

InfraTracker Methodology



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1 Background and context

The InfraTracker is a digital data tool that depicts the GI Hub's analyses of the G20 infrastructure stimulus announcements made in response to COVID-19. It identifies trends that represent opportunities and challenges for governments and the infrastructure sector. Its purpose is to help G20 governments make more informed decisions on using infrastructure to achieve a transformative recovery post-COVID-19.

The InfraTracker was developed by the GI Hub in response to requests of the Saudi Arabian and Italian G20 Presidencies and the Infrastructure Working Group (IWG) to examine the role of infrastructure in facilitating transformative recovery from COVID-19 and address the following problem statement:

How can the experience from current and previous stimulus packages support G20 governments in making more informed decisions on how to include infrastructure as stimulus post-COVID-19 to achieve long-term transformative outcomes?

The first draft of the InfraTracker was circulated to the IWG in March 2021 and cited in the G20 Communiqué in April 2021. The final draft of the Infrastructure was circulated to the IWG in September 2021.

The InfraTracker data tool will remain a 'living resource' and may be improved and updated periodically.



2 Approach to the InfraTracker development

The development of InfraTracker started in October 2020.

It has comprised two rounds of data gathering and desktop research to obtain and classify infrastructure stimulus announcements. The first round of data gathering was completed in March 2021, and the second round was completed in September 2021. Each round of data gathering was followed by a G20 member-led review and verification of the resulting datasets. During the verification phase, GI Hub worked with each country to identify unexpected trends and missing packages, and to gather additional data to fill any remaining gaps.

Note: The data presented in the InfraTracker tool were derived from publicly available announcements of stimulus (where this related to national government infrastructure investments) and validated with countries where and if possible. The data intends to capture key trends across the G20 and as a result the list of packages included in the database may not be exhaustive or validated.

The scope of the data collected is outlined in Section 2.1 below.

2.1 What is *infrastructure as a stimulus*?

The type of stimulus announcement that was considered to be infrastructure stimulus is outlined in Figure 1 below. The definition was developed in consultation with the International Monetary Fund (IMF) based on their COVID Fiscal Monitor typology.

Figure 1 Definition of *infrastructure as a stimulus*

		IMF Tracker ¹	GI Hub InfraTracker
Infrastructure	<ul style="list-style-type: none"> Economic infrastructure Social infrastructure 		
Stimulus	<ul style="list-style-type: none"> Fiscal policy Accelerated / additional spending Liquidity support Related to investment (capex) 		
Timeframes	<ul style="list-style-type: none"> Feb 2020 onwards 		
Entity	<ul style="list-style-type: none"> National governments 		
Exclusions	<ul style="list-style-type: none"> State / local government Opex Workforce training 		
		Above the line measures	
		Additional spending	✓
		Foregone revenue	✓
		Accelerated spending	✓
		Deferred revenue	✓
		Liquidity support	
		Loans and equity	✓
		Guarantees	✓
		Quasi-fiscal operations	✓

¹ Using typology from IMF's COVID Fiscal Monitor



2.2 What infrastructure as a stimulus data was collected and mapped?

Two levels of data were collected from infrastructure stimulus announcements (Figure 2). Level 1 consists of the broader packages and Level 2 consists of the specific announcements within the packages identified in Level 1. The availability of data under each level is different. Data collected and analysed included those classified as high or medium as per Figure 2 below. An example of an assessment of an announcement is included in Figure 3 below. The sector and subsector categories are included in Appendix A. The methodology for mapping announcements to transformative outcomes through infrastructure is detailed in the following section.

Assumptions were made with regard to aspects of the data acquisition work. Data were initially sourced from publicly available sources such as government websites and press announcements. Data categories such as amount of total stimulus announced, portion of infrastructure against the total stimulus amount, estimated spend per subsector, and breakdown of stimulus packages by subsectors were not always consistent and reflect the individual data disclosures by governments. To maintain the InfraTracker data integrity (so as not to wholly rely on information availability in the public channels), firsthand validation from member states was used to fill in gaps where possible.

