The Role and Financing of Quality Infrastructure

Amar Bhattacharya

Center for Sustainable Development

Brookings Institution

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B | Global Economy and Development at BROOKINGS

THE NEW CLIMATE ECONOMY
The Global Commission on the Economy and Climate

Structure

- **Centrality of Quality and Sustainable Infrastructure**
- **Urgency, Scale and Opportunity in the Post-COVID19 Context**
- **Unlocking investment opportunities**
- **Financing of sustainable infrastructure**

Quality/sustainable infrastructure is key to growth, development, and climate

Source: Bhattacharya et al. (2016)

Changes are needed across key systems

Energy	• Raising revenue by pricing carbon and eliminating fossil fuel subsidies • Saving energy through greater energy productivity • Supporting energy access through distributed renewable energy
Cities	• Well managed densification to revitalise cities • Sustainable and affordable housing for urban poor • Shared, electric, low carbon transport
Food and land use	• Avoiding deforestation and degradation of forests • Scaling up landscape restoration • Implementing climate-smart agricultural approaches • Supporting better food consumption patterns and reducing waste
Water	• Sustainable and equitable water allocation • Target investment in resilient water and sanitation infrastructure
Industry, Innovation and Transport	• Focus on energy efficiency, resource efficiency, and decarbonisation in heavy industry • Reduce emissions from the plastics value chain • Develop low-carbon solutions for heavy-duty transport • Increased support for innovation and deployment

Source: New Climate Economy, 2018

By 2030

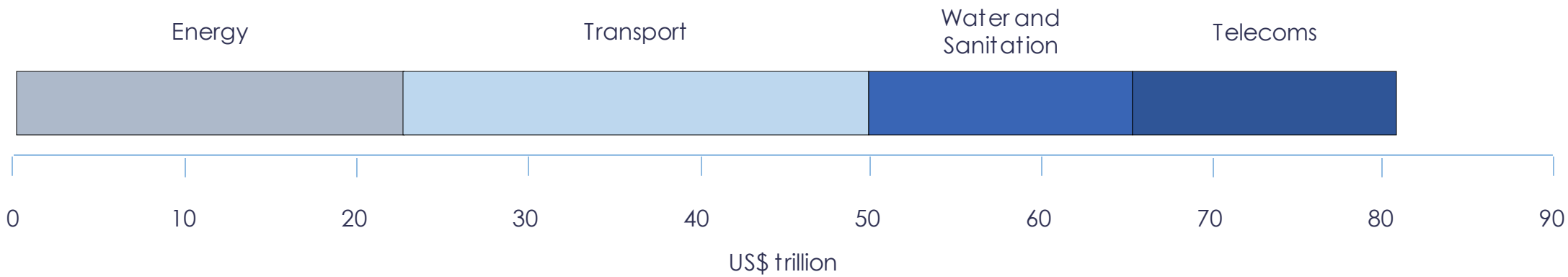
Generate over
65 million
additional low-carbon jobs

Make available
US$ 2.8 trillion
from carbon pricing revenues and removing fossil fuel subsidies

Avoid
700,000
premature deaths from air pollution

Seen remarkable progress in technology in last dozen years (renewables, EV, digital management, materials…); momentum is building but rapid acceleration needed.

The scale of infrastructure demand over the next 15 years will be more than the current existing stock



Projected cumulative infrastructure demand (2015-2030) Source: Bhattacharya et al (2016)

Note: Projections based on mid-point of range estimates. Excludes fossil fuel extraction and use, expenditure to enhance energy use efficiency, and operation and maintenance costs.

There are challenges in translating the tremendous needs and opportunities for sustainable infrastructure investment into realized demand (finance, policy…).

