

# Sustainable Infrastructure for Recovery and Better Growth: A Roadmap for the G20

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*\* This presentation is based on the 2018 Report of the Global Commission on the Economy and Climate, "Unlocking the Inclusive Growth Story of the 21<sup>st</sup> Century: Accelerating Climate Action in Urgent Times," the GDP/BU-Brookings paper, "Aligning G20 Infrastructure Investments with Climate Goals & the 2030 Agenda," and joint work with Professor Nicholas Stern over the past several years.*



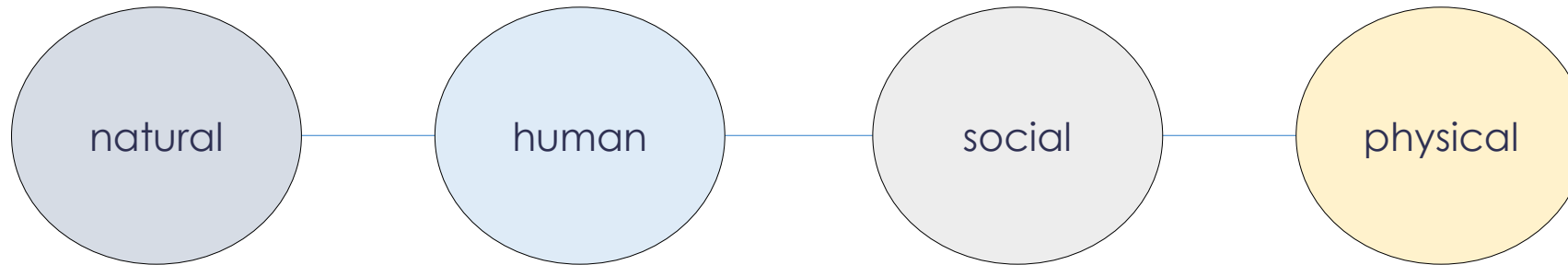
- **Centrality of Quality and Sustainable Infrastructure**
- **Urgency, Scale and Opportunity in the Post-COVID19 Context**
- **G20 Role on Quality Infrastructure and Climate Action**
- **Accelerating Change—Opportunities for G20 2022**

# Sustainable growth is driven by the quality and quantity of the four types of capital

## Definition of sustainability:

This generation makes available to future generations, opportunities at least as good as their own, assuming that the next generation behaves in a similar way towards its successors.

## Four types of capitals that are essential to human well-being and wealth:



**Recognising the interactions and complementarity between the four types of capital is of fundamental importance.**

**Investing in and achieving high productivity of these capitals is crucial to enabling economic growth to continue at high rates with lower factor inputs, and to making growth sustainable.**

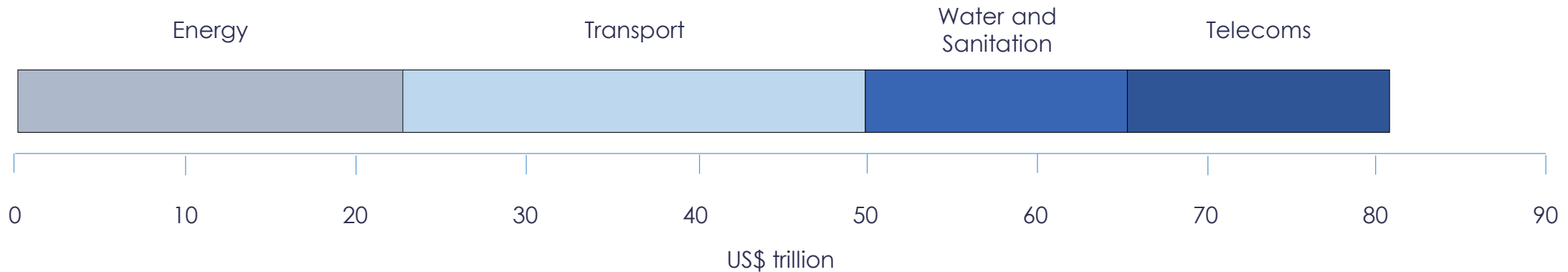
**Investing in all four capitals is crucial to achieving net-zero and resilience.**