Figure 2 Data collected from infrastructure stimulus announcements

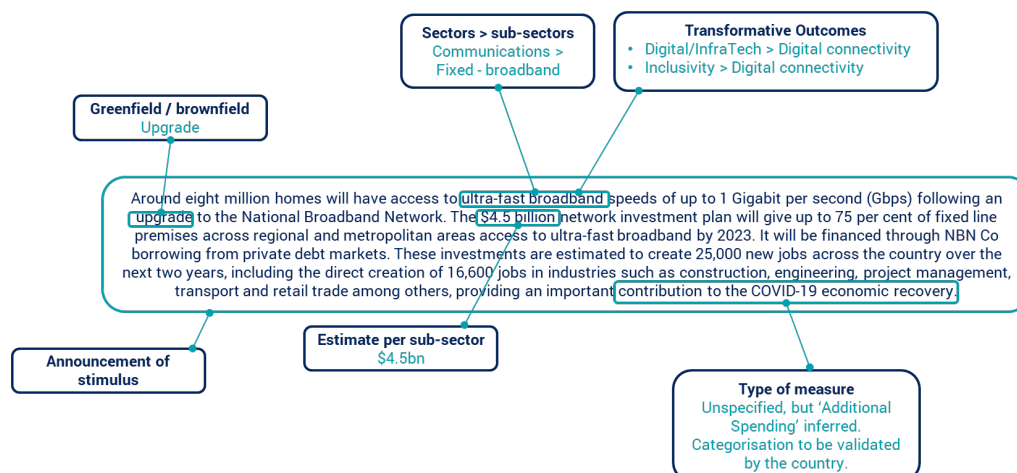
Level 1: Packages		Level 2: Details of Announcements	
These are the overarching national government stimulus packages		These contain an itemized list of infrastructure-related stimulus included in the packages.	
Package name	High	Announcement of stimulus	High
Date announced	High	Sectors and sub-sectors	High
Package headlines	High	Estimate per sub-sector	High
Total package value	High	Type of measure (based on IMF typology)	Med
Infra-related amounts in package	High	Transformative outcomes through infrastructure	Med
		Greenfield / brownfield	Med
		Estimate per year	Low
		Channels to beneficiaries	Low
		Beneficiaries	Low

High, medium and low rankings indicate the level of availability of data in the public domain

Note that due to the low availability (even after member-led validation) of the last three categories (i.e. estimate per year, channels to beneficiaries and beneficiaries) these were excluded from the InfraTracker analysis.



Figure 3 Example of data collection method from an infrastructure stimulus announcement



The GI Hub introduced the concept of transformative stimulus through infrastructure in the Phase 1 Report on Transformative Infrastructure for COVID Recovery submitted to the IWG in July 2020. Since then, the concept of transformative infrastructure stimulus has evolved following G20 member and guest country ('G20 members') feedback and consultations.

Our methodology in developing this revised framework included four phases as outlined below.

1. Literature review

The GI Hub undertook a literature review based on the *Compendium of Transformative Infrastructure Approaches* (draft submitted to the IWG on 29 June 2021) to identify a list of transformative outcomes under each of the five transformative categories.

These transformative outcomes were compiled and rationalised based on their relevance to infrastructure and their applicability to the infrastructure as a stimulus announcements contained within the *InfraTracker*.

2. Development of transformative outcomes analysis framework

To guide the categorisation of stimulus announcements, the GI Hub gathered definitions for each transformative outcome based on existing reference material where possible. These are detailed in Table 1 below. Testing of the definitions and approach also took place with a small group of public and private sector stakeholders.

3. Mapping of stimulus announcements to transformative outcomes

The GI Hub used its judgement to map stimulus announcements to transformative outcomes. Some rules were developed to guide this mapping. The methodology permitted stimulus announcements to be mapped to multiple outcomes.

4. Validation of mapping with G20 members

This analysis was tested with G20 members. Feedback on mapping was incorporated into the final product. Any further comments or questions are welcome.

Table 1 provides a list of all the transformative outcomes as well as their description and some examples that demonstrate how they were mapped to the stimulus announcements.



