINNING TEAM VALUES WITH ACTIVE COMMITMENTS

The leaders in Australia are also committed to making sure teams reflect the communities they live in, and that starts with shared values. "We're keen to show our clients the changes we've made internally to ensure we are more diverse, equitable and inclusive. Some changes are simple, yet signal to our staff and our clients that diversity, equity and inclusion are core to our thinking. For example, we're changing our approach to social events to embrace cultural diversity, such as celebrating the Lunar New Year," says Syvilla.

Together, Simon and Syvilla are joined by a global network of like-minded leaders across the firm who are determined to leave a lasting legacy of Deloitte as an inclusive employer of choice for everyone, everywhere.



Team members in Deloitte China surrounding Derek Lai. (Image: Deloitte)

Simon says, "Some changes are bolder. For instance, we recently agreed that for every client engagement, we will make two core commitments: a 40:40:20 gender split, which is the industry benchmark; and at least 20 percent of the team will be from racially or culturally diverse backgrounds – while showing gender diversity at every level. No one said this is easy, but it's the right thing to do."

A NATIONAL AUSTRALIAN CONVERSATION SERIES SPARKS HEALTHY DEBATE AND CHANGE

There is no doubt that different organizations have different priorities. Simon says, "In Australia, we know that only 25.9 percent of the construction industry (the third largest national employer) identifies as female, for example. And the Australian Human Resources Institute recently reported that 75 percent of those surveyed in the construction industry have observed homophobia in the workplace. This is a challenge we need to address."

To encourage awareness and address these challenges, Deloitte Australia is hosting a national conversation series comprising 24 events with clients. Discussions will center on how Australia's infrastructure projects and investment pipeline can promote diversity, equity and inclusion in infrastructure, and how projects can be designed with diverse communities in mind.

For example, in February 2023, the Chief Minister of the Australian Capital Territory (ACT), Andrew Barr MLA, was hosted at a client breakfast where he talked about his government's goal of making Canberra the most LGBTQI+ friendly city in Australia, and how the ACT Government's infrastructure pipeline is helping to drive meaningful diversity, equity and inclusion outcomes. Simon presented at the event, and was deeply encouraged by the feedback and participation on the day.

"This event (pictured on page 51) formed part of our national conversation series, entitled The Next Generation - Infrastructure for Diverse People. For a practice group that didn't exist in Canberra 18 months ago, we had a room of 45 senior clients and prospective clients, which was a really great outcome. Every client who attended was asked to bring a rising star in their organization with them, which gave our own rising stars the chance to network," says Simon.



Deloitte's "Wonderful, Proud and Free" Sydney World Pride March. (Image: Deloitte)

THE POWER OF PILOTS – A CLOSER LOOK AT WOMEN IN INFRASTRUCTURE

Recognizing any gaps is the first important step, and piloting possible solutions – like the Global Women in Infrastructure Mentoring Program – are key. **Sima Gupta**, Deloitte Partner, Infrastructure & Capital Projects based in Toronto, Canada, is committed to mentoring the next generation of women, and says it's great that Deloitte is encouraging its people to make a difference.

"As a woman, I only wish that someone had mentored me in the early stages of my career. Now, I have been given the opportunity to lead from the front and give back to the next generation of women by sharing insights, ideas and guidance. We need to take care of one another so the next generation of leaders is even stronger and better than we are. It is hugely rewarding, both within and external to Deloitte," says Sima.

MEET SAACHI PANDE, A "WOMEN IN INFRASTRUCTURE" MENTEE



As an Associate Director based in Sydney, **Saachi Pande** leads complex infrastructure procurement projects for public sector clients. Saachi has recently returned to Deloitte from parental leave and has been nominated for the Women in Infrastructure Mentoring Program to accelerate her career by pairing her with a senior leader in the infrastructure sector.

"There is a need to encourage women's participation and leadership in infrastructure. The sector is

transforming and it's important to lay strong foundations of diversity, inclusion, resilience and sustainability as we build the infrastructure of the future that meets the needs of everyone, including women," says Saachi.

Sima Gupta and her team are active in women's leadership associations across Toronto, including the local chapter of Women in Transportation and the Canadian Chapter of the Women in Infrastructure Network, speaking up about important concerns for women. For example, Deloitte Canada recently hosted a successful in-person event featuring a panel of senior women on 'Imposter Syndrome.'

Likewise, the Women in Infrastructure Network is also gaining traction in Australia. Simon reflects on the pilot's recent launches in Melbourne and Sydney. "In February, we launched two industry mentoring program pilots for Women in Infrastructure with Infrastructure Partnerships Australia and the Australian Chapter of the Women's Infrastructure Network. CEO-level female leaders from across the sector have been paired with Director and Associate Director-level employees. They will be guided through a six-month mentoring program around leadership and executive presence," says Simon.

To gain momentum and be inclusive in the way diversity, equity and inclusion are embedded in all their forms requires being clear about roles and responsibilities. Having several programs and pilots taking place at the same time will make sure you can test and refine your approach.

Syvilla shares some valuable advice on this approach. "It is also important that every strand of work supports a broader strategy and is championed by a senior leader. At a global level, different Deloitte offices also take the lead on different agendas, so these can be locally developed, tested and rolled out globally," says Syvilla.

"For example, Deloitte member firms have been targeted with championing different diversity, equity and inclusion pillars including First Nations, gender diversity, racial diversity and LGBTQI+ inclusion. Each Deloitte firm has a senior partner dedicated to the agenda who is advocating for positive change. They are taking the lead on developing a transformation program for that pillar. By leaning in globally, we can learn from one another and share best in class principles across all our geographies," says Syvilla.

To continually inspire awareness and action, Simon and Syvilla recently developed a Global Playbook to drive how Deloitte's global network approaches localized diversity, equity and inclusion strategies. The playbook also outlines the qualifications and commitments people should be looking for when building excellent teams. Ultimately, Simon and Syvilla strongly believe society at large needs to get to a place where diversity, equity and inclusion is unremarkable.

No matter where you are on your roadmap toward inclusivity, it helps to look at what other organizations are doing. Consider your own values and priorities, and then test the waters with informed pilots that can be rolled out to leave a lasting legacy.