# Sustainable infrastructure is key to growth, development, and climate



Source: Bhattacharya et al. (2016)

# 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...).**

# 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.



# Impediments to 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.

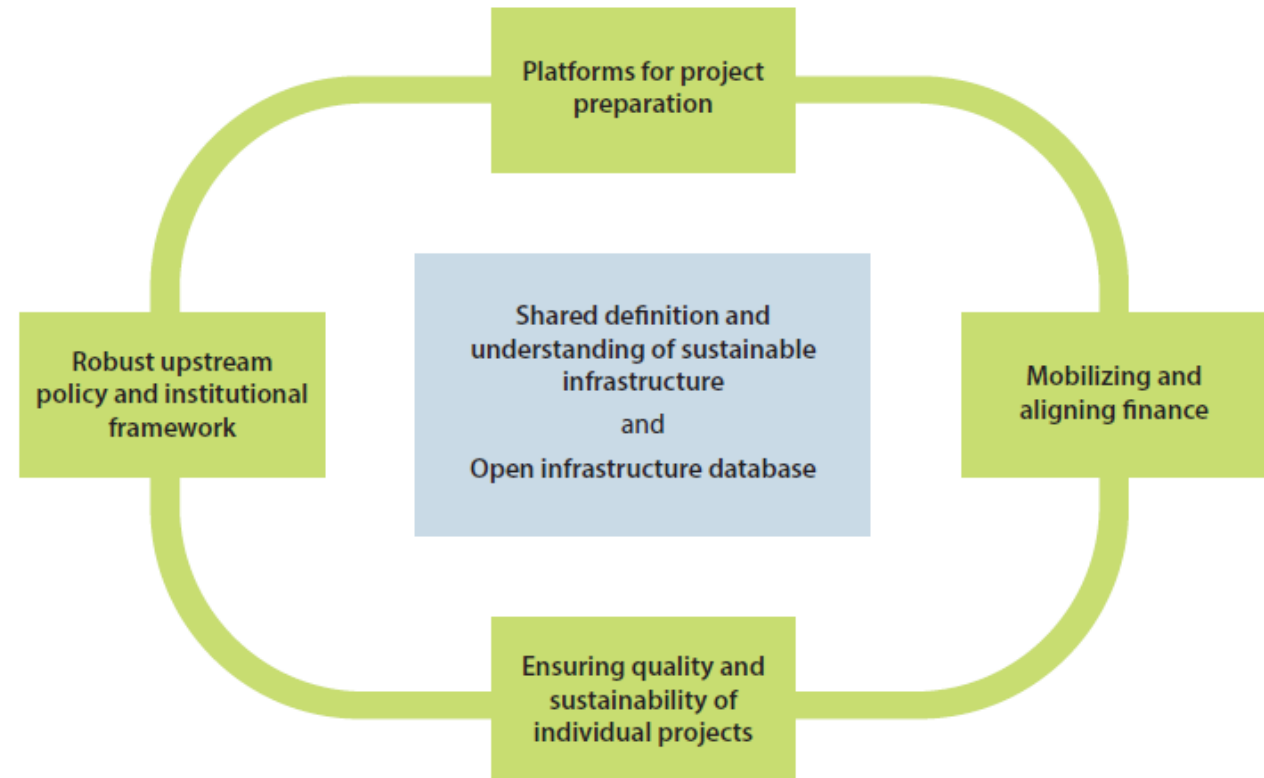
# The nature of infrastructure investment and the urgent challenge require an integrated approach to quality and sustainable infrastructure

