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SERIES EXECUTIVE SUMMARY

Beyond the Baseline

How infrastructure can deliver transformative outcomes



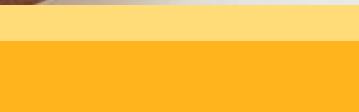
Background

In late 2020, the Saudi Arabian and Italian G20 presidencies asked the Global Infrastructure Hub (GI Hub) to “examine the role of infrastructure in facilitating transformative recovery from COVID” and in November 2021, the GI Hub publicly launched the [Transformative Outcomes Through Infrastructure](#) initiative. The initiative tracked the infrastructure stimulus announced by G20 governments between February 2020 and August 2021 in response to the impact of the COVID-19 pandemic.

The GI Hub found that:

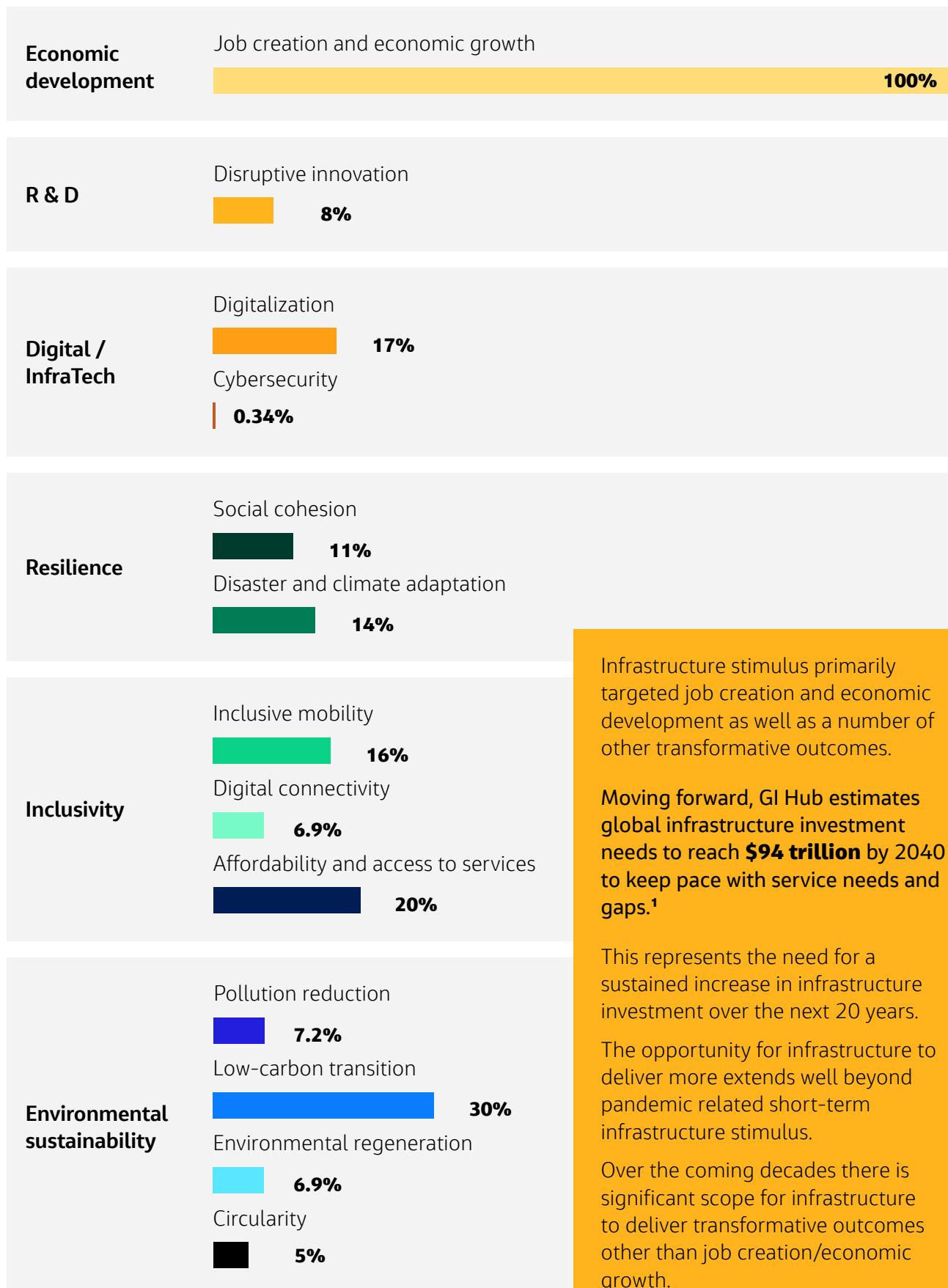
- G20 governments committed significant funding for new infrastructure, announcing \$3.2 trillion* (4.6% of G20 GDP) of infrastructure-as-a-stimulus between February 2020 and August 2021.
- The transport and social infrastructure sectors are receiving a large portion of the infrastructure as a stimulus investment.
- Infrastructure stimulus was targeting one or more transformative outcomes across six core categories: environmental sustainability, inclusivity, resilience, digital/InfraTech, research and development, and economic development, as shown in the following table.