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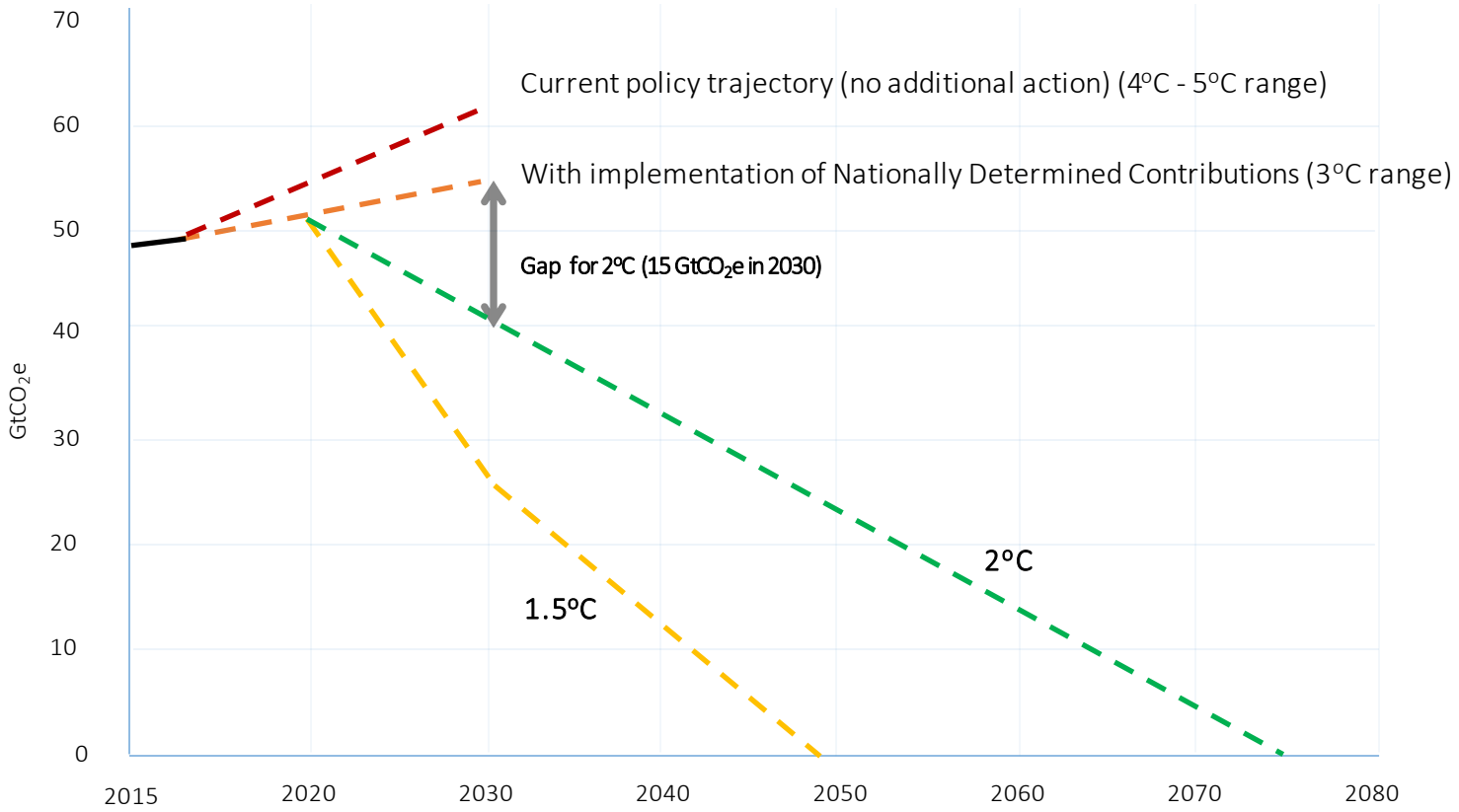
Urgency: the next two decades are critical in establishing low-carbon development, growth and poverty reduction

Change in the next decades					At the same time (to meet Paris targets)		
15 years	Infrastructure		2x	Investment of approximately US$ 90 trillion.	1.5°C	~50%	Decrease GHG emissions from ~50 to ~ 25 Gt CO_2e by 2030
20 years	GDP		2x	Growth of approximately 3% per annum. Led by emerging and developing countries.			
						or	
40 years	Urban Population		2x	Urban population will double in 40 years, Towns and cities shaped in the next 20.	2°C	~20%	Decrease GHG emissions from ~50 to ~40 Gt CO_2e by 2030

The next decade is critical. Choices made on infrastructure and capital now will either lock us in to high emissions, or set us on a low-carbon growth path which can be sustainable and inclusive.

The current path is far from sustainable



Source: Stern (2019); UNEP (2018)

- On the basis of the current NDC commitments, global temperatures are projected to increase by 3°C or more by 2100.
- To limit global warming to 1.5°C, the ambitions of the NDCs need to be sharply raised before the next submissions in 2020.

The science of climate change is clear; the impacts of failure could be devastating; difference between 1.5°C and 2°C strongly significant

	1.5°C	2°C
Extreme Heat (Global pop. exposed to severe heat at least once every 5 years)	14%	37%
Frequency of rainfall extremes (land)	17%	36%
Average drought length (months)	2	4

Source: IPCC (2018) and WRI (2018)

Differences between 1.5°C and 2°C are major. Differences from 2°C to 2.5°C, and then to 3°C likely still bigger. Current Paris COP21 plans for 2030 look like paths headed for 3°C and above over the next century or so.

Have not seen temperatures above 3°C for around 3 million years; hundreds of millions, perhaps billions, would have to move. Risks of severe and extended conflict. Note that 3 million years ago CO_2 concentrations were similar levels to now, and sea levels were 10 – 20m higher (Foster et al., 2017).

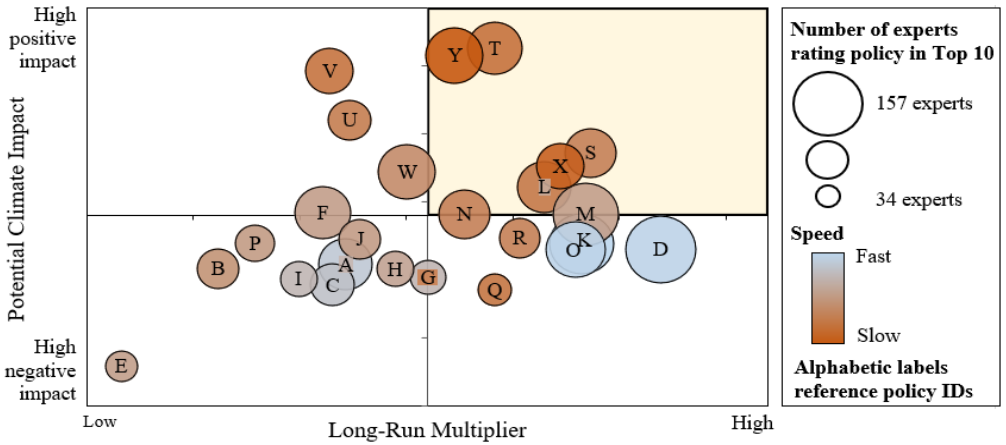
Sustainable infrastructure is a key element of building back better

- The world has been transformed by the COVID19 pandemic.
- The collapse in output is global, with the biggest and most severe hardships with the poorest people, in the poorest countries of the world.
- We must not to go back to the old normal: it was deeply fragile and dangerous. The recovery must 'build back better' in a way that can tackle underlying weaknesses and set a course for long-term transformation to a new form of growth and development.
- Investments for a sustainable recovery can:
    - Be **fast**, **labour-intensive**, with strong **multipliers**.
    - Delivered through investment in both **natural** (e.g. land restoration, forests and landscapes) and **physical** capital (e.g. broadband, renewables, infrastructure for EVs).
    - Avoid **lock-in** of a brown recovery.