Contact Simon Moses
✉ smoses@deloitte.com.au

Contact Syvilla Boon
✉ syboon@deloitte.com.au



Adam Powick, Deloitte Australia CEO interviewing Lord Herbert of South Down, the United Kingdom's Special Envoy on LGBTQI+ rights and Jessica Stern, United States Special Envoy to Advance the Human Rights of LGBTQI+ Persons. (Image: Deloitte)



Simon Moses and other attendees at the national conversation series held in Canberra, 23 February 2023. (Image: Deloitte)

Deloitte Australia has developed five guiding principles to unite and inspire teams to act every day:

- 1. Gender equality** - We will have a workforce that reflects the diversity of a contemporary global society, and a culture that is inclusive, equitable, and accountable
- 2. Diverse workforce** - We will have women leaders, role models and allies in every part of our business strongly influencing decision-making and change
- 3. Inclusive teams and communities** - We will design for diversity and team up together to solve differently, lift performance, and achieve stronger outcomes for our clients, society and ourselves
- 4. Break stereotypes** - We will have new and different pathways that break stereotypes of success and progression (the mentoring program is a great example)
- 5. New models of work** - We will experiment with new models of work to provide new value, choice and flexibility for our people and clients.

5 Global transportation trends

TRANSPORTATION PLAYS A FUNDAMENTAL ROLE IN THE WORLD OF INFRASTRUCTURE, SUPPORTING ECONOMIC GROWTH, CREATING JOBS, AND CONNECTING PEOPLE TO ESSENTIAL SERVICES SUCH AS HEALTH CARE OR EDUCATION

HOWEVER, ACCORDING TO THE WORLD BANK, ABOUT A BILLION PEOPLE STILL LIVE MORE THAN A MILE FROM AN "ALL-WEATHER" ROAD, AND EVEN IN DEVELOPED COUNTRIES, BASIC TRANSPORTATION OFTEN ISN'T AVAILABLE TO THE RESIDENTS WHO NEED IT.

Moreover, existing transportation systems also often face a variety of hurdles, from congestion to climate change. And the revenues that support these systems are increasingly at risk from tax structures that no longer reflect the way many people move today.

Technology, obviously, will be pivotal in modernizing our transportation systems, but many traditional challenges continue to act as a brake on progress in the sector. Transportation leaders, planners, and ecosystem stakeholders thus face a mix of new and old challenges. For instance, movement toward the development of sustainable funding models to replace the "gas tax" has been slow, as has been the struggle to scale new transportation technologies and successful pilots.

Data can improve transport efficiencies and effectiveness, but will likely require new governance structures across the ecosystem related to data sharing, security, and privacy. The transportation ecosystem should build resiliency, both in the cyber and physical worlds, through cybersecurity measures and a climate-resilient transportation infrastructure.

In Deloitte's *Global Transport Trends 2022*, we explore five trends that address the myriad challenges facing transportation as it potentially enters the next era of exponential growth. We see progress in some areas, even as concerns emerge due to the COVID-19 pandemic, compounded by the growing need to tackle climate change and environmental sustainability.

CREATING SUSTAINABLE FUNDING MECHANISMS FOR TRANSPORTATION

The developing crisis in transportation funding - in many cases, vehicle miles traveled continue to rise while gasoline tax receipts continue to be eroded by greater fuel efficiency and the increasing popularity of electric vehicles - calls for greater urgency in the development, testing, and scaling of sustainable alternatives to fuel taxes.

To help gain widespread public acceptance and adoption, road user charging (RUC) programs should articulate a clear value proposition for stakeholders, educate stakeholders about the necessity for RUC and what's at stake in its absence, and build public trust by highlighting the links between how funding is obtained and how and where it's spent.

EVs USHER IN A GENERATIONAL SHIFT IN MOBILITY

The widespread adoption of electric vehicles (EVs) represents a growing technological and cultural transformation. With some countries already seeing exponential growth in EV ownership, transportation leaders and ecosystem partners should focus on addressing the charging infrastructure problem and a potential talent crunch in the EV market.

MODERNIZING TRANSPORTATION SYSTEMS IN AN INCLUSIVE, EQUITABLE WAY

By tapping into the momentum generated by the focus on inclusion and equity, transportation leaders can create an equity-centered approach to investment and design that brings underserved and disadvantaged communities into the planning process. Transportation agencies would have to balance equity with innovation, keeping mobility ecosystems functioning and accessible while encouraging modernization.

MAKING TRANSPORTATION NETWORKS MORE RESILIENT

Transportation leaders should fight a two-front war to make the transportation system more resilient to cyber threats and climate change. Both problems are probably unavoidable and will continue to pose growing threats.

To address cyber threats, effective cybersecurity should be embedded in new systems and technologies, from design through implementation. New collaborative governance models are needed to manage the increased risks associated with a growing number of connected physical devices. On the climate front, increasing the resiliency of the transportation system and infrastructure will require significant innovations in design and maintenance, coupled with a more data-driven approach to prioritizing investment decisions.

TURBOCHARGING DIGITAL AND TECHNOLOGICAL REVOLUTION

The pandemic turbocharged digital transformation at transportation agencies. New funding could provide further impetus to experiment with smart infrastructure, connected and autonomous vehicle technologies, and innovative mobility-on-demand solutions. To succeed, transportation agencies should address the age-old challenge of scaling successful pilots by improving pilot design and building better systems for scaling innovation.