**To help readers easily compare the scale of investment from country to country, all foreign currency figures have been converted and are stated in US dollars. The original foreign currency figure is included in parentheses. Figures were converted to USD on 19 April 2022.*



Category	Overview of transformative outcomes targeted by category	Specific transformative outcomes contained in the category
Environmental sustainability	Enhancing the environment by regenerating ecosystems and biodiversity, maximizing resource recovery, eliminating use of finite resources and becoming carbon positive.	<ul style="list-style-type: none"> ▪ Circularity ▪ Environmental regeneration ▪ Low carbon transition ▪ Pollution reduction
Resilience	Building the capacity of individuals, communities, institutions, businesses and systems (natural and built) to survive, adapt, grow and thrive no matter what kinds of chronic stresses and acute shocks they experience.	<ul style="list-style-type: none"> ▪ Disaster and climate adaptation ▪ Social cohesion
Inclusivity	Improving the quality of life and wellbeing of individuals, specifically by reducing inequalities and inequity in all its forms.	<ul style="list-style-type: none"> ▪ Inclusive mobility ▪ Digital connectivity ▪ Affordability and access to services
Research and Development	Creating for citizens and businesses new products and services that are more useful and valued, thereby developing an enduring innovation culture.	<ul style="list-style-type: none"> ▪ Disruptive innovation
Digital/ InfraTech	Achieving rapid technology advancements as a result of infrastructure either scaling-up or advancing a new or existing secure (physical, information, operational) infrastructure technology.	<ul style="list-style-type: none"> ▪ Digitalization ▪ Cyber security ▪ Digital connectivity
Economic development	Supporting sustained and diverse growth that drives job creation and a rise in living standards.	<ul style="list-style-type: none"> ▪ Job creation and economic growth

This chart shows the percentage of the \$3.2 trillion infrastructure stimulus targeted at each transformative outcome.



Infrastructure stimulus primarily targeted job creation and economic development as well as a number of other transformative outcomes.

Moving forward, GI Hub estimates global infrastructure investment needs to reach **\$94 trillion** by 2040 to keep pace with service needs and gaps.¹

This represents the need for a sustained increase in infrastructure investment over the next 20 years.

The opportunity for infrastructure to deliver more extends well beyond pandemic related short-term infrastructure stimulus.

Over the coming decades there is significant scope for infrastructure to deliver transformative outcomes other than job creation/economic growth.

Source: Global Infrastructure Hub, 2021

1. Global Infrastructure Outlook, Global Infrastructure Hub, Accessed January 2022



Introducing our latest thought leadership series:

Beyond the Baseline

How infrastructure can deliver transformative outcomes

Right now, the world faces numerous challenges and opportunities resulting from the global pandemic, climate change, social equality and technology advancements.

As a purpose-led organization, Jacobs believes infrastructure can lead in transforming our economic, social, environmental and governance systems both for today and tomorrow. For infrastructure leaders, the investments explored in the GI Hub's research represent a once-in-a-generation opportunity to achieve a wide range of transformative outcomes at scale.

To be successful will require a step change in the way we conceptualize, plan and deliver infrastructure programs and projects. For infrastructure to realize its potential to contribute to transforming transform our world, infrastructure leaders and program and project teams must embrace as many, if not all, of these transformative outcomes at every investment opportunity.

Figure 1 puts the challenge into perspective relative to how our approach to infrastructure has evolved.