Sustainable investments have good short-and long-run features

- **In the short run**, clean energy infrastructure (like insulation retrofits and building wind turbines, restoring wetlands) is labour-intensive but not import intensive or susceptible to offshoring. Consequently, they impart high short run multipliers (Pollinet al. 2008, Houser et al. 2009, Jacobs 2012).

- **In the long term**, as the operation and maintenance of more productive renewable technologies becomes less labour intensive, productivity rises and energy cost savings are passed to the wider economy, giving high long-run multipliers (Blyth et al. 2014, Hepburn et al 2020).



A	Temporary waiver of interest payments	N	Worker retraining
B	Assisted bankruptcy (super Chapter 11)	O	Targeted direct cash transfers or temporary wage increases
C	Liquidity support for large corporations	P	Rural support policies
D	Liquidity support for households, start-ups and SME's	Q	Traditional transport infrastructure investment
E	Airline bailouts	R	Project-based local infrastructure grants
F	Not for profits, education, research, health inst. bailouts	S	Connectivity infrastructure investment
G	Reduction in VAT and other goods and services taxes	T	Clean energy infrastructure investment
H	Income tax cuts	U	Buildings upgrades (energy efficiency)
I	Business tax deferrals	V	Green spaces and natural infrastructure investment
J	Business tax relief for strategic and structural adj.	W	Disaster preparedness, capacity building
K	Direct provision of basic needs	X	General R&D spending
L	Education investment	Y	Clean R&D spending
M	Healthcare investment		

Survey of 231 finance ministry/central bank officials/senior economists (representing 53 countries incl. all G20): perspectives on COVID-19 fiscal recovery packages (Hepburn et al, 2020).

Sustainable investments have appealing short-and long-run characteristics in a recession.

The growth story of the 21st century: strong, sustainable, inclusive

5 - 10 years		Investment in sustainable infrastructure can boost shorter-run demand and growth, sharpen supply, reduce poverty and support sustainable development.
5 - 10 years		Investment in sustainable infrastructure and human capital can foster health and well-being for all.
>10 years		Spur innovation, creativity and growth in the medium term, unleash new waves of innovation and discovery.
>20 years		Low-carbon is the only feasible longer-run growth on offer; high carbon growth self destructs.

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Impediments to quality/sustainable infrastructure

- Despite its central importance, **unable to deliver on the quantity and quality of investment needed**.

- The failure to deliver on the scale and sustainability of infrastructure investments reflects two fundamental and persistent gaps.

- Most countries are unable to translate the tremendous needs and opportunities for sustainable infrastructure investment into realized demand, and a significant proportion of investment is not as sustainable as it should be. This is largely due to the inherent complexities of infrastructure investment (long-term nature, interconnectedness, social impacts, and externalities positive and negative) and policy and institutional impediments.

- Second, despite the large pools of available savings, mobilizing long-term finance at reasonable cost to match the risks of the infrastructure project cycle and ensuring that finance is well-aligned with sustainability criteria remains a widespread challenge.

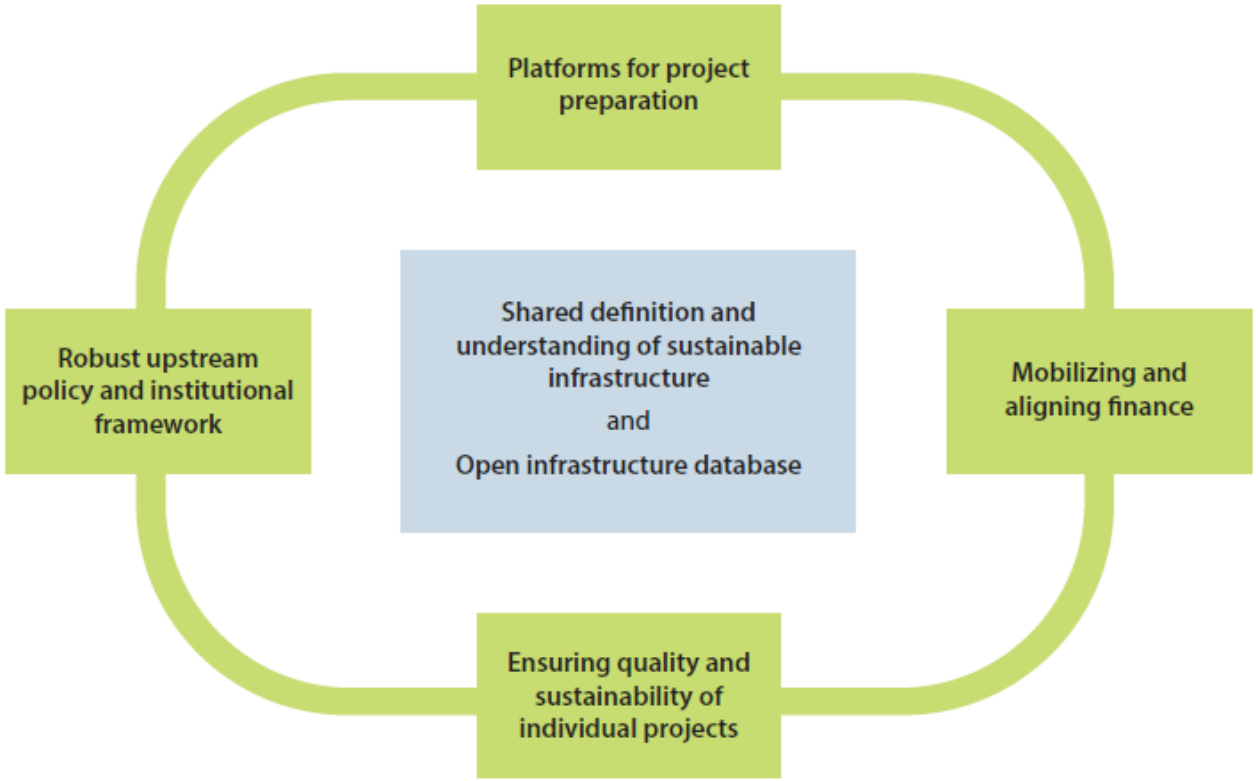
The nature of infrastructure investment and the urgent challenge require an integrated approach to quality and sustainable infrastructure