## 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

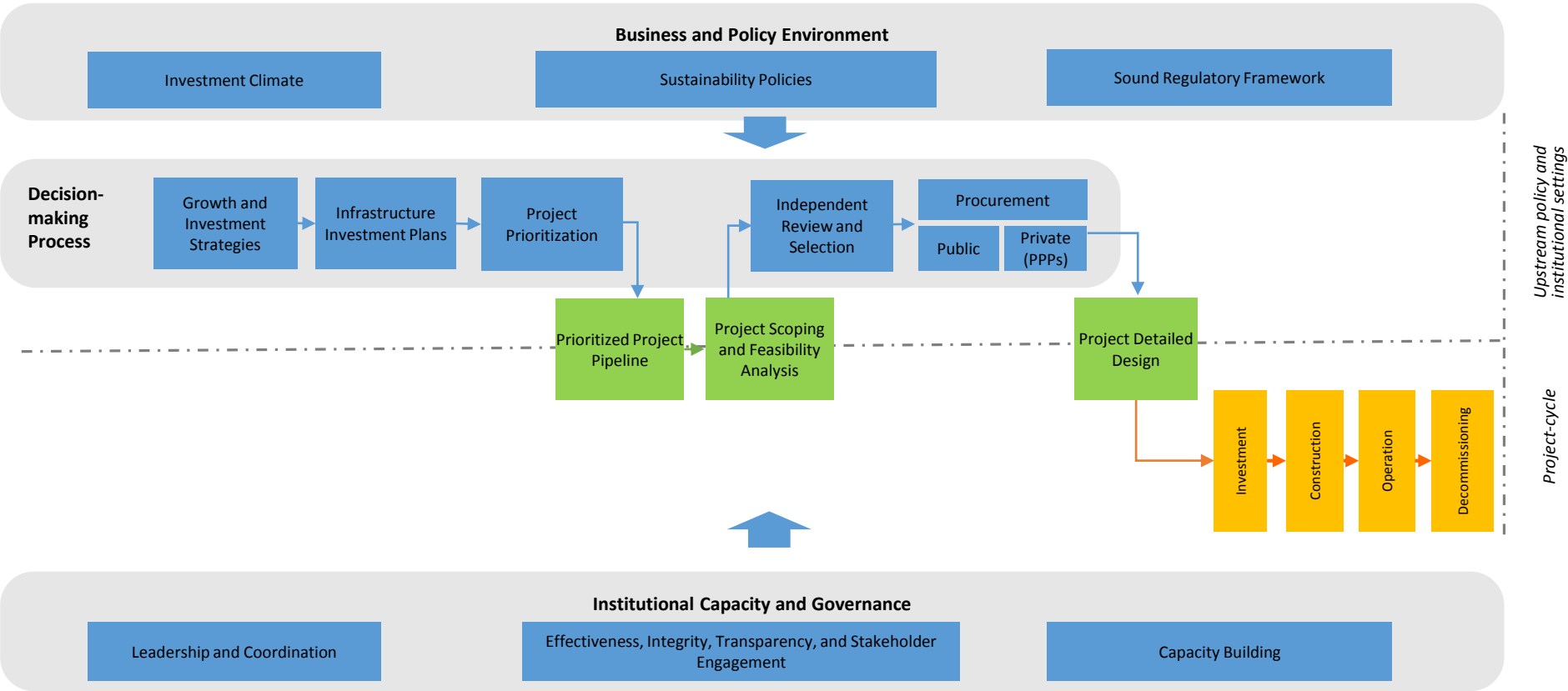
- Requires transformative changes in key economic systems
- Both new infrastructure and existing infrastructure must be low-carbon and climate-resilient



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)

# 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
<b>Description</b>	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
<b>Main risks</b>	Macroeconomic & political risks Technical risks to project viability Environmental and planning 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)
<b>Cash flows (stylized)</b>			
<b>Financing moments</b>	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 complete and started to operate project can be refinanced to reflect the changing risk profile

Source: Bhattacharya, Romani and Stern (2012)

