



Italian G20 Presidency

Annex of Infrastructure Maintenance Case Studies

[Overview]

July 2021



Annex – Infrastructure Maintenance Case Studies

I. Background

This Annex presents a collection of G20 maintenance case studies to enrich the *G20 Policy Agenda on Infrastructure Maintenance* by promoting knowledge sharing, as well as illustrating concrete applications of a range of policy tools and levers that can be adopted to enable better planning and prioritization, to secure adequate resources and to implement more efficient and effective maintenance of infrastructure.

G20 members have submitted on a **voluntary basis** the case studies, providing a brief description of a domestic project, program or institutional reform (completed or ongoing) that could illustrate a best practice solution to promote infrastructure maintenance¹. To secure a balanced representation, **two cases per member** have been selected, so as to ensure a more accurate focus on infrastructure maintenance and diversity in terms of sectors covered. This collection of case studies should not be interpreted as a representative sample of members' efforts in infrastructure maintenance, but rather as a **demonstration of the G20 active engagement** in this field.

Details on all cases can be found at this [link](#).

II. Selected Case Studies

Country	Name	Policy	Sector
AUS	 Roads to Recovery Program	funding	transportation
AUS	 Bridges Renewal Program	funding	transportation
BRA	 New Basic Sanitation Regulatory Framework	planning; funding; delivery	Water-Waste
BRA	 PROSEFER – National Railway Safety Program in Urban Areas	planning	transportation; social
CAN	 Canada Core Public Infrastructure Survey	planning	Water-Waste; transportation; social
CAN	 Municipal Asset Management Program	delivery	other
CHE	 National Roads and Agglomeration Transport Fund	planning; funding; delivery	transportation
CHE	 Electricity Grid Usage Tariff	planning; funding; delivery	energy
CHN	 Retrofitting Ageing Highway Bridges	planning	transportation; social
CHN	 Circular of the Ministry of Finance on Issuing the Operation Guideline for Performance Management of PPP Projects	planning; funding; delivery	energy; Water-Waste; transportation; ICT; social; other
EGY (from EIB)	 Cairo Metro Rehabilitation	planning; delivery	transportation
ESP	 Adaptation Plans of the Spanish Port System to Climate Change	planning; funding; delivery	transportation; social; other (sustainability)

¹ To assist the case studies collection, IWG members received an *Infrastructure Maintenance Case Study Template*, along with an *Annotated Glossary on Infrastructure Maintenance for guidance* (see both instruments at this [link](#)).



Country	Name	Policy	Sector
ESP	 Real-time Monitoring and Drones for a Better Road Bridges Maintenance.	planning; funding; delivery	transportation; ICT
ESP (from EIB)	 Metro de Madrid Infrastructure Upgrade	planning; delivery	transportation
ETH (from EU)	 Road Sector Policy Support Programs – Ethiopia (Sector Budget Support Modality)	planning; funding; delivery	transportation
FFF (from EU)	 Africa Transport Policy Program - SSATP	planning; funding; delivery	transportation
FRA	 Sud Europe Atlantique High Speed Rail Link	planning; funding; delivery	transportation
GBR	 Ofwat Price Review 19	funding; delivery	Water-Waste
GBR	 Asset Information Services Strategic Plan - as part of the Control Period 6 (2019 – 2024) for Network Rail	planning; delivery	transportation; ICT
GER	 Bridge Modernization Program, Retrofitting of Older Road Bridges (part A); Research Cluster “Intelligent Bridge” (part B)	planning; delivery	transportation
GER	 Quality regulation, CAPEX in period mark-up and investment measures at TSO level by Bundesnetzagentur	delivery	energy
IDN	 Eastern Sumatera Highway Preservation in Riau Province	planning; funding; delivery	transportation
IDN	 Eastern Sumatera Highway Preservation in South Sumatera Province	planning; funding; delivery	transportation
IND	 Long term O&M of Infrastructure Assets through Public Private Partnerships	planning; funding; delivery	transportation
ITA	 Bridge Safety National Guidelines	planning	transportation
ITA	 ANAS multi-year planning cycle of road maintenance	planning; funding; delivery	transportation; ICT
JPN	 National Strategy for Life Extension of Infrastructure	planning; delivery	Water-Waste; transportation; social
JPN	 Fundamental Policy and Guideline for Pre-Flood Emergency Reservoir Drawdown Operational Procedure for Enhanced Flood Management	planning; funding; delivery	energy; Water-Waste
KOR	 Master Plans for Managing Infrastructure (2020-2025)	planning; delivery	energy; Water-Waste; transportation; information and communications; other
KOR	 Seoul Metropolitan City’s Sustainable Infrastructure Management Plan	planning; funding; delivery	Water-Waste; transportation; other
MEX	 Mexico Tollroads MRO (Maintainer – Rehabilitator – Operator) Model	planning; funding; delivery	transportation
NLD	 Procurement of Innovative Circular and Modular Bridges	planning; funding; delivery	transportation; social; other (sustainability)