Complex nature of infrastructure investment

- Long-term and large upfront investments
- Spillovers and externalities
- Complex decision making process and policy-induced risks

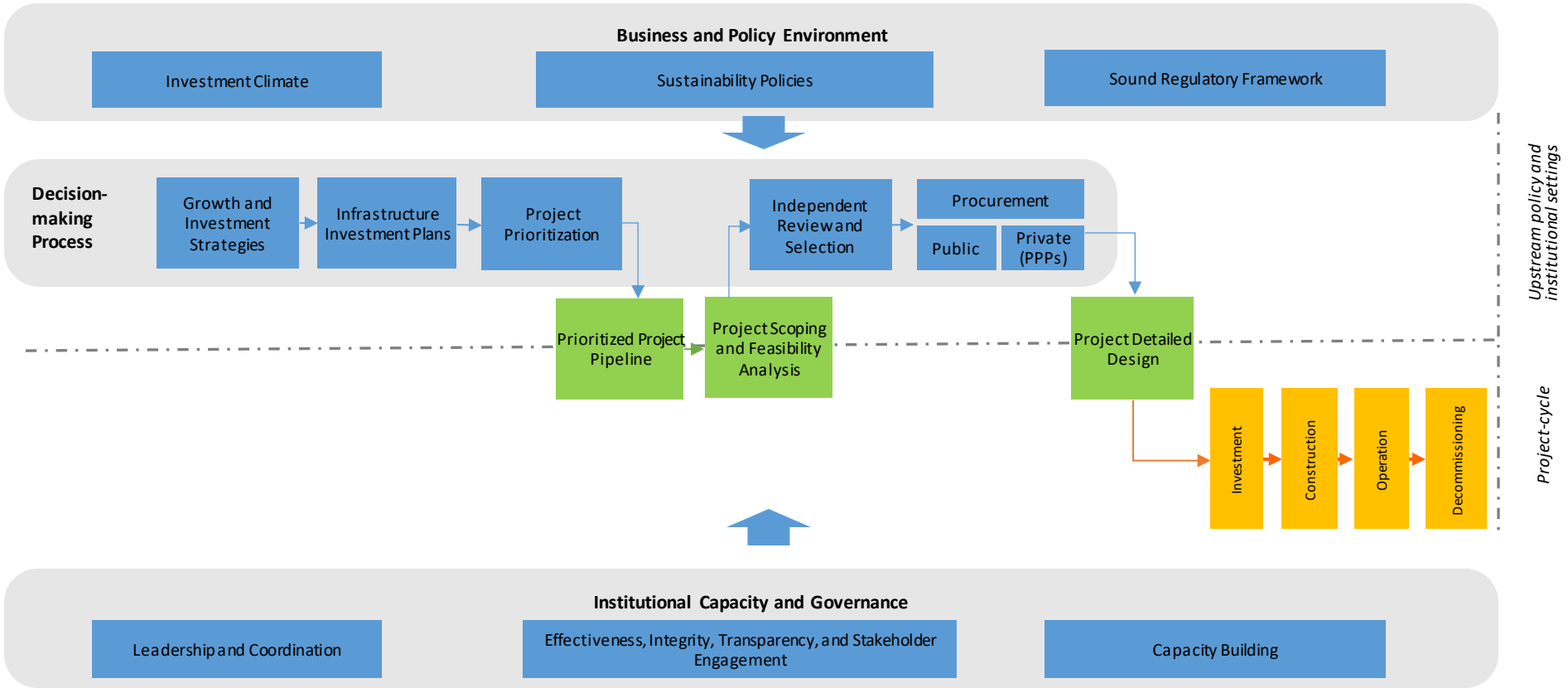
Urgent challenge to cut carbon emissions and build resilience

- Requires transformative changes in key economic systems
- Both new infrastructure and existing infrastructure must be low-carbon and climate-resilient



Source: Bhattacharya et al. (forthcoming)

Robust policy and institutional underpinnings are needed to unlock investments, attract the private sector, and ensure sustainability of investments



Source: Bhattacharya, Contreras, and Jeong (2020)

G20 Principles on Quality Infrastructure

"The aim of pursuing quality infrastructure investment is to maximize the economic, environmental, social, and development impact of infrastructure and create a virtuous cycle of economic activities, while ensuring sound public finances."