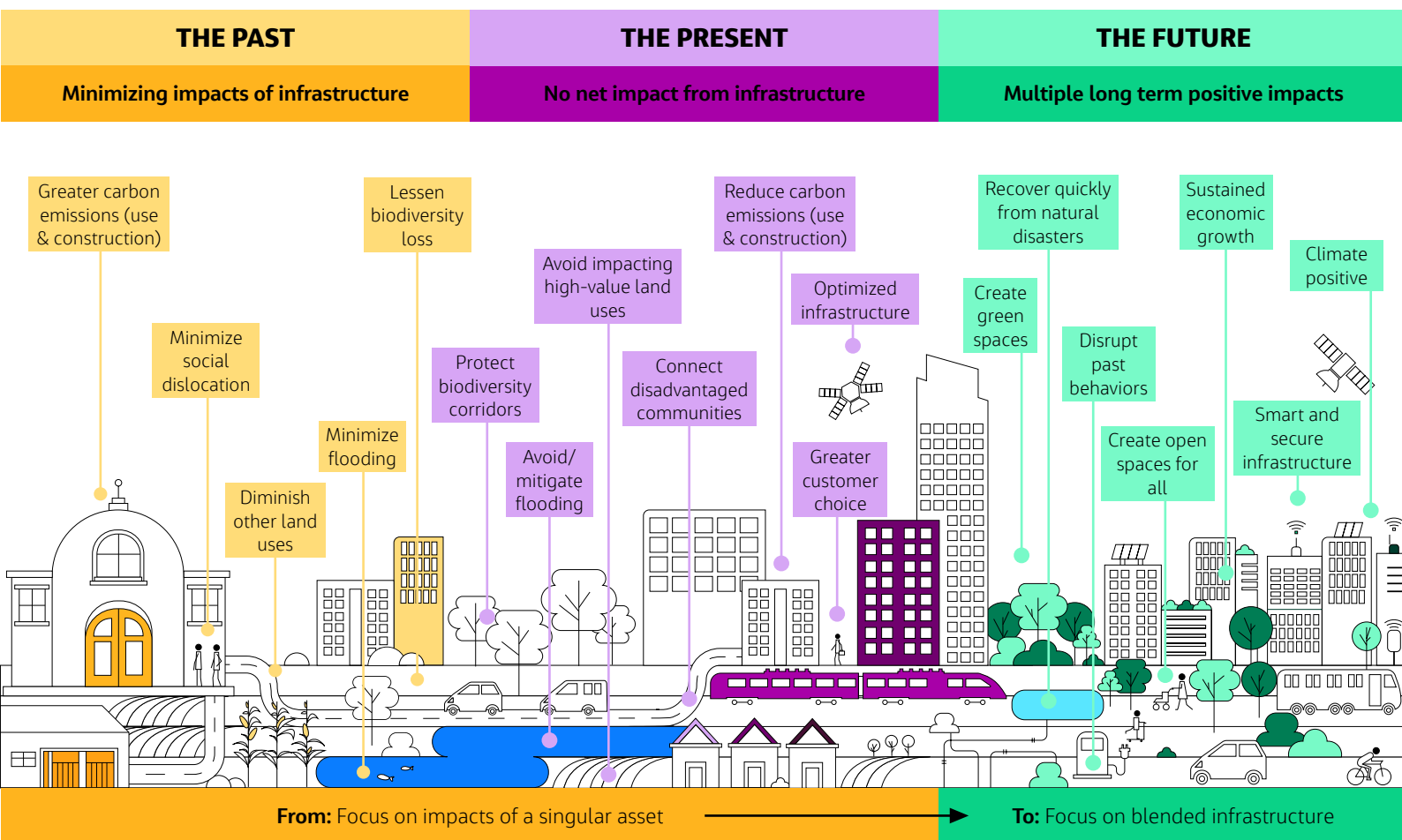
In the **past**, infrastructure delivery was largely concerned with time, cost and quality and the impacts of a singular asset. There was typically only cursory awareness of the adverse environmental and social impacts of the individual asset, for example social disruption due to dislocation, biodiversity loss and carbon emissions from the production and use of materials. Infrastructure largely focused on delivering economic outcomes (e.g. productivity improvements and essential services).

In recent times (the **present**), infrastructure planning and delivery has become progressively more aware and embraced the challenge of avoiding and reducing infrastructure's adverse direct and indirect impacts.

In the **future**, infrastructure planning and design must evolve to a focus on blended infrastructure capable of both:

1. Effectively delivering multiple positive impacts across each transformative outcome category
2. Efficiently delivering infrastructure (e.g. cost and schedule).