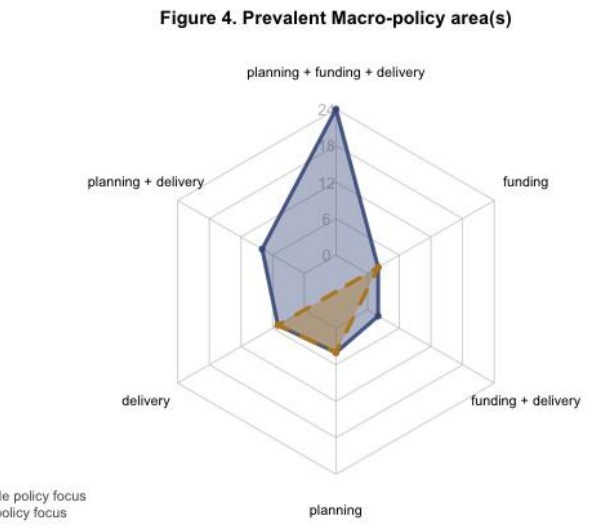
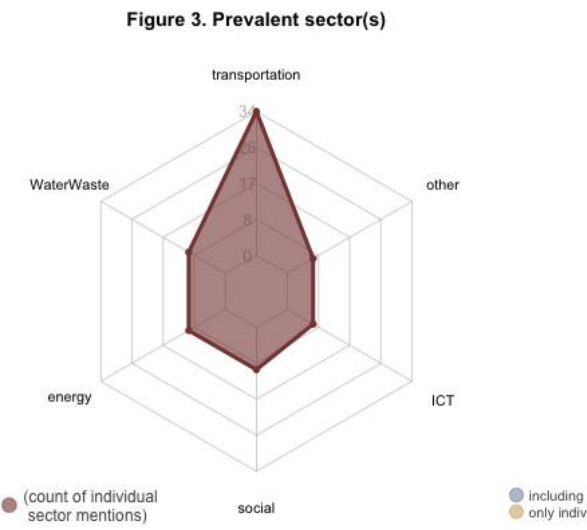
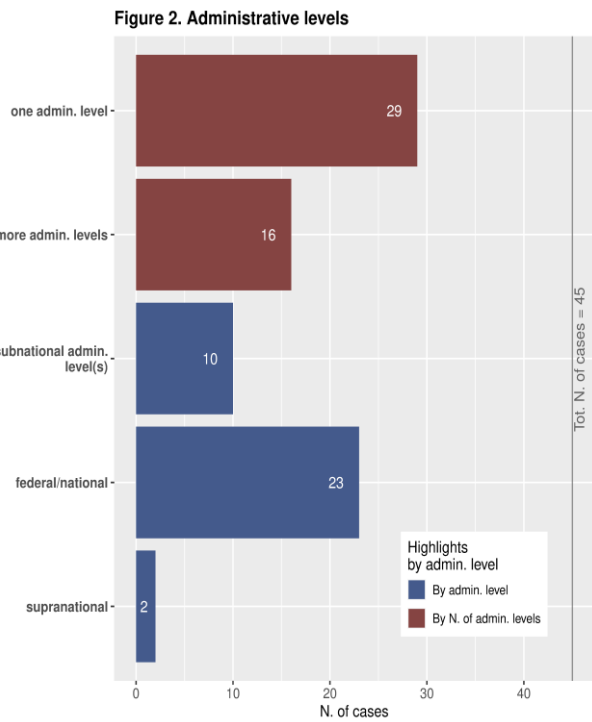
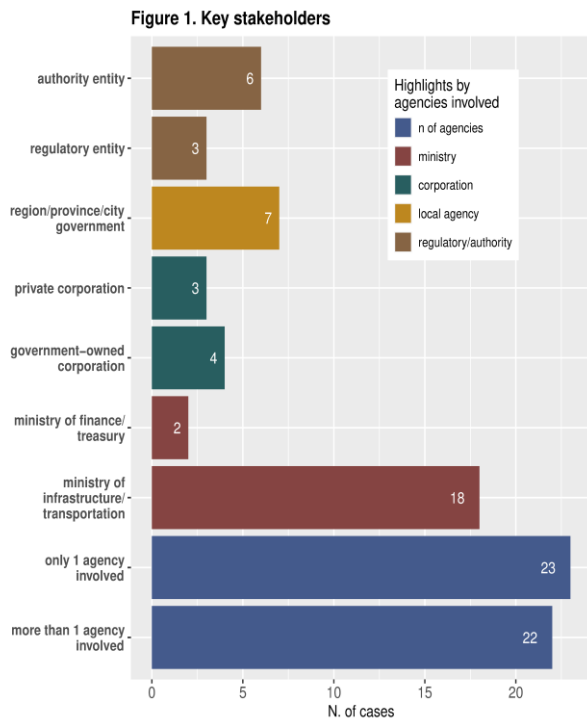