- Principle 1: Maximizing the positive impact of infrastructure to achieve sustainable growth and development
- Principle 2: Raising economic efficiency in view of life-cycle cost
- Principle 3: Integrating environmental considerations in infrastructure investment
- Principle 4: Building resilience against disasters and other risks
- Principle 5: Integrating social considerations in infrastructure investment
- Principle 6: Strengthening infrastructure governance

Tools and indicators on quality/sustainable infrastructure

Attributes and Framework for Sustainable Infrastructure, Bhattacharya et al, IADB, 2019

MDB Infrastructure Cooperation Platform: A common set of aligned sustainable infrastructure indicators, IADB, 2020

The Green, Inclusive, Resilient, Sustainable Indicators (GRIS), Asian Development Bank

G20 Quality Infrastructure Investment Case Study Survey, Global Infrastructure Hub

OECD Compendium of Policy Good Practices for Quality Infrastructure, 2020

OECD Implementation Handbook for Quality Infrastructure Investment, 2021

Quality Infrastructure Investment, World Bank Group

G20 Compendium of Quality Infrastructure Investment Indicators (forthcoming)

Sustainable Infrastructure Tool Navigator (www.sustainable-infrastructure-tools.org)

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Funding vs. Financing

Infrastructure Funding

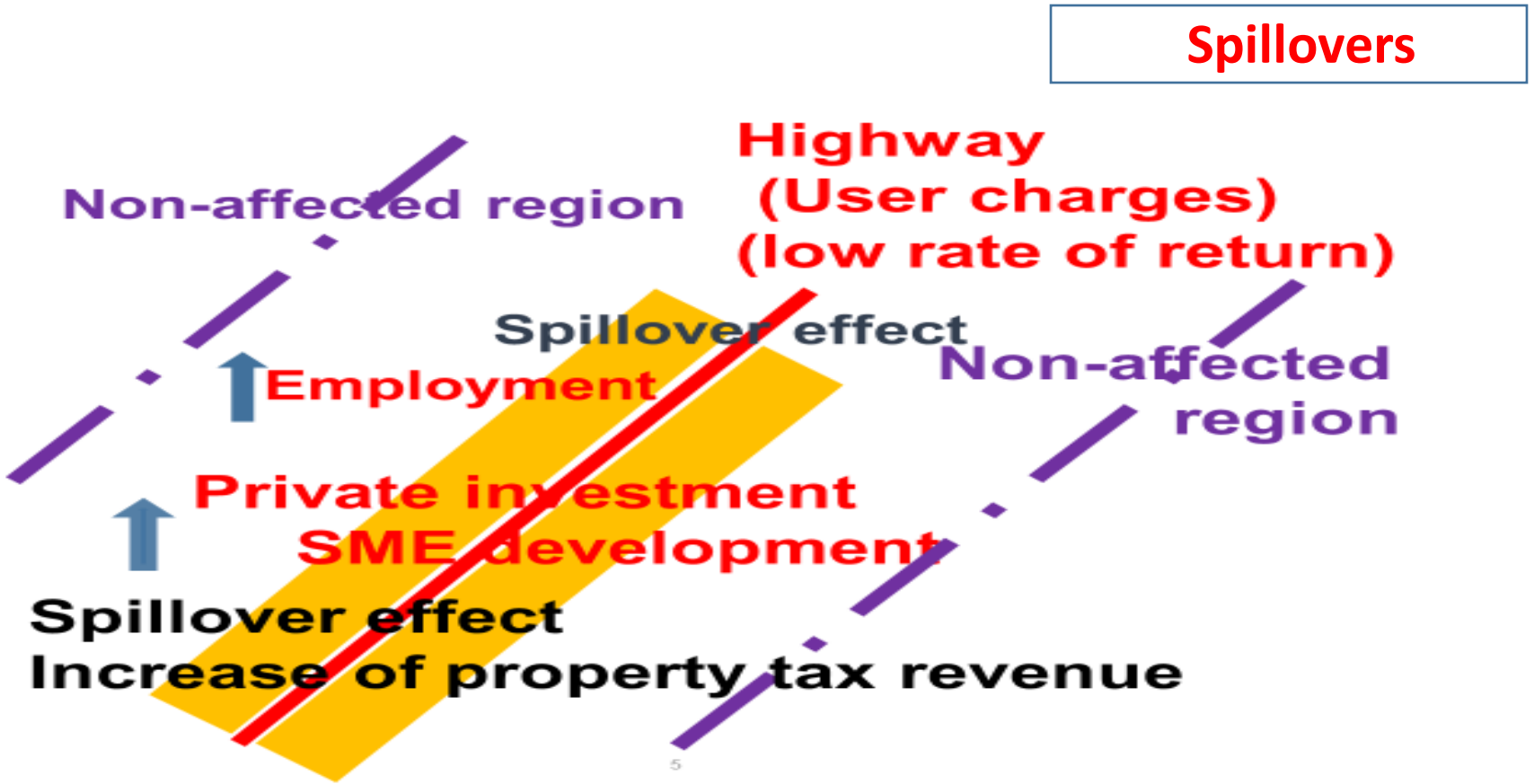
- **Revenue sources**, often collected over a span of many years, which are used to pay the costs of providing infrastructure services
- Most common sources of funding are:
  - ✓ General purpose tax revenues
  - ✓ Revenues from user charges
  - ✓ Other charges or fees dedicated to infrastructure