FIGURE 1 Infrastructure evolution – from minimizing negative impact to achieving multiple positive impacts over the long term



In creating the series we have:

- **Collaborated with the GI Hub** to articulate the urgent need and opportunity to deliver transformative outcomes through infrastructure. The paper incorporates findings from the GI Hub’s *Transformative Outcomes Through Infrastructure* initiative and *InfraTracker* infrastructure stimulus tracking tool.
- **Drawn on Jacobs’ global infrastructure program management experience** to better understand what is required to successfully deliver transformative outcomes for clients. Jacobs’ Program Management Portfolio spans 60+ infrastructure programs located across the United Kingdom, Europe, Middle East, Asia Pacific and North America.

The portfolio manages approximately \$400 billion in capital investment across sectors such as Cities & Places, Energy & Power, Water, Transport, Health and Education etc.

Reviewed recent leading practice publications spanning infrastructure outcomes and leadership theory and practice.

- **Drawn on specific industry leading insights** from our global Market Solutions leaders, spanning economic development, inclusion, resilience, digital, sustainability, environmental regeneration, capital projects and transactions.
- **Drawn on specialist advice from our Global Learning and Development and People group** regarding how to lead, inspire and equip infrastructure teams to realize transformative outcomes.

We’re excited to share all our findings in the *Beyond the Baseline: How infrastructure can deliver transformative outcomes* thought leadership series. We hope it will help drive the time-critical collective will we need now more than ever before to implement change at a jurisdictional, portfolio, program and project level.



The **first** paper

Leading infrastructure teams to deliver transformative outcomes

EXPLORE PAPER ONE

Achieving all the transformative outcomes largely hinges on whether infrastructure program/ project leadership can justify solutions capable of meeting all transformative outcomes and inspire infrastructure project teams to challenge themselves to deliver beyond what they have typically done prior.

The first paper asks: **are our current and emerging infrastructure leaders ready and able to lead the charge on achieving each transformative outcome?**

To answer this question the paper explores 13 essential attributes of effective/successful infrastructure leadership.

Infrastructure leadership must:

1. Fully appreciate the complicated and dynamic nature of the strategic operating environment
2. Have clear values and communicate these values
3. Be able to mobilize private capital and partner with an array of potential investors
4. Be exceptional at building and leading diverse teams

5. Have the experience needed to deliver complex projects
6. Have an entrepreneurial spirit
7. Be politically astute and able to collaborate across government(s)
8. Be excellent communicators
9. Implement agile organizational structures with clear plans for resourcing both now and in the future
10. Be data and analytics driven
11. Be comfortable with disruption and change
12. Commit to a learning-based approach
13. Create an environment which values and facilitates cooperative relationships with partners.

The paper also explores how leaders can develop the leadership attributes required, outlining methods for developing leadership attributes at a jurisdictional/organizational and program/project level.

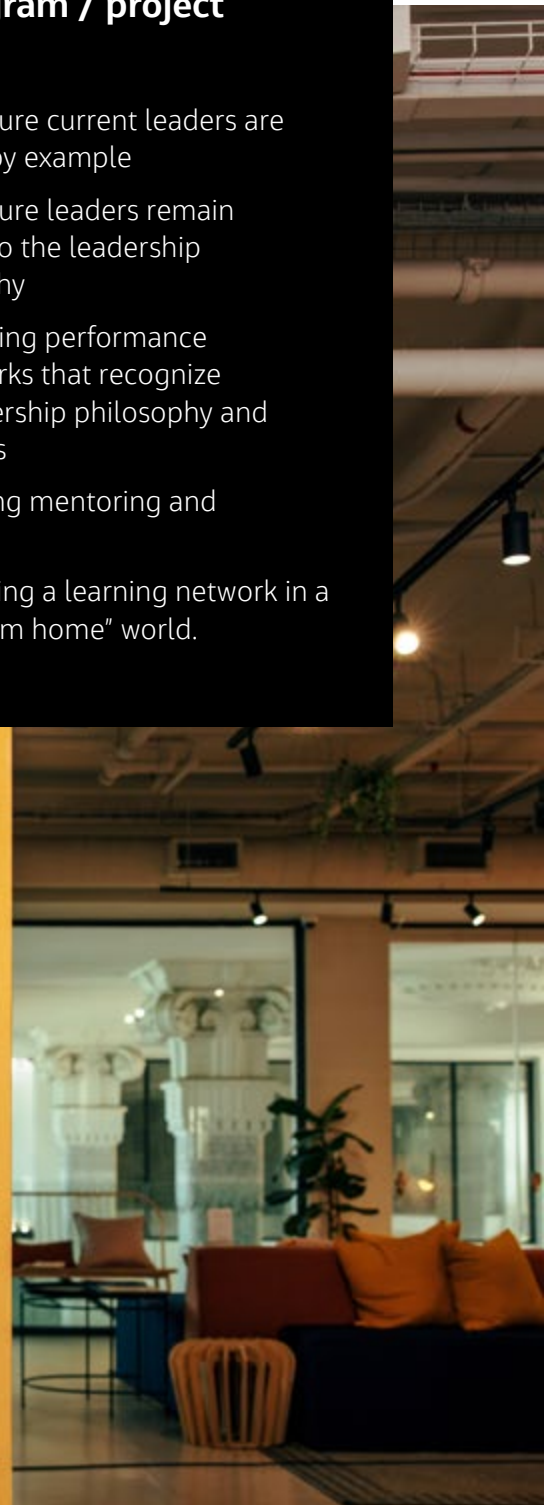
Infrastructure entities can develop the ideal leadership attributes:

At a jurisdictional / organizational level by:

- Developing a unifying and memorable leadership philosophy
- Providing ongoing professional training and development
- Removing unconscious bias from leadership recruitment and selection
- Equipping leaders with tools and techniques to allow them to connect with their teams beyond project needs.

At a program / project level by:

- Making sure current leaders are leading by example
- Making sure leaders remain aligned to the leadership philosophy
- Establishing performance frameworks that recognize the leadership philosophy and attributes
- Prioritizing mentoring and coaching
- Maintaining a learning network in a "work from home" world.



Key messages in the first paper:

1.

Given most mega and giga infrastructure projects last around five years, the effect of leadership on infrastructure outcomes is profound.

2.

We must be realistic and practical. No one infrastructure leader will hold all the required leadership attributes.

It's the collective leadership of the infrastructure program or project and how each individual leader contributes to instilling the culture and behaviors needed to achieve transformative outcomes that matters.

What's key for infrastructure leaders is that they surround themselves with people, including direct reports and line managers, who possess the leadership attributes they lack.

At Jacobs we refer to this as the "collective clever".

3.

By being mindful of the breath of leadership attributes needed and through a collective and deliberate training and development effort, infrastructure program and project teams can have the leadership attributes necessary to inspire them to realize transformative outcomes.



The **second** paper

Achieving a positive level of impact to deliver transformative outcomes.

EXPLORE PAPER TWO

Utilizing their leadership skills and attributes, infrastructure leaders need to inspire teams to aim higher, broader and wider and embed transformative outcomes in the infrastructure programs and projects they lead. To do this, they must clearly articulate the level of positive impact they are seeking to achieve for each transformative outcome. This clarity is fundamental to achieving the change necessary for infrastructure to deliver more and last longer.

The second paper asks: **What transformative outcomes and positive impacts should infrastructure deliver and how do they differ from what infrastructure has typically delivered?**

To answer this question, the paper explores the difference between a typical and positive level of impact and the measurement indicators that can be used to determine impact.

The paper recognizes that the extent of positive impact of infrastructure across each outcome will always be relative to the past impacts delivered by infrastructure and that the level of positive impact will differ based on available capability and capacity.

For each transformative outcome category introduced in the first paper, there are specific transformative outcomes that can be targeted by infrastructure leaders.

For each specific transformative outcome we define:

- The typical level of impact from infrastructure
- The positive level of impact that could be delivered from infrastructure

- A set of performance indicators that can be used to demonstrate a positive level of impact
- A series of key questions infrastructure leaders can ask their team to determine readiness to deliver transformative outcomes.

Below is an indicative example related to environmental regeneration.

Environmental regeneration

Typical level of impact

- Results in habitat and biodiversity loss or degradation through land clearing and fragmentation.
- Maintains current health of natural systems on which we, and other species depend.

Positive level of impact

- Restores and creates sustainable terrestrial, riparian and marine ecosystems and reverses biodiversity loss, e.g. retention and natural treatment of storm water, habitat creation aligned to local reference habitat.
- Sustainable use of local natural resources.

Indicators of impact

- Area of natural habitat regenerated to local reference habitat.
- Percentage of native vegetation, species and coverage.
- Species diversity measured or predicted through models appropriate to the scale and location of the site.
- Surface, ground and marine water quality parameters, e.g. acidity or basicity (pH), temperature, electrical conductivity, dissolved oxygen, turbidity, hydrocarbons, nutrients. (As applicable to the geography's guidelines or, in the absence of guidelines, recognized international standards.)