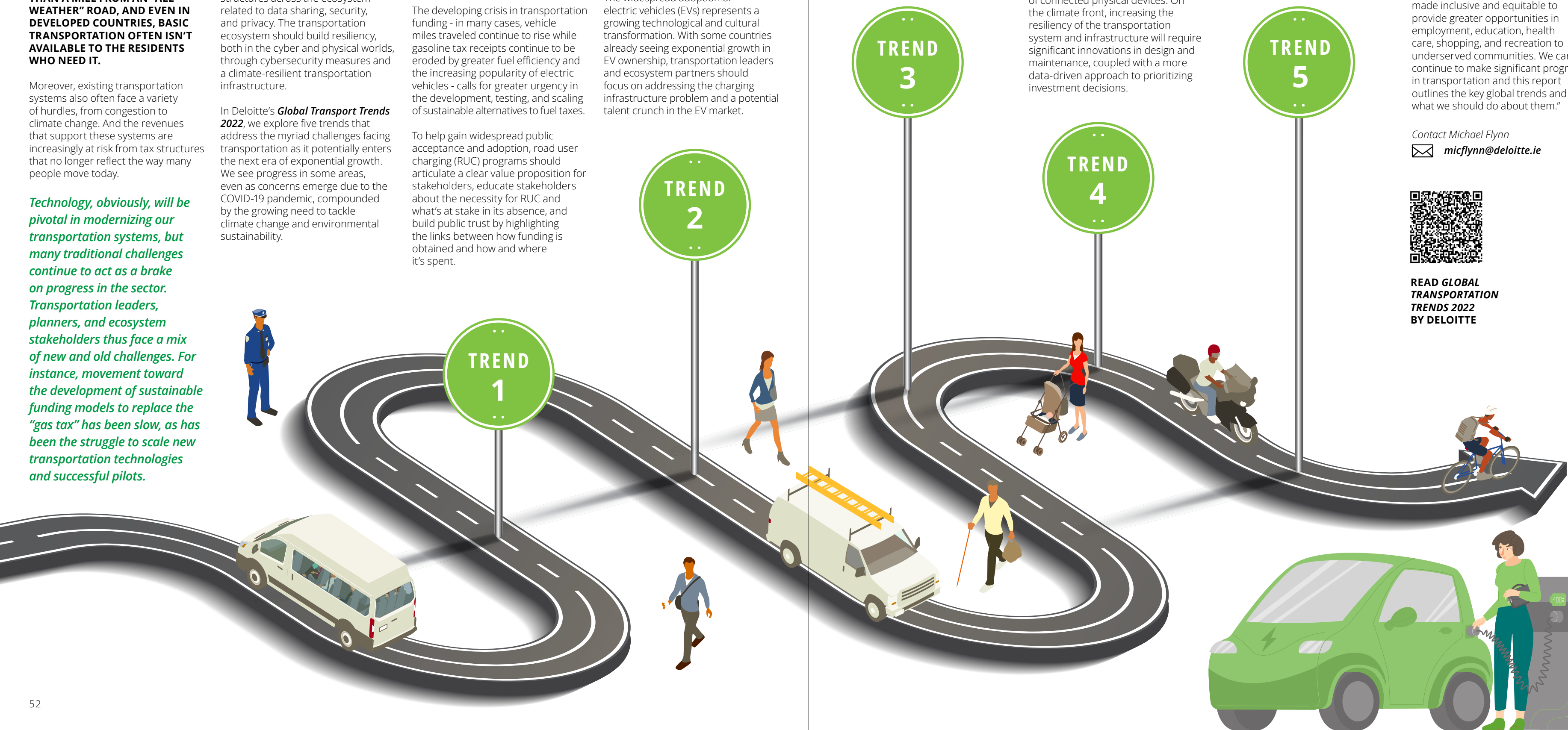


Michael Flynn, Deloitte Global Infrastructure Leader - Government & Public Services, and one of the global co-authors of this sector report, is passionate about transport and its potential role in improving everyday lives. He says, "Transport modernization efforts should be made inclusive and equitable to provide greater opportunities in employment, education, health care, shopping, and recreation to underserved communities. We can continue to make significant progress in transportation and this report outlines the key global trends and what we should do about them."

Contact Michael Flynn
✉ micflynn@deloitte.ie



READ GLOBAL TRANSPORTATION TRENDS 2022 BY DELOITTE



Modern infrastructure is helping deliver net zero goals

AFFORDABLE, RELIABLE AND CONVENIENT EV CHARGING SOLUTIONS ARE DRIVING BEHAVIOR CHANGE IN THE UK



Connected Kerb customers. (Image: Connected Kerb)

“Our desire to travel is a positive thing that brings huge benefits; we just need to ensure that everyone has the ability to do it as sustainably as possible.” Chris Pateman-Jones, Chief Executive Officer, Connected Kerb

ELECTRIC VEHICLES TEND TO BE USED BY PEOPLE WHO CAN AFFORD TO BUY WHAT ARE STILL EXPENSIVE VEHICLES, AND WHO HAVE ACCESS TO THE NECESSARY CHARGING INFRASTRUCTURE ON THEIR OWN DRIVEWAYS. THIS TREND IS ONE THAT MULTI AWARD-WINNING, UK-BASED CONNECTED KERB IS REVERSING WITH ITS UNIQUE APPROACH TO ELECTRIC VEHICLE (EV) CHARGING INFRASTRUCTURE – ONE THAT CHAMPIONS EQUAL ACCESS, SUSTAINABILITY AND CONNECTIVITY. IN FACT, THE FOUNDERS’ VISION IN 2017 WAS THAT THE TRANSITION TO EVS SHOULD BE OPEN TO EVERYONE BY MAKING CHARGING AS EASY AS POSSIBLE.



Chris Pateman-Jones, Chief Executive Officer of Connected Kerb, explains, “We want to avoid a two-tier adoption where limited access to public charging infrastructure, for those parking on-street, stalls the adoption of electric vehicles. We aim to accelerate the transition to sustainable mobility for people from all walks of life with reliable, affordable and accessible EV charging solutions, deployed where it’s most convenient to charge – in workplaces, public carparks and residential streets. Ultimately it’s simple: The more we are able to bring communities along on the journey, the quicker we will see the societal benefits of EV, from reduced CO2 emissions to improved air quality.”

CONNECTED FOR LONG-TERM GOOD

In thinking well ahead, Connected Kerb’s charging stations are located in public spaces and designed with a dual purpose. Using fast fiber ducting means the charging stations can also support Internet of Things (IoT) sensors and advanced telecommunications technologies like 5G. This effectively means digging only a hole in the street once, thus minimizing disruption and costs.

“Over the last few years we have moved from purely deploying to now operating large numbers of charging points, and we have increased our attention on the experience of our

end users. We went from B2B to B2P – business to people – because while we have bold global ambitions, we recognize that for our users, every single charge counts. We plan, deploy and operate our network with a focus on reliability, convenience and affordability: seeking to continuously improve our performance through investment in innovation,” says Chris.

Connected Kerb’s success in providing convenience for drivers who rely on street parking has led to it quickly growing an infrastructure network of dual-purpose charging stations in the UK’s residential and city streets, at workplaces and in car parks.

DATA AND AI ARE INFORMING GROWTH DECISIONS

“In the UK, national housing statistics show that 62 percent of households are unable to charge an EV at home – so that means that if we want a full societal transition to sustainable mobility, we need to provide public places for those cars to be charged. Demand for public charging varies across the UK, with some areas far lower and other areas higher. In Glasgow, Scotland, for example, 87 percent of the population has to park on the street. There’s also a social dynamic involved, with poorer suburbs tending to lack charging infrastructure despite a higher proportion of people parking on-street.

Of course, this isn’t only about sustainability, it’s also about health and air quality. Alarming, around 20,000 people die of air pollution in the UK each year – and some 4 million die each year around the world! It’s our view at Connected Kerb that if we make EVs more accessible to everyone, and focus on charging in the public realm, we can change this,” says Chris.

The Connected Kerb team knows its end users extremely well – and it uses the latest data from surveys and research, together with its own AI platform, to identify priority growth areas where demand for charging already exists or can be confidently forecast. The team also use this data to challenge the prevailing thinking on where charge points should be deployed, so that chargers are spread more equitably across society and not only in wealthier areas.