Infrastructure Financing

- **Turns the infrastructure funding into capital** that can be used today to build or make improvements in infrastructure
- Only if a project can demonstrate reasonable predictability in funding sources for both capital expenditures and for operations and maintenance (O&M), financing can be feasible

Source: World Economic Forum

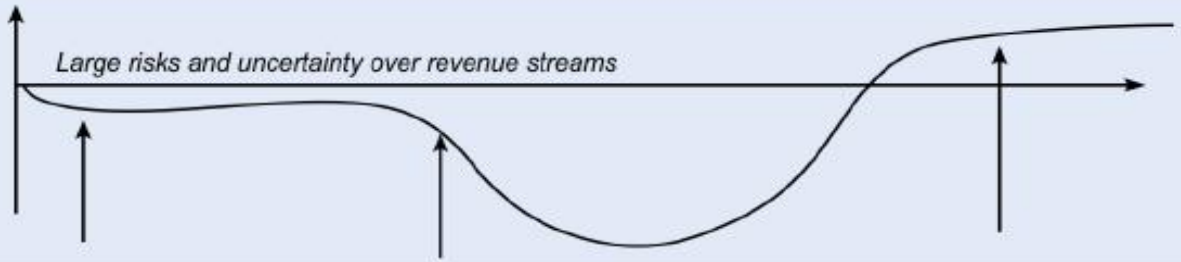
Spillover effects from infrastructure projects can be used to develop a better revenue model for infrastructure investment



Source: Yoshino (2019)

The characteristics of infrastructure financing

- The characteristics of infrastructure pose various risks in each phase of the life-cycle of a project
- The biggest risks and constraints to financing arise at the early stages of project

	Preparation	Construction	Operation
Description	Developer/government organizes feasibility studies; models cash flows, finances; organizes contracts with utilities, operators and construction firms	Construction first build the project to specifications	Separate operating company takes over operation and maintenance of the project
Main risks	Macroeconomic & political risks Technical risks to project viability Environmental and planing risks	Macroeconomic & political risks Construction risks (e.g., of overrun, delay)	Macroeconomic & political risks Demand/traffic risks Operating risks Policy risks (e.g., tariff changes)
Cash flows (stylized)			
Financing moments	During project preparation and feasibility studies the developer seeks patient capital or, often, public funds	Once project is 'bankable' the developer will seek equity investors and debt providers to finance the project	Once construction is compete and started to operate project can be refinanced to reflect the changing risk profile

Source: Bhattacharya, Romani and Stern (2012)

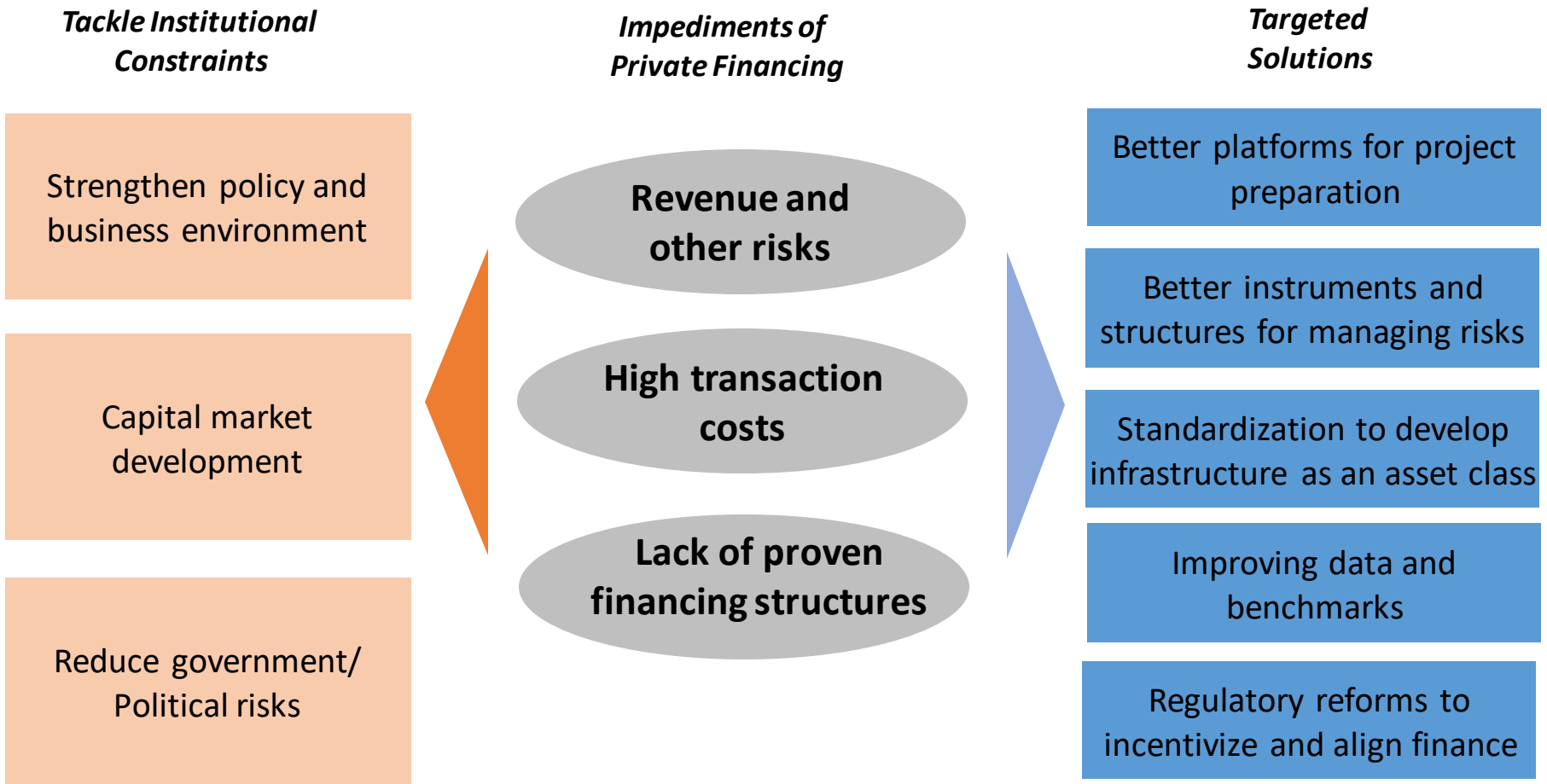
Mobilizing the required capital for sustainable investment requires unlocking a number of pools to work together