Table 1 Transformative outcomes and examples

Category	Transformative Outcome	Types of announcements that were mapped to these categories	Examples of relevant stimulus announcements
Environmental sustainability	Circularity	Infrastructure that supports circular economy outcomes, either in the way the infrastructure is developed and delivered (circular infrastructure), or by enabling broader circular economy activity through infrastructure (infrastructure for circularity) Reference: GI Hub, The Role of Infrastructure in the Circular Economy (2021)	<ul style="list-style-type: none"> • Circular infrastructure: Maintenance and revitalisation of local public transportation, thereby reducing the need for new infrastructure to be built • Infrastructure for circularity: Modernisation of sorting, recycling, and waste recovery centers to enable recovery and reuse of products
	Environmental regeneration	Infrastructure that supports rehabilitation or restoration of environmental assets or biodiversity	<ul style="list-style-type: none"> • Afforestation and plantation works • Artificial regeneration, assisted natural regeneration • Forest protection, forest and wildlife related infrastructure development, and wildlife protection and management
	Low-carbon transition	Infrastructure that supports the transition to net zero emissions of carbon dioxide Reference: World Bank Group, Decarbonising Development (2015)	<ul style="list-style-type: none"> • Green and resilient mobility, including green vehicles and charging stations • Investments into renewable electricity generation • Green buildings and energy-efficient buildings • Moving to low-carbon fuels (e.g. hydrogen, renewable natural gas, cellulosic ethanol) • Carbon capture, utilisation, and storage (CCUS) in industrial clusters
	Pollution reduction	Infrastructure that supports reduction of air, water, noise, and land pollution (other than that covered under 'low-carbon transition')	<ul style="list-style-type: none"> • Upgrade of sewerage networks and waste treatment facilities • Increasing comprehensive treatment to reduce water pollution



Category	Transformative Outcome	Types of announcements that were mapped to these categories	Examples of relevant stimulus announcements
Inclusivity	Inclusive mobility	Infrastructure that increases access and safety to transport modes for underserved communities	<ul style="list-style-type: none"> • Development of cycling and public transport infrastructure such as metro, tram, and bus • Transit solutions for rural and remote communities • Transport upgrades targeting safety and punctuality of services
	Digital Connectivity	Digital infrastructure that improves skills, enhances quality of life, drive education, and promotes economic wellbeing across society Reference: Australian Digital Inclusion Index (2016)	<ul style="list-style-type: none"> • Rollout of broadband networks and 4G/5G to homes, businesses, and schools • ICT development programs in rural areas
Resilience	Disaster and climate adaptation	Infrastructure that improves affordability of tariffs and infrastructure services for low-income groups, thereby enabling universal access to basic services Reference: GI Hub, Inclusive Infrastructure (2019)	<ul style="list-style-type: none"> • Water saving / efficiency investments to enhance water security • Public works to improve disaster management • Disaster mitigation and adaptation projects, including natural infrastructure, flood/fire mitigation, and related infrastructure
	Social cohesion	Infrastructure that increases the ability of individuals, institutions, businesses, and systems within a community to survive, adapt, and grow despite the chronic stresses or acute shocks they experience. 'Stresses' and 'shocks' include but are not limited to impacts of climate change, natural disasters, and pandemics. Reference: Resilient Cities Network	<ul style="list-style-type: none"> • Creating safe and vibrant public spaces • Investment in public spaces, arts, and culture within local communities • Regeneration projects for towns and regions
Digital/ InfraTech	Digitalisation	Infrastructure that supports community wellbeing, fights exclusion and marginalisation, creates a sense of belonging, promotes trust, and offers its members the opportunity of upward mobility, enhancing the capacity of communities to respond to shocks and stresses Reference: OECD, Perspectives on Global Development 2012: Social Cohesion in a Shifting World (2012)	<ul style="list-style-type: none"> • Digital upgrades and technical strengthening of public services (e.g. health and education) • Creation of digital apps to allow residents to access municipal services remotely • Investment in InfraTech • Investment into data centres