“We build our network in places where it makes economic sense, which doesn’t mean we only deploy in early adopting, wealthy areas. For example, it’s often the case that poorer areas have more limited access to high quality public transport links and therefore have greater average commuting distances by car ... meaning that it’s reasonable to expect higher use over time compared to some wealthier, early adopting areas. This data-led approach to deployment and network building, combined with our active engagement of the local population, means that even where we’ve deployed chargers in poorer areas – areas that have to date been left behind – we’re still seeing strong utilization of our assets,” says Chris.

COMMUNITY ENGAGEMENT IS DRIVING ADOPTION

One way Connected Kerb has been engaging with local communities is through brand ambassadors like **Martin Offiah**, a former professional rugby player who joined the team in 2018, a few years after replacing his fossil-fueled cars with EVs. As an early adopter, he is inspiring others to change their attitudes too. He often uses social and media channels – as well as in-person network launch events – to share his passion for sustainable infrastructure, protecting the planet for future generations and educating people on how EVs have a key role to play in that.

“Community ambassadors are another way that we educate and inspire local communities. For example, we may agree to a six-month EV leasing arrangement in a specific area, where we provide a limited number of EVs to drivers living within walking distance of newly installed Connected Kerb charging points ... and we do this because we know that once you have experienced driving an EV and are confident in being able to charge when you need to, you never go back to driving traditional cars,” adds Chris.

INVESTING IN INNOVATION TO DRIVE DOWN COST

While Connected Kerb is able to deploy rapid charging solutions, it continues to focus most of its attention on slow and fast charging in longer dwell locations. This is because these locations are the most convenient for users – although technologically slow, the user experience is far faster – since they simply “plug in and forget about it” while they work, rest or play. It’s also where the biggest opportunities exist to offer public charging at the most affordable prices.

In late 2021, Connected Kerb was involved in the UK’s first smart public charging scheme. The *Agile Streets* project aimed to save drivers money and, at the same time, reduce pressure on the energy network by intelligently managing the supply of power to charging vehicles. It was partly funded by the UK Government, Octopus and Samsung and involved the deployment of 100 charging stations in four UK councils – East

Lothian, Glasgow, Hackney and Shropshire. By asking users one simple question when they plugged in – “When are you collecting your vehicle?” – the Connected Kerb technology was able to step in to manage power intelligently across the specified charging time, working within and responding to grid capacity limits to save the user money (an average of a 36 percent saving across users in the trial), while still ensuring sufficient charge is delivered to the vehicle by the time the driver returns.

Chris says, “The *Agile Streets* project demonstrated the use of a smart metering system as a new business model to manage public EV charging sustainably, giving EV drivers an incentive to use a flexible charging schedule normally reserved for those with home charging.

Following successful competition of the pilot, Connected Kerb is working to industrialize the technology, with plans to deploy it across its wider network by the end of 2023.

LOCAL AUTHORITIES ARE THE DOOR TO A CLEAN TRANSPORT FUTURE

Increasingly, users are coming to Connected Kerb with suggestions on charging station placement and this data is constantly factored into innovation, decisions and growth plans. In response to growing interest from residents keen to make the switch to EVs, local and regional councils are looking to deploy large numbers of charging points for their communities. A good example is Surrey County Council, who recently agreed to a long-term contract with Connected Kerb for up to 10,000 charging points across the county.

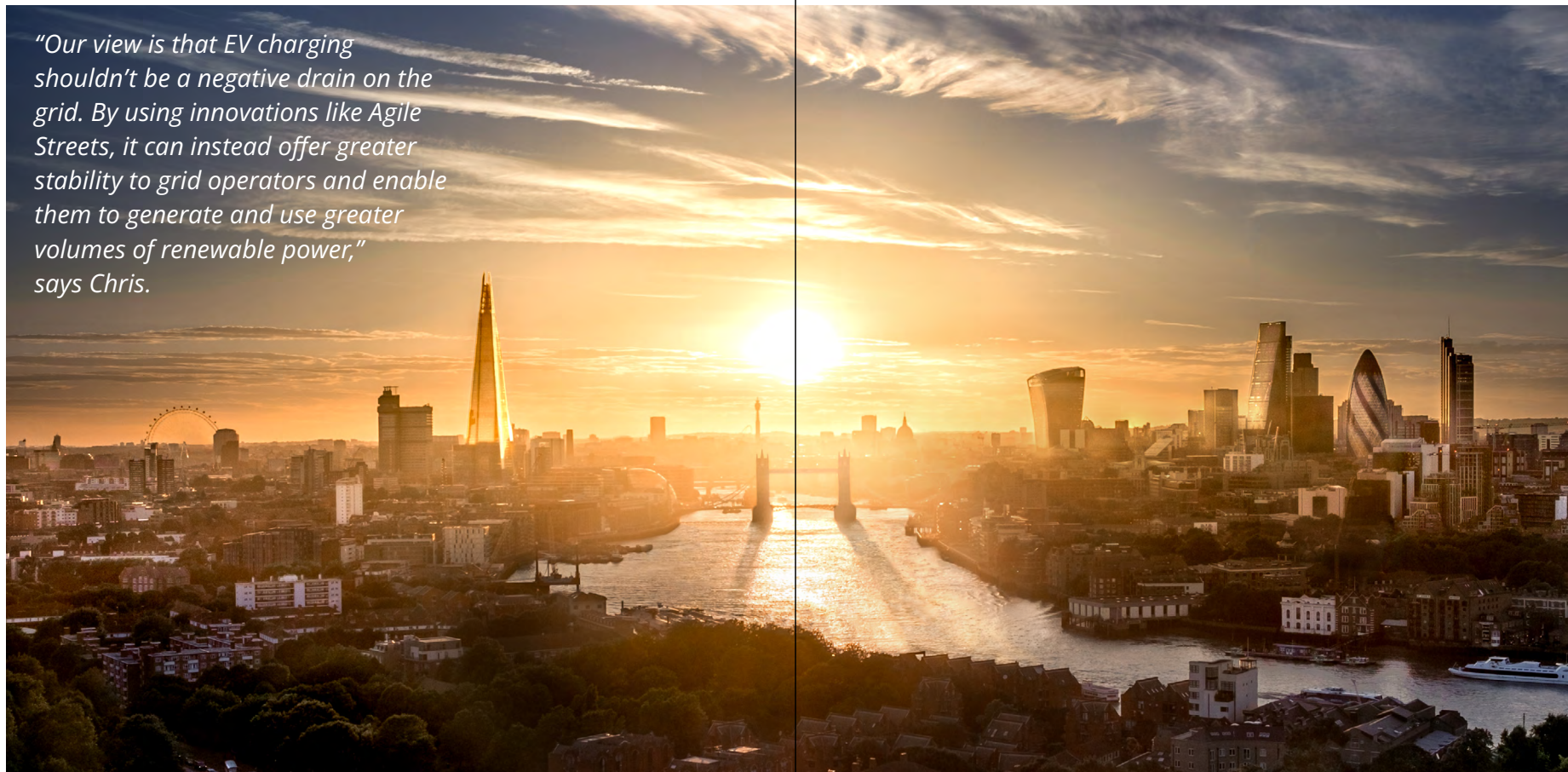
To put this scale into perspective, up until March 2023 the whole of UK only had 30,000 public charging stations. The contract in Surrey is rightly being seen as a gamechanger for Connected Kerb, the charging industry and county citizens alike.