Private sector

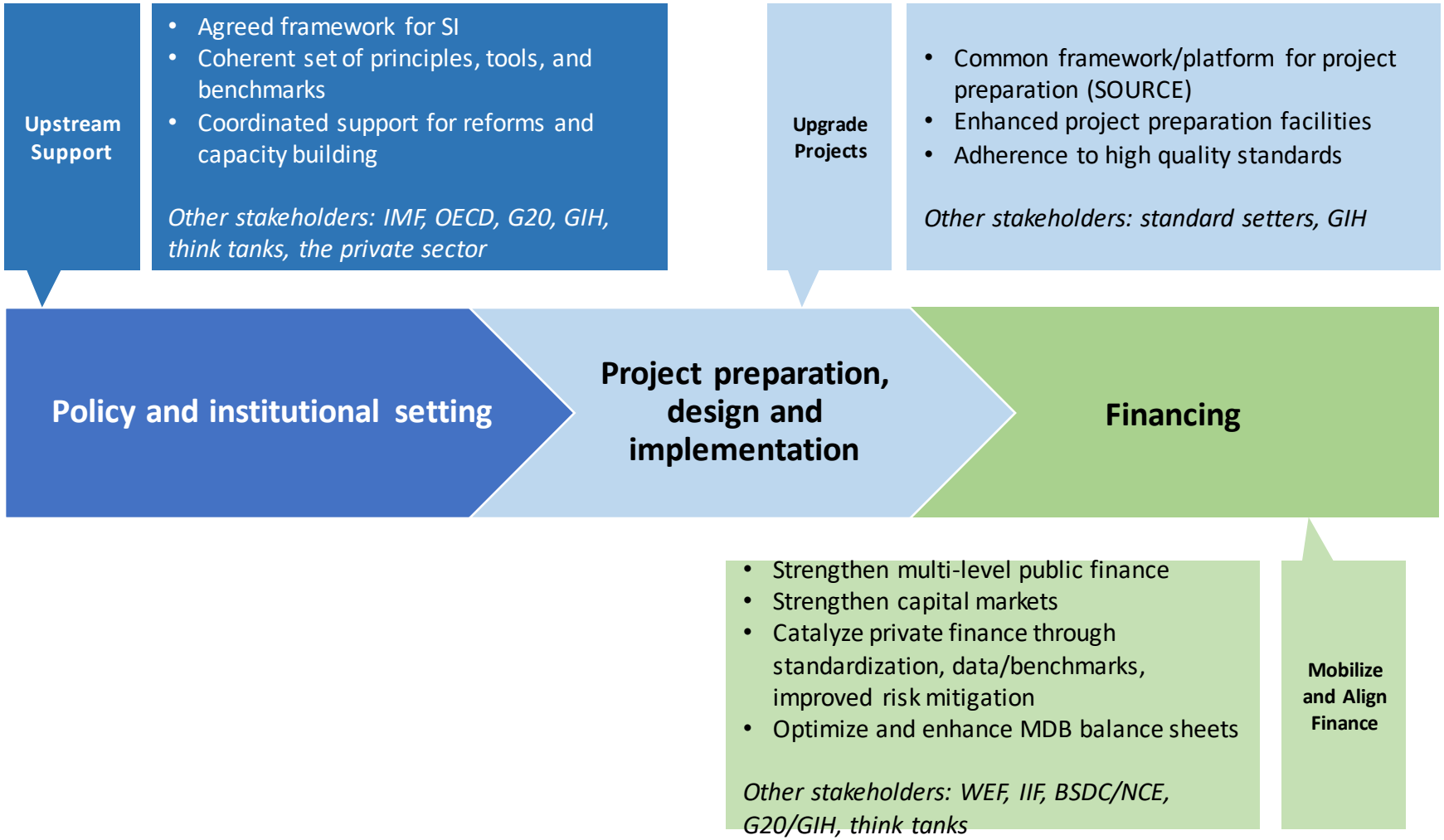
Domestic Public Resources	International Public Finance (Climate Funds, MDBs, DFIs)	Domestic Investment	International Investment
Develop own sources of revenue and improve revenue collection. Creating the enabling policy environment that directs and protects investments towards sustainable investment	Provide catalytic support from MDBs and other DFIs (IDFC) and use range of instruments available to reduce the risks of investment and lower the costs of capital. Boost concessional finance for high risk projects or areas where commercial returns aren't high enough.	Requires enabling policies and institutions to manage and reduce risks, plus capabilities in bringing management, technology and finance to scale. Platforms can play a critical role. Set out plans to make their portfolios and operations entirely sustainable. Disclose and report in line with the TCFD, implement shadow carbon pricing…	

Given the scale of investment required a significant increase of finance is needed from all sources — domestic public, international, private — and the links between them made stronger.