Category	Transformative Outcome	Types of announcements that were mapped to these categories	Examples of relevant stimulus announcements
	Cyber-security	Infrastructure that integrates material, machine, and digital and data technologies across its lifecycle to improve services other than digital connectivity References: G20 Infrastructure Working Group, G20 Riyadh InfraTech Agenda (2020) and OECD, Going Digital: Shaping Policies, Improving Lives (2019)	<ul style="list-style-type: none"> Acceleration in cyber-security investments
	Digital connectivity	Infrastructure that increases the security of digital infrastructure (including hardware, networks, and data) against unauthorised access or malicious attacks, ensuring confidentiality, integrity, and availability of information Reference: US Cybersecurity and Infrastructure Security Agency, Security Tip (ST04-001): What is Cyber-Security? (2009)	As defined above
Research and development	Disruptive innovation	Digital infrastructure that improves skills, enhances quality of life, drives education, and promotes economic wellbeing across society Reference: Australian Digital Inclusion Index (2016)	<p>Examples include research and technology development in areas such as:</p> <ul style="list-style-type: none"> Hydrogen and alternative fuels Electric vehicles and associated infrastructure Carbon capture and utilisation
Economic development	Job creation and economic growth	Infrastructure can support sustained and inclusive economic growth that can drive progress, create decent jobs for all, and improve living standards. Reference: Sustainable Development Goal 8: Decent work and economic growth	<ul style="list-style-type: none"> Investments in road or airport infrastructure that does not meet inclusive outcomes Investments into electricity transmission / distribution not related to environmental sustainability or inclusivity Industrial / commercial infrastructure



Appendix A - Sector and subsector categories

Sector	Subsector	Type of Measure (according to IMF typology)	Channel to beneficiaries	Greenfield / Brownfield
Infrastructure (unspecified sectors)	Infrastructure (unspecified)	Additional spending	Direct national investment	Greenfield
Communications	Fixed - e.g. broadband	Accelerated spending	Indirect through states	Upgrade
Communications	Wireless - e.g. 4G/5G	Loans and equity	Indirect through local government	Maintenance
Communications	Satellite	Guarantees	Indirect through funds	Greenfield and brownfield (unspecified)
Communications	Data centres	Quasi-fiscal	Indirect through NIB/NDB	
Communications	Digital / enterprise solutions	Other policy	Indirect through government agency	
Renewable generation	Renewables (unspecified)		NIB/NDB investment	
Renewable generation	Solar			
Renewable generation	Wind			
Renewable generation	Biofuels			
Renewable generation	Hydro			
Renewable generation	Other			
Non-Renewable generation	Non-renewables (unspecified)			
Non-Renewable generation	Coal fired			



Sector	Subsector	Type of Measure (according to IMF typology)	Channel to beneficiaries	Greenfield / Brownfield
Non-Renewable generation	Oil & Gas fired			
Non-Renewable generation	Nuclear			
Non-Renewable generation	Carbon capture, utilisation, and storage (CCUS)			
Energy storage, transmission and distribution	Energy distribution (unspecified)			
Energy storage, transmission and distribution	Electricity transmission and distribution			
Energy storage, transmission and distribution	Gas transmission and distribution			
Energy storage, transmission and distribution	Energy storage			
Energy storage, transmission and distribution	Hydrogen			
Social	Social (unspecified)			
Social	Healthcare and wellness services			
Social	Education			
Social	Housing			
Social	Tourism, arts, and culture			
Social	Sports and recreation			



Sector	Subsector	Type of Measure (according to IMF typology)	Channel to beneficiaries	Greenfield / Brownfield
Social	Urban landscape / public spaces			
Social	Justice			
Social	Other public buildings and structures			
Transport	Transport (unspecified)			
Transport	Zero Emissions Vehicles (ZEV) infrastructure			
Transport	Rail			
Transport	Air transport			
Transport	Ports			
Transport	Maritime / Inland water transport			
Transport	Roads			
Transport	Active transport			
Water	Dams and Irrigation			
Water	Water treatment and distribution			
Water	Sewage treatment and collection			
Water	Water efficiency solutions			
Water	Water (unspecified)			



Sector	Subsector	Type of Measure (according to IMF typology)	Channel to beneficiaries	Greenfield / Brownfield
Waste	Municipal solid waste			
Waste	Industrial and trade waste			
Waste	Recycling and waste minimisation solutions			
Other	Disaster management infrastructure (e.g. flooding, earthquakes)			
Other	Agriculture			
Other	Environment and nature-based solution (NBS)			
Other	Commercial and industrial infrastructure			

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