“If one local authority can deliver such a significant boost to the UK’s charging network, just imagine what we could achieve by 2030 if every city, county and combined authority was empowered to do the same. The recent Net Zero Review was clear – local authorities can become the driving force behind the rollout of charging infrastructure across the country. Our partnership with Surrey County Council is a case in point,” says Chris.

Chris believes that local and regional government can help open the door to a clean transport future, and charging networks like Connected Kerb can provide them with the tools and expertise needed to unlock the transition at the pace and scale required to reach the UK’s net zero targets. Chris adds, “Although the UK Government’s target of at least 300,000 chargers by 2030 may feel ambitious, it’s eminently possible – and necessary – to achieve. This deal proves it.”



Connected Kerb charging station. (Image: Connected Kerb)



London at sunset. (Image: Getty Images)



Connected Kerb charging stations. (Image: Connected Kerb)

“Our view is that EV charging shouldn’t be a negative drain on the grid. By using innovations like Agile Streets, it can instead offer greater stability to grid operators and enable them to generate and use greater volumes of renewable power,” says Chris.

Chris concludes, “If you meet an EV driver today, you can be almost certain that they’re fortunate enough to be able to charge up off-street on a private driveway, where their car sits for long periods during the day while they work, or overnight while they sleep. This is because charging off-street is convenient, affordable and in a setting where reliability isn’t an issue - where they are able to enjoy the superior driving experience of an EV without any of the downsides. Unfortunately at the moment this isn’t the case for those unable to charge at home, who park on-street and have to rely on public infrastructure.”

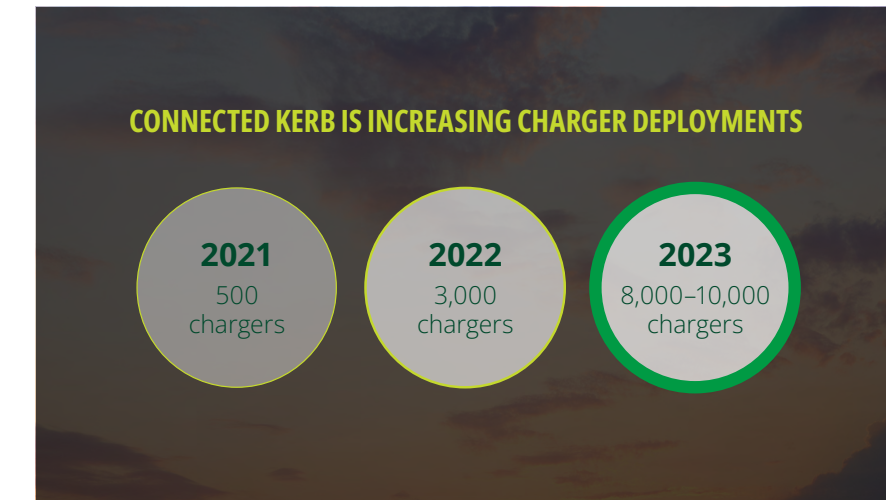
A MODULAR APPROACH IS GOOD FOR BUSINESS AND THE ENVIRONMENT

Chris explains that Connected Kerb uses recycled materials across its range of charging stations, and the stations are manufactured locally – this is important to the company, local authorities and users. As an example, the company uses recycled vehicle tires in its charging points designed for the tough environment such as fleet depots.

But that’s not all. “We have designed the system to be a modular infrastructure, so that if bits fail or are vandalized, they can be replaced quickly and affordably. With this design thinking we’ve been able to

design a system with a lifespan of 15 to 25 years instead of the usual 5 to 7 that our competitors deliver. That modularity also has benefits from a visual perspective, as our charging stations are positioned underground with only the sockets visible to users. The sockets are usually tucked in close to an existing bollard or parking post to minimize “street furniture” and clutter.

“Ultimately, we need to ensure we build a successful, growing business – but I believe that by building sustainable thinking into the way we design our hardware and operate our network, has driven greater commercial success for Connected Kerb,” reflects Chris.



FOCUSING ON THE FUTURE

The journey Connected Kerb has been on since it was established just over five years ago has by no means been easy, and it’s only in the last few years that momentum has started to build within the industry. The team’s deep-rooted commitment to tackling inequality and protecting the environment have been constant motivators to continue data gathering, innovating and piloting until transition to EVs becomes the norm, rather than the exception.

Chris concludes, “If you meet an EV driver today, you can be almost certain that they’re fortunate enough to be able to charge up off-street, where their car sits for long periods during the day while they work, or overnight while they sleep. This is because charging off-street is convenient, affordable and in a setting where reliability isn’t an issue. Drivers enjoy the superior driving experience of an EV without any of the downsides. Unfortunately, this isn’t the case for those unable to charge at home, who park on-street and have to rely on public infrastructure.”

If we want a full-scale transition to EV – and the data shows that the vast majority of drivers do not have access to off-street parking – we need to ensure there is a public charging network that works for everyone.

Being able to access convenient, affordable and reliable infrastructure should never be a barrier to adopting an electric vehicle. Delivering that transformational infrastructure is Connected Kerb’s mission.



Nicole Wang, Infrastructure Advisory Partner at Deloitte Canada, invited Chris to take part in this exclusive interview and she is equally excited about shaping the future. She says, “We can treat infrastructure as an opportunity to build better communities and enable growth in a more equitable and sustainable manner. Road infrastructure touches everyone’s life and will continue to play a role in driving societal, environmental and economic outcomes. Connected Kerb is showing us how we can provide infrastructure services in a different way.”

Contact Nicole Wang
✉ nicolewang@deloitte.ca

Harnessing private capital in turbulent times

MAKING THE MOST OF INFRASTRUCTURE STIMULUS PROGRAMS



David Krüger, Infrastructure M&A Leader for Deloitte Germany

In Deloitte's recent report *Harnessing private capital in turbulent times through infrastructure stimulus programs*, the team examines the ways in which governments can harness private capital to help deliver a strong economic stimulus in the wake of the pandemic. This includes investments in physical infrastructure, digital and communications upgrades, sustainability improvements and highly targeted tax incentives. Private capital has an essential role to play in stimulating the economy, but programs must be well structured and managed.