Mobilizing private financing



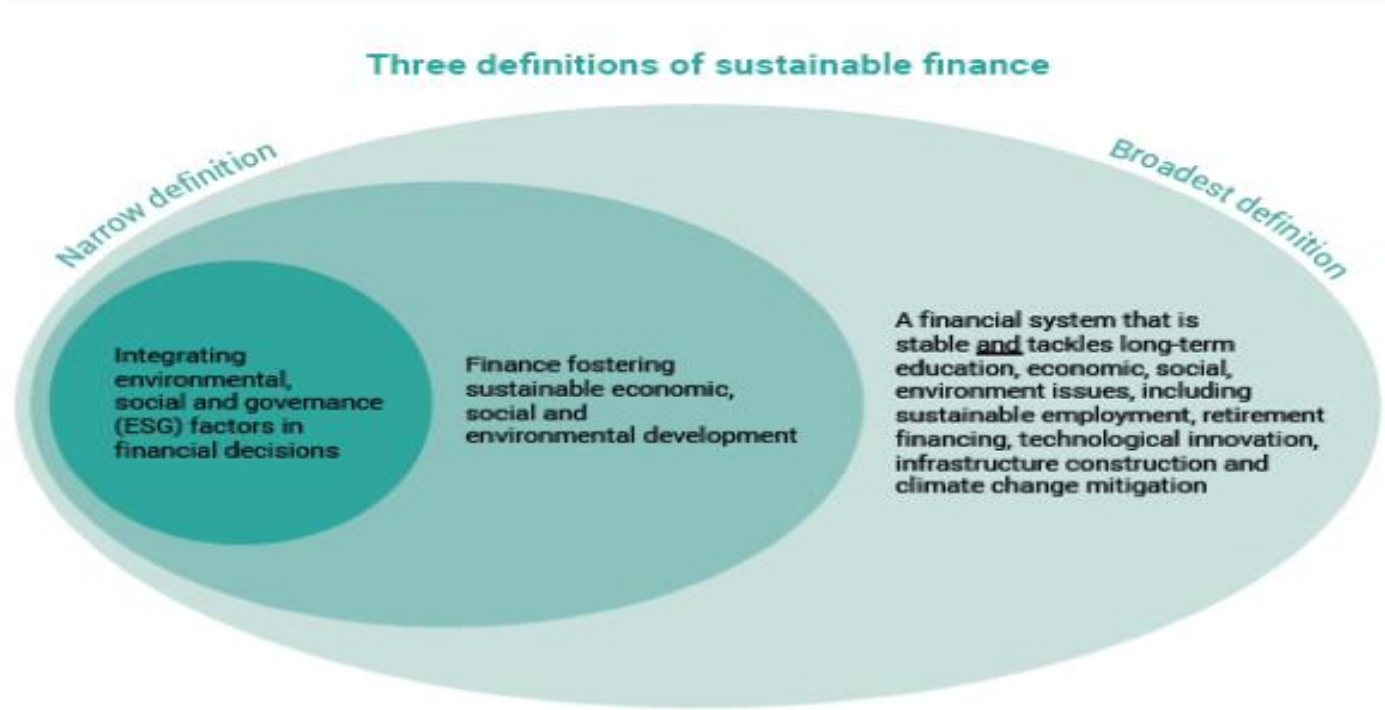
Role of the MDBs



Private sector coalitions to mobilize and align finance

- Glasgow Financial Alliance for Net-Zero (GFANZ)
- Finance to Accelerate the Sustainable Transition-Infrastructure (FAST Infra)
- Climate Finance Leadership Initiative (CFLI)
- Global Investors for Sustainable Development (GISD)
- Sustainable Markets Initiative
- Voluntary Carbon Markets Integrity Initiative (VCMI)

Finance needs to be aligned with sustainability



Source: EU High-Level Expert Group on Sustainable Finance

Accelerating the shift to sustainable finance

Disclosure and Reporting

- Make reporting against the Task Force on Climate-related Financial Disclosure's framework mandatory.
- Pension trustees need to be required to incorporate climate risk criteria into their fiduciary responsibilities.

Regulatory Frameworks

- Mandate central banks and other financial supervisory bodies to incorporate climate risk into prudential and risk assessment frameworks.
- Adjust regulatory regimes (Solvency and Basel) to remove the bias against sustainable infrastructure finance.

From Green to Sustainable Finance

- Encourage financial institutions to operate on sustainable principles and build their sustainable development programs.
- Accelerate the growth of green and sustainable bond markets, and develop taxonomy and standards for sustainable finance

Improved disclosure of climate-related risks is essential

*The recommendations of the **Task Force on Climate-related Financial Disclosures** should be considered for designing a policy and institutional framework for climate finance*

Governance
The organization's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk Management
The processes used by the organization to identify, assess, and manage climate-related risks

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

Source: Task Force on Climate-related Financial Disclosures