Country	Name	Policy	Sector
NLD	 Vital Assets Program	planning; funding; delivery	transportation
RUS	 Investment-Construction Model of Public-Private Partnership in the Development and Maintenance of Port and Coastal Infrastructure	planning; funding; delivery	energy; transportation
RUS	 Energy Efficient School Maintenance Systems	delivery	energy; ICT; social
SAU	 Treated Wastewater Use Scheme in Al Hasa Oasis	delivery	Water-Waste
SAU	 Improve the Efficiency of Sea Water Desalination Plants in the Kingdom of Saudi Arabia - Shuaiba 1 Plant	planning; delivery	energy; Water-Waste
SGP	 Singapore Air Traffic Management System Enhancement Project	planning; delivery	transportation; ICT
SGP	 Punggol Digital District	delivery	energy
TUR	 Istanbul Seismic Risk Mitigation and Emergency Preparedness Project (ISMEP)	planning; funding; delivery	ICT; social
TUR	 Eurasia Tunnel: Ventilation Optimization Study	planning; funding; delivery	energy; transportation; other
USA	 Pennsylvania Rapid Bridge Replacement	planning; funding; delivery	transportation
USA	 The Transform 66 Outside the Beltway	funding; delivery	transportation
ZAF	 Expanded Public Works Programme Integrated Grant for Municipalities	planning; funding; delivery	transportation; social
ZAF	 Provincial Roads Maintenance Grant	planning; funding; delivery	transportation

II. Case studies at a glance

The 45 case studies presented in this Annex reflect the great variability of efforts undertaken by the G20, in terms of:

- **Key stakeholders in charge of the intervention** (Figure 1). Half of the cases involve more than one entity to implement the initiative. At the national level, the Ministries of Infrastructure/Transportation have a leading role in many cases (in only two cases Ministries of Finance are directly in charge). Local, regional and city government agencies, as well as sector authorities, are widely involved in infrastructure maintenance cases, while private corporations, government-owned corporations and regulators' participation is less frequent.
- **Administrative level of interventions** (Figure 2). Many examples involve multiple administrative levels (e.g. national, state and city level jointly engaged). Most cases submitted are at the federal or national level, while only two involved supranational entities.
- **Sector** (Figure 3). When counting each sector independently mentioned, transportation is, by far, the most frequently covered, followed by water and waste, and energy.
- **Macro-policy area** (Figure 4). Most of the selected cases touch all three policy areas related to infrastructure maintenance (planning, funding and delivery), followed by 8 cases combining two policy areas (planning and delivery).



IV. Key Insights

Many of the core messages included in the *G20 Policy Agenda on Infrastructure Maintenance* are reflected in the G20 case studies.

Rationale

- **Maintenance is key to resilience.** Several cases report among their components improvements in term of sustainability and resilience (e.g. energy savings, CO2 emissions reduction, mitigation of



natural hazard risk, early warning systems) or even the implementation of circular solutions for procurement and construction of bridges and viaducts.

- ***Maintenance is required because of assets' age.*** In nine of the selected cases the urgent need for maintenance interventions is explicitly driven by the age of the infrastructure assets.

Challenges

- ***Sectors are increasingly interdependent.*** Close to half of the cases concern multiple sectors, where almost every possible combination of the covered sectors is represented. A fair number of cases has a focus on social infrastructure or on extending equitable access to networks, putting people (including vulnerable groups and future generations) at the center of their strategies.
- ***Data as an inescapable prerequisite.*** Several cases include some sort of data collection, survey or monitoring effort, often at the onset of the initiative to inform subsequent policy decisions.

Solutions

- ***Macro policy 1: Planning and regulation.*** Many cases include some form of planning or guidelines revision effort, while a few others propose regulatory innovations. Among other planning-oriented policies reported are: the definition/adoption of standards, cross-agency collaboration and strengthening institutional capacity.
- ***Macro policy 2: A role for the private sector in funding.*** Several cases illustrate initiatives involving the private sector in the form of Public-Private Partnerships (PPPs), concessions or other contribution from private operators (mostly applied in the transport sector). Additional policies described by the case studies include various instances documenting earmarking of public funding sources for maintenance, including via dedicated funds. The reported initiatives included also a few examples of funding schemes incorporating preparedness to risk and other innovative funding sources.
- ***Macro policy 3: Technology and knowledge sharing in improving delivery.*** A large share of the examples illustrates initiatives that adopt *InfraTech* solutions (from innovative monitoring approaches, to data-driven, “smart” maintenance solutions, to new material technologies). Notably, there were also 4 cases with an explicit component dedicated to knowledge sharing efforts.

Benefits

The *G20 Policy Agenda on Infrastructure Maintenance* highlighted the potential of maintenance to generate benefits at the **micro level** (i.e. project-level positive impacts), as well as at the **macro level** (i.e. impact positively affecting society, the economic system and the environment).

- ***Project-level benefits.*** A fair share of cases explicitly reports some reduction of Operations and Maintenance (O&M) costs associated with the implemented policy tool, often progressively achieved in phases. Some cases illustrate how rethinking approaches to O&M or introducing proper incentives can promote efficiency and construction quality, as well as extending assets' life span.
- ***Socio-economic impact and quality of service delivered to users.*** The benefits achieved by reported cases encompass increasing safety and/or access to services. Interestingly, several examples illustrate a shifting to a long-term management perspective aligned with long-term goals set at the national or local level. A few of the reported cases also give explicit consideration to the creation of jobs connected to maintenance projects.
- ***Environmental impact.*** Energy efficiency gains are the most frequently observed among sustainability-related benefits. Other benefits mentioned are: optimization of water resource management and reduction of construction material use and of CO2 emissions.