David Krüger, Infrastructure M&A Leader for Deloitte Germany and report author, says it's interesting to see many governments with a strong desire to involve private capital in infrastructure projects to accelerate recovery from the pandemic. "We strongly encourage governments to start with an examination of how to improve their own infrastructure scheme development and management first, before exploring where private involvement can be usefully introduced for better delivery. In the report we outline five steps to get the best results for all stakeholders," he says.

1

CAREFUL ASSESSMENT OF GOALS, COSTS AND RISKS

To maximize productivity and growth in both the short and longer term, governments must build a pipeline of projects based on priority developments. Once the prioritization is established, program funding and private sector involvement can be assessed in addition to the project structure.

2

THOROUGH APPRAISAL OF FUND TYPES AND COLLABORATIVE APPROACH

Governments intending to secure private capital to finance infrastructure projects should carefully assess the numerous funds available to them. It's important that governments investigate the capabilities each fund offers, as well as their investment and risk appetites and how collaboration between the public and private entities could be achieved. If contemplating the use of foreign-based private funds, governments must consider the public's perception of essential services being funded by overseas investors.

3

CYCLICAL INVESTMENTS FOR LONG-TERM BENEFIT

To maximize infrastructure investment, programs should be designed over the long term using a cyclical approach to create momentum. Public sector funding should be used for the initial build while private sector funding should be sought to manage or update the structure.

4

BLEND PRUDENT PROGRAM MANAGEMENT WITH POSITIVE PUBLIC DIALOGUE

Governments should merge rigorous management of private capital infrastructure programs with high quality contracts and competitive bidding in addition to transparent processes. They should also ensure that communication to citizens is positive, promoting success stories and the benefits offered by upcoming infrastructure projects.

5

WELL-STRUCTURED RISK, REWARD AND OPPORTUNITIES

To attract private investment, governments need to ensure risk pricing and policies are consistent, pipelines of future infrastructure projects are clear and infrastructure programs are well structured and managed.

Five steps

TO MAKE THE MOST OF PRIVATE CAPITAL



READ *HARNESSING PRIVATE CAPITAL IN TURBULENT TIMES THROUGH INFRASTRUCTURE STIMULUS PROGRAMS* BY DELOITTE

Contact David Krüger
✉ dakreuger@deloitte.de

Enhancing critical infrastructure resilience in New Zealand

CRITICAL INFRASTRUCTURE PROVIDES ESSENTIAL SERVICES THAT UNDERPIN OUR SOCIETY

BECAUSE OF ITS FUNDAMENTAL IMPORTANCE, WE OFTEN ASSUME INFRASTRUCTURE ORGANIZATIONS CAN DELIVER THOSE SERVICES NO MATTER WHAT ADVERSITY THEY FACE. HOW REALISTIC IS THAT IN TODAY'S COMPLEX ENVIRONMENT, AND WHAT IS IT EXECUTIVE TEAMS SHOULD BE LOOKING AT TO BETTER ANTICIPATE AND RESPOND TO CHANGE AND DISRUPTION?

THE WORLD IS TRANSITIONING TO A NEW NORMAL THAT'S IMPACTING EVERY CORNER OF THE GLOBE

New Zealand – also fondly known as Aotearoa, the land of the long white cloud – has long benefited from its geographic remoteness and tight knit society. Historically, the nation has not felt as proximate to world shocks as other developed economies, but that all changed with the onset of COVID-19.

The pandemic resulted in several concurrent shocks worldwide that undermined the ability for many organizations to operate effectively. A severely impacted workforce disrupted supply chains, including access to vital inputs and global logistics, while demand unexpectedly skyrocketed. It created a “perfect storm” that caught everyone off guard, serving to highlight a range of resilience issues that were typically resolved through ad hoc emergency measures, rather than comprehensive contingency planning and foresight.

While the pandemic's immediate impacts are abating, its longer-term effects are conflating with other factors to create an equally challenging environment. Geopolitical conflicts, climate change, inflation and rising interest rates are a few examples of shocks that continue to upset our journey back to a more stable equilibrium. As we move past the initial destabilization, it is becoming apparent we are transitioning to a “new normal” that is a long way from the pre-pandemic world in which we once lived. There is no doubt the current environment brings with it numerous complex challenges, each impacting the way critical infrastructure operates. With that comes an increasing requirement from governments and other stakeholders to ensure that a high level of security and resilience becomes part of our corporate fabric.

Does that mean we simply rinse and repeat what has been done in the past, or is it time to reassess and build more appropriate strategies that are better aligned with today?

A HOLISTIC, ASSET-LED APPROACH TO CRITICAL INFRASTRUCTURE RESILIENCE

Enterprise frameworks typically consider risk at a macro level, not always capturing some of the more granular or complex vectors that need to be identified and managed. Prioritizing an asset-based approach helps balance that situation.

The services of critical infrastructure are delivered through assets. Identifying and mitigating material risks at an asset level can help an organization to structure appropriate resilience controls. These controls need to support the delivery of core services in the face of multiple market and operational challenges, simultaneously.

Successfully adopting an asset-led approach requires a detailed assessment of all hazards in testing the effectiveness of an organization's

risk management and continuity plans. This is a practical and effective way of developing robust resilience strategies that are more aligned with the multifaceted threat environment we face today.

AN ALL-HAZARDS, ASSET-LED APPROACH IN APPLICATION

One of the most powerful aspects of an asset-led, all-hazards approach is that it transcends traditional silos to focus on core service delivery, which can be applied to aspects of an organization over time. This makes it far easier to prioritize and build capability in essential business units facing immediate disruption.

Organizations can use a sprint-based approach to then uplift other areas at a manageable cadence, rather than trying to run a more daunting and resource intensive transformation of a whole business.

At Deloitte New Zealand, we have seen the success of taking this pragmatic approach, working with clients on supply chain and procurement as the tip of the spear.

Ben Davis, Critical Infrastructure Specialist at Deloitte Australia, says, “The adverse consequences of being at the end of global supply chains has become an issue of national importance. Both New Zealand and Australia sit at the extremity of complex and physically dispersed supply lines that continue to experience significant delays, shortages and cost escalations.”

Guy Finny, Associate Director at Deloitte New Zealand, adds, “New Zealand has a nation-building opportunity to enhance the resilience of our critical infrastructure. The government has recently tasked its officials with reviewing existing regulatory frameworks, recognizing a need to ensure legislation is fit for purpose in the current operating environment.”