Key readiness questions

Do we have a strong understanding of the baseline natural environment and ecosystem function and, if not, how can we acquire a strong understanding?

Do we prioritize long term value as well as short term use?

Do current laws (legislation/regulations), policy and standards support or prevent positive impact?

Does the performance management framework for the infrastructure prioritize the protection, restoration and creation of ecosystems, habitat and biodiversity?

Key messages in the second paper:

1.

The inability to define and/or measure a positive level of impact should not be used as a barrier to infrastructure projects targeting and achieving transformative outcomes across environmental sustainability, resilience, inclusivity, research and development, digital / InfraTech and economic development categories.

2.

Infrastructure projects must always commence and develop solutions with the transformative outcome in mind rather than retrofitting an already existing solution to deliver greater positive impact.

By commencing with clearly articulated outcomes in mind, infrastructure program and project teams are more likely to identify solutions capable of delivering more and lasting longer.



The **third** paper

How to mobilize and equip infrastructure project teams to realize transformative outcomes

Coming soon

Infrastructure programs and projects are fundamentally transitory activities involving an assembly of people and entities who are often working together for the first time. It can take weeks, months and sometimes years for teams to form a shared understanding of the actors, actions and initiatives that drive transformative outcomes, how they interplay and how infrastructure solutions can deliver them.

The third and final paper in this series outlines how to increase the speed with which this can be achieved, asking the question: **how can we equip project teams to quickly and effectively reach a shared appreciation of the transformative outcomes to be achieved?**

The paper outlines activities that can help teams quickly reach consensus on the transformative outcomes to be achieved.

The activities include:

1. Producing a plan to acquire the digital capabilities needed to realize transformative outcomes

Transformative outcomes are more likely to be realized if appropriate digital thinking and technology are utilized at all stages of the infrastructure lifecycle.

To apply the full potential of digital to achieve transformative outcomes, an infrastructure team should develop a Digital Plan at the commencement of the infrastructure program or project. The plan should cover existing strategies, regulatory environment, stakeholder engagement, user journeys, digital goals and objectives and digital interventions.

2. Understanding the local context to inform the level of positive impact possible for each transformative outcome.

Transformative outcomes must be relevant and reflect the local context and place where the infrastructure will be used and operated.

From day one the infrastructure project team must have a laser focus on the information needed immediately to understand the local context and place.

There is a standard set of contextual information themes relevant to all the transformative outcomes. They are:

- Current system and place
- Stakeholders
- Government policies and priorities
- Supply chain
- Risks and threats
- Opportunities
- Potential partners and investors.

3. Involving citizens in determining the level of positive impact targeted for each transformative.

Citizen involvement must be front and center. Citizen involvement is critical to understanding the level of positive impact desired for each transformative outcome and is an essential input into securing regulatory and investment approvals.

4. Setting positive impact targets for each transformative outcome.

Informed by the infrastructure project vision, an understanding of the project context and place, and citizen engagement, infrastructure teams need to set targets in relation to each transformative outcome.

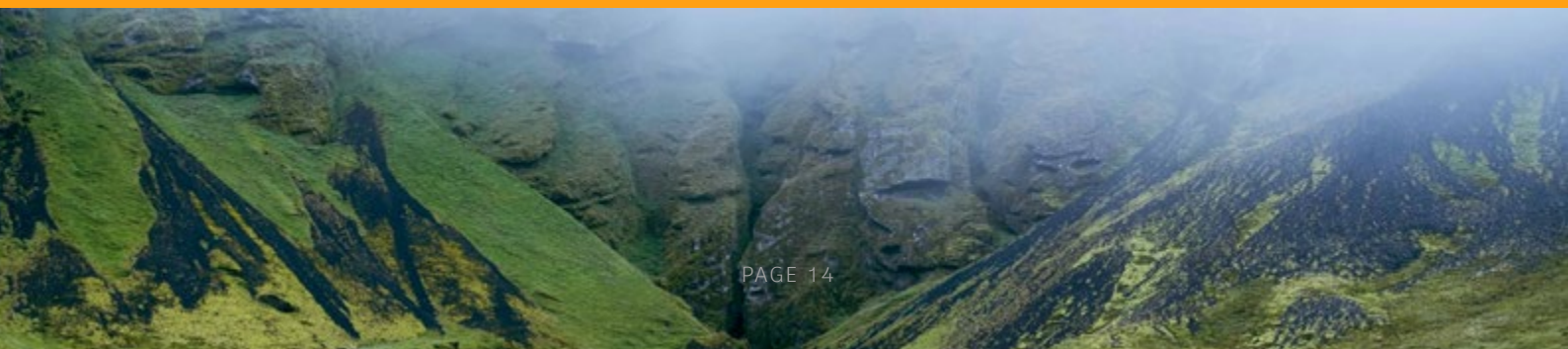
There are a range of target setting methods available to infrastructure teams. Two such methods that embrace all transformative outcomes are:

- Materiality assessments
- Positive performance.

5. Appraising infrastructure options to identify those most capable of delivering transformative outcomes.

After gathering the contextual information about each transformative outcome and engaging citizens, infrastructure teams must be equipped to undertake a rapid ideation and appraisal process - often referred to as a sprint.

The rapid ideation and appraisal process, often referred to as a sprint, should identify, assess and prioritize potential infrastructure solutions capable of delivering transformative outcomes.



Key messages in the third paper:

1.

By placing infrastructure at the forefront of addressing rapid technological, climate and societal change, infrastructure can utilize new opportunities, for example new digital technologies enabling fast iterative design, new flex employment models and new digital communication for engaging stakeholders and communities, to deliver transformative outcomes.

2.

A key historical challenge to delivering transformative outcomes—especially environmental sustainability, resilience and inclusivity outcomes—has been the idea that if it cannot be measured and/or the outcome properly monetized, it cannot be properly appraised.

That is no longer the case.

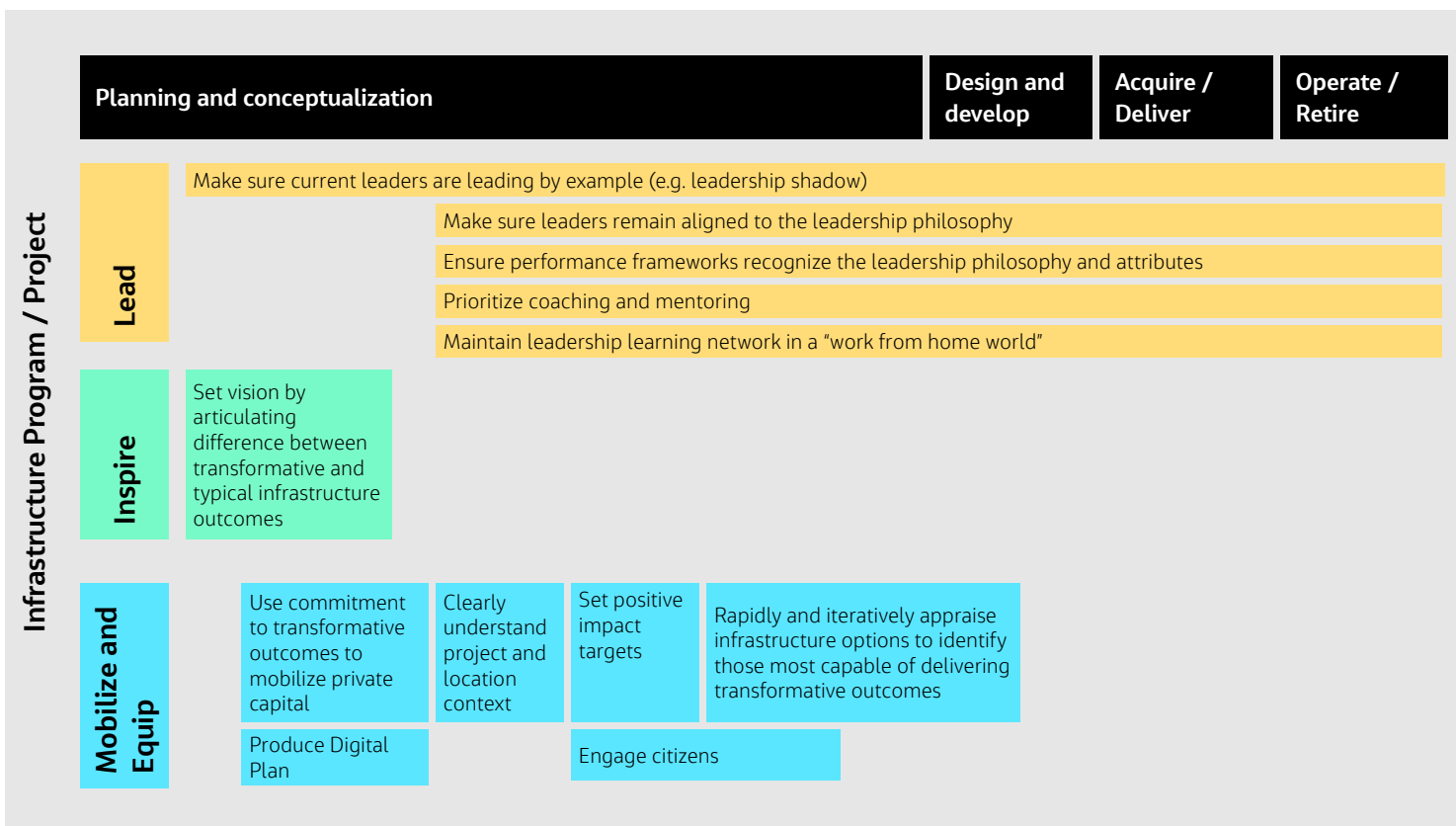
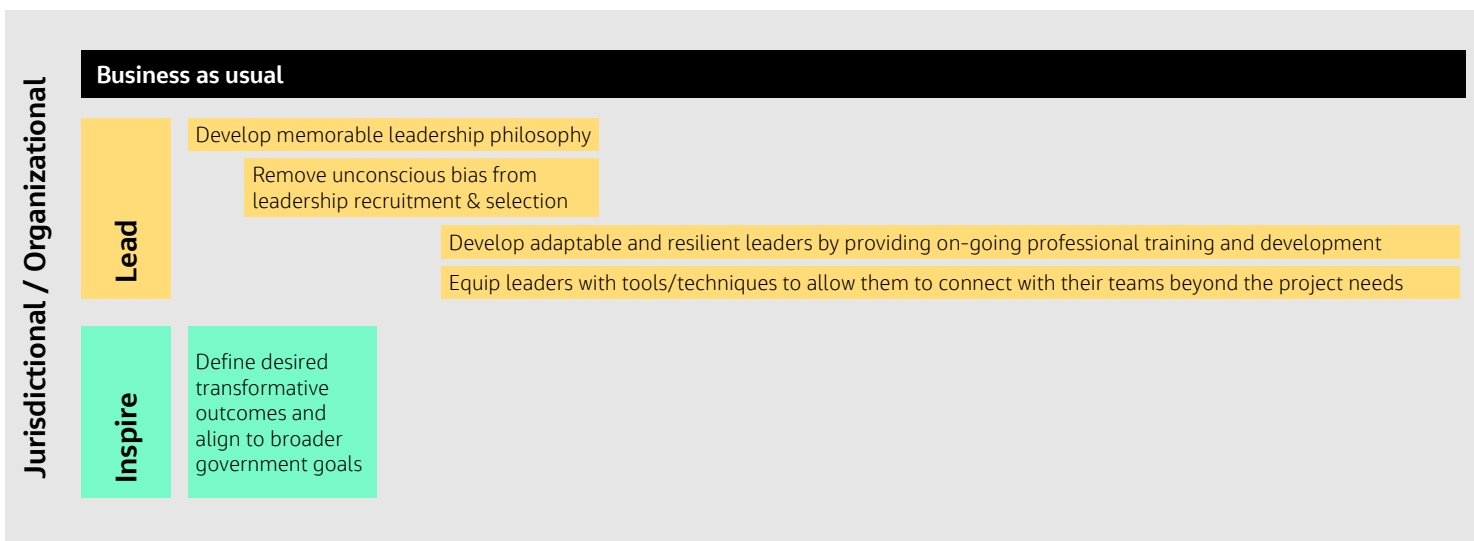
Today there are a wide range of methods and tools available to appraise such outcomes. For example for inclusion appraisal methods include:

- Social Vulnerability Index
- Social Progress Index
- Multidimensional Poverty Index
- The Green Book
- Social Value Bank.

Road map to realization

Making every infrastructure program and project an opportunity to deliver transformative outcomes.

The diagram below illustrates the cumulative recommendations from the three papers. The cumulative recommendations form a roadmap for infrastructure entities and associated programs and projects to follow to help realize transformative outcomes through infrastructure.



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