Recognizing these trends, Deloitte drew from Australia's recent experience with a newly mandated all-hazards framework to assist Transpower, the owner and operator of New Zealand's national electricity grid, reviews and uplifts its supply chain management practices.

Transpower maintains a national asset base and is a critical enabler of New Zealand's energy infrastructure. It has to be responsive to the changing dynamics of the New Zealand energy market, including a record number of requests in connecting renewable generation.

Rutger Keijser, Head of Risk and Assurance at Transpower, notes, “Transpower weathered the supply chain disruptions of recent years well. At the same time, we have witnessed levels of disruption we had not encountered before, and this pattern is unlikely to change any time soon. We want to make sure our organizational practices are appropriate for an increasingly volatile and disrupted operating environment.”

APPLYING AN ALL-HAZARDS LENS TO TRANSPOWER'S SUPPLY CHAIN

Any operating environment that has to perform in the face of adversity needs a framework that gives stakeholders a line of sight on the most critical things that could materially impact the organization's core functions.

In achieving that, Transpower and Deloitte applied an all-hazards methodology in evaluating supply chain management practices, focusing on critical assets, their interdependencies, and touchpoints throughout the organization. Assessing how the functions of key assets could be disrupted by material factors helped Transpower build on its existing practices. This was done by approaching resilience through a focus on critical components and the internal and external influences on those across the procurement process and along the supply chain.

Dan Robertson, Head of Procurement and Supply at Transpower, says, “Taking an asset-led approach was key in helping

bring teams together to ensure supply chain considerations for our critical assets are appropriately factored across asset planning, project delivery, and operations. The approach helped identify areas of strength within the organization, allowing us to build on that through greater knowledge sharing. While our supply chains held up well during the pandemic, the lessons learned from this review are helping us take steps to further improve our resilience.”

LEGISLATING AN ALL-HAZARDS APPROACH

It is no surprise given the desire to uplift national security and resilience, that an all-hazards framework is at the center of whole of nation reforms targeting critical infrastructure in nearby Australia. Recent changes to the *Security of Critical Infrastructure Act* require responsible entities to create and operationalize a risk management program based on an extensive, asset-level lens.

Ben says, “The positive obligations introduced in Australia were not necessarily welcomed by industry, but after taking the time to work through them systematically and collaboratively, we're seeing just how transformative a more holistic and asset-driven approach can be.”

Boards and executive leadership teams are facing a horizon where more proactive and informed decision-making is required for the due care and diligence associated with their fiduciary duties. Expectations are increasing around the foreseeability of risks, good governance and mitigation planning.

John Marker, Partner, Deloitte National Infrastructure Leader for New Zealand, concludes,

“In New Zealand, we expect the government will closely consider embedding an all-hazards, asset-based security and resilience approach into legislation. However, even without legislation, we expect this framework will increasingly set the benchmark for organizational best practice and strong leadership.”

Contact Ben Davis

✉ bedavis@deloitte.com.au

Contact Guy Finny

✉ gfinny@deloitte.co.nz

Contact John Marker

✉ jmarker@deloitte.co.nz

Food security and infrastructure must go hand in hand

CAREFULLY PLANNING INFRASTRUCTURE TO SUPPORT MALAYSIANS

DEVELOPING COUNTRIES IN SOUTHEAST ASIA, LIKE MALAYSIA, HAVE LONG BEEN CHALLENGED BY THE NEED TO GROW ENOUGH FOOD FOR HUGE POPULATIONS. A FURTHER DIFFICULTY FOR MALAYSIA IS IN DISTRIBUTION: MAKING SURE THAT FOOD REACHES THE WIDESPREAD COMMUNITIES LOCATED IN REMOTE POCKETS OF THIS BEAUTIFUL COUNTRY. COMPOUNDING THESE CHALLENGES IS THE COUNTRY'S RECENT FOCUS ON ITS MANUFACTURING AND SERVICES SECTORS, WHICH HAS REDUCED THE FORMERLY SIGNIFICANT CONTRIBUTIONS MADE BY THE AGRICULTURE SECTOR TO THE ECONOMY.

players, associations, researchers, and academics is expected to create a tremendous synergy that will transform the country's current position.

She believes that there are numerous ways in which infrastructure can be leveraged to raise agricultural productivity, which often induces growth in rural areas. For example, road infrastructure is a significant determinant of agricultural productivity, since it connects growing markets and growers themselves. In addition, technological infrastructure (e.g. solar panels and precision farming) can combat the impact of weather and climate changes, as well as enhance crop yields and productivity.

and social development – in this case, enhancing the quality of life of rural growers.

For Malaysia, this effort could have far-reaching implications for national food security by improving the lives of rural growers and encouraging sustainable crop production. With more affordable and widely available food, people are more able to achieve their basic rights to health and wellbeing. In turn, improved food security contributes to fulfilling the UN's Sustainable Development Goal 2, which aims for a world free of hunger by 2030.

"It's vital that we address food security in the face of climate change and our growing population. Infrastructure can enable agriculture by improving roads and ports, which will encourage an uplift in our farmers and communities' wellbeing by improving access to food and reducing the cost of living,"

Nik Anira, Financial Advisory Partner, Kuala Lumpur, Malaysia

Contact Nik Anira
✉ nikanira@deloitte.com

SO, HOW CAN INFRASTRUCTURE HELP TACKLE THESE ISSUES?

THERE IS MORE TO INFRASTRUCTURE

Nik Anira, Partner, Deloitte Malaysia, shares her insights. "The Malaysian government is facing a trade deficit of approximately RM 24.9 billion, increased by 15.1 percent from the previous year. This has spurred the government to take a closer look at agriculture and how it relates to food security for local communities, especially farmers who live and work in rural Malaysia."

Infrastructure development is often associated with efforts to promote accessibility and connectivity, bridging urban-rural development gaps. In fact, these developments are crucial in driving food accessibility and affordability.

Anira highlighted that infrastructure for good is a proponent for the advancement of social justice through long-term and carefully deliberated infrastructure development. The concept advocates for the inclusion of social aspects in infrastructure decision making to foster harmony between advancing economic growth and promoting an equitable society, while also addressing global concerns. Infrastructure is more than just roads and buildings; it encapsulates long-term visions that will spur economic



Farmer sowing seeds in greenhouse, Malaysia. (Image: Getty Images)

In 2020, between 720 million and 811 million persons worldwide were suffering from hunger, roughly 161 million more than in 2019. And a staggering 2.4 billion people, or above 30 per cent of the world's population, were moderately or severely food-insecure, lacking regular access to adequate food.

THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOAL 2 - ZERO HUNGER - IS ABOUT CREATING A WORLD FREE OF HUNGER BY 2030.



READ THE UN SUSTAINABLE DEVELOPMENT GOAL 2: ZERO HUNGER

Infrastructure for good

INFRASTRUCTURE IS AT THE HEART OF OUR SOCIETIES. FROM THE HOMES WE LIVE IN, OUR PLACES OF WORK AND SOCIALIZATION, AND THE WAY IN WHICH WE TRAVEL, QUALITY INFRASTRUCTURE AND ITS IMPACT ON CITIZENS' LIVES IS IMMEASURABLE – OR IS IT?

Deloitte believes that investment in infrastructure can have a transformative power on economies and societies and wants to enable both the private and public sector to improve how they prioritize and utilize infrastructure to create better futures for all. With an anticipated USD 5 trillion per year in global economic stimulus and infrastructure spending forecasted annually, the ability to shape the use, prioritization, security, and social impact of these funds is an enormous opportunity and privilege.

The specific output of the Infrastructure for Good program is a unique barometer that explores the key drivers of excellence in infrastructure. The data-driven framework offers straightforward and powerful comparisons across the 30 countries that can be used to mobilize change, identify opportunities and recognize progress.

“We are proud to pioneer this initiative and know that it will make a lasting positive impact for the communities around us all. To find out more about the Infrastructure for Good program, please scan the QR code to access a hub that hosts a rich collection of videos, podcasts and case studies that explore the nuances of infrastructure around the world.”

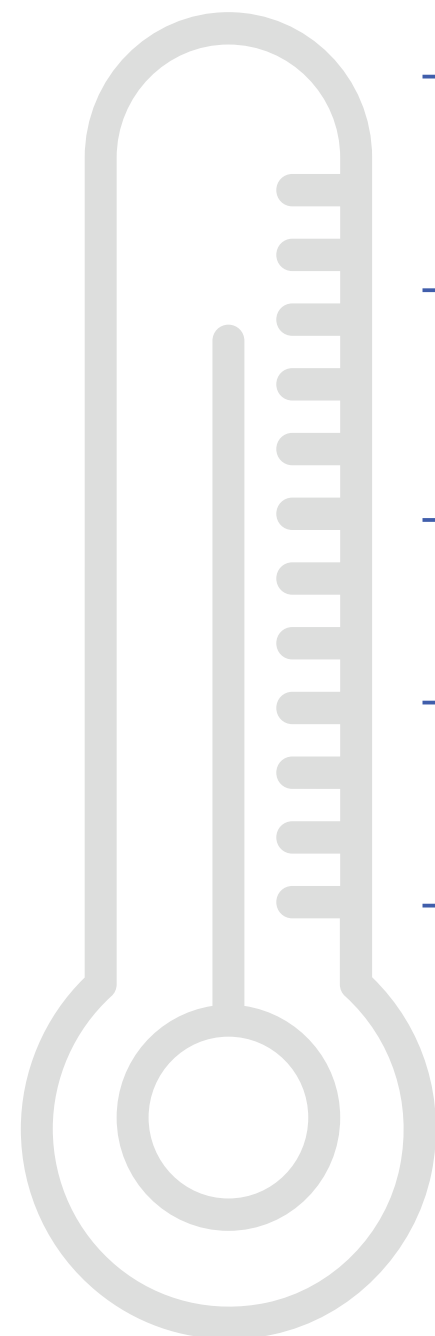
Luke Houghton, Deloitte
Global Infrastructure Leader – Advisory

Contact Luke Houghton
✉ lhoughton@deloitte.com.au



Green building with vertical garden. (Image: Getty Images)

The Infrastructure For Good Barometer will:



- **1**
Create new ways of thinking about the social benefits of infrastructure
- **2**
Examine both public sector- and private sector-led initiatives
- **3**
Build knowledge about best practices
- **4**
Provide a roadmap for countries to improve how they prioritize and utilize infrastructure
- **5**
Enable dialogue between key stakeholders in infrastructure development and regulation

**ECONOMIST
IMPACT**

How can infrastructure transform society for the better?

Find out at infrastructure-for-good.economist.com



Supported by
Deloitte.

Research partner
Duke
NICHOLAS INSTITUTE
for ENERGY, ENVIRONMENT
& SUSTAINABILITY

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited (“DTTL”), its global network of member firms, and their related entities (collectively, the “Deloitte organisation”). DTTL (also referred to as “Deloitte Global”) and each of its member firms and related entities are legally separate and independent entities, which cannot obligate or bind each other in respect of third parties. DTTL and each DTTL member firm and related entity is liable only for its own acts and omissions, and not those of each other. DTTL does not provide services to clients. Please see www.deloitte.com/about to learn more.

This publication contains general information only. Liability limited by a scheme approved under Professional Standards Legislation.

Member of Deloitte Asia Pacific Limited and the Deloitte Network.

© 2023 Deloitte Touche Tohmatsu

**“THIS TOWER TAKES INSPIRATION
FROM SHANGHAI’S TRADITION
OF PARKS AND NEIGHBORHOODS,
RECASTING THAT HISTORY IN A
HIGH-DENSITY, URBAN FORM
SYMBOLIZING THE EMERGENCE OF
MODERN SHANGHAI AND CHINA.”**

– JUN XIA, SHANGHAI TOWER DESIGN LEADER

**A SPECIAL THANKS TO THE GLOBAL TEAM OF EXPERTS
WHO MADE THIS MAGAZINE POSSIBLE**

VISION: MATT McGRATH, DELOITTE GLOBAL CHIEF MARKETING OFFICER
LUKE HOUGHTON, DELOITTE GLOBAL INFRASTRUCTURE LEADER – ADVISORY
MICHAEL FLYNN, DELOITTE GLOBAL INFRASTRUCTURE LEADER – GOVERNMENT & PUBLIC SERVICES
EDITOR: IKE LEVICK
DESIGN: ROBERT KANTOR, 630 AGENCY
ILLUSTRATIONS: PHILIPPA GARRARD

We would also like to thank everyone who contributed to and featured in this magazine.
We greatly appreciate your time, insights and interest.

To engage with Deloitte’s global infrastructure expertise:
email: Luke Houghton at loughton@deloitte.com.au
email: Michael Flynn at micflynn@deloitte.ie

To contribute to the next edition or nominate topics that you’d
like us to explore, email Ike Levick at ilevick@deloitte.com.au

*This magazine is printed on sustainably
sourced FSC certified paper.*

Shanghai Tower, Pudong, Shanghai, China. (Image: Getty Images)

Deloitte.