# Funding vs. Financing

## Infrastructure Funding

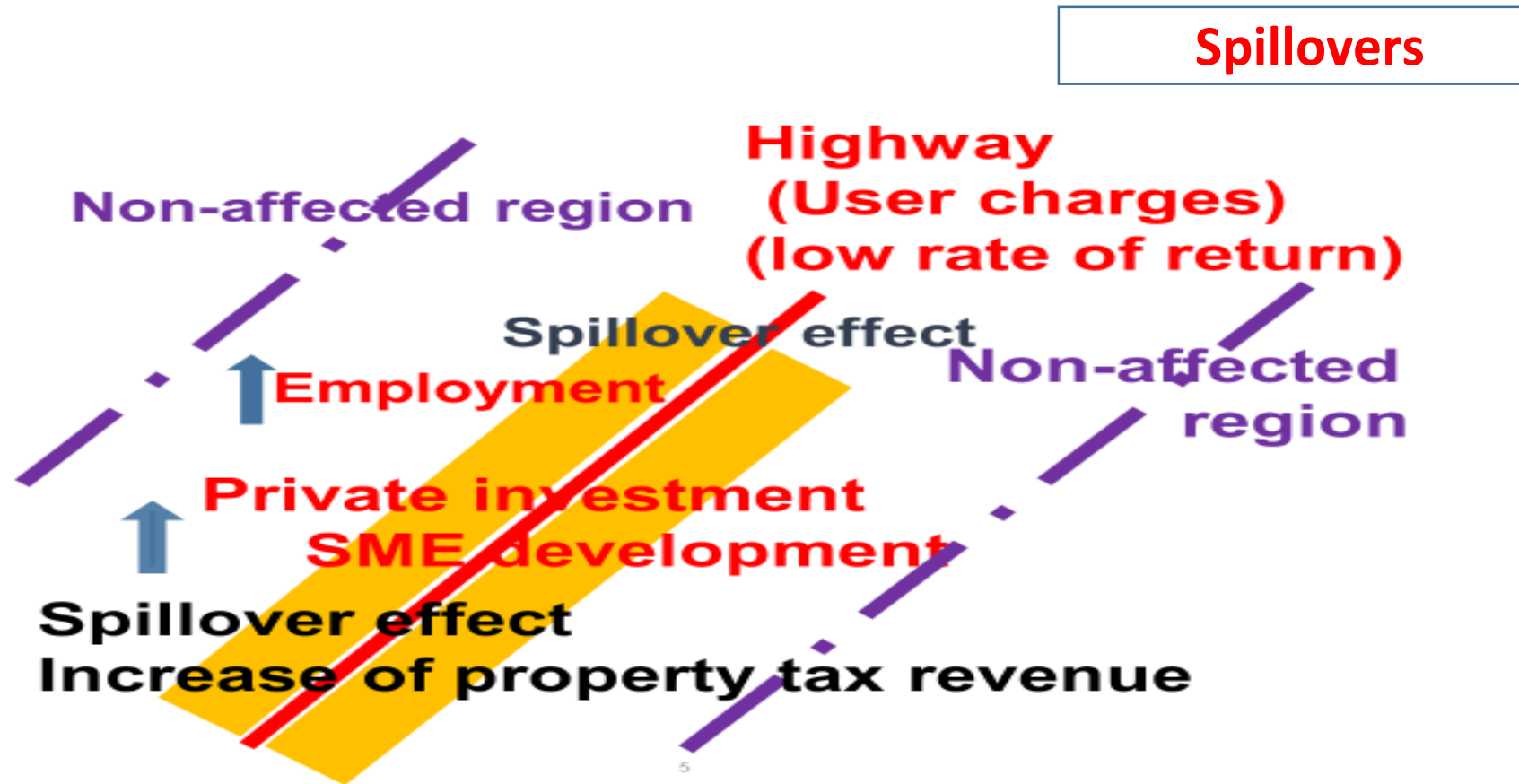
- **Revenue sources**, often collected over a span of many years, which are used to pay the costs of providing infrastructure services
- Most common sources of funding are:
  - ✓ General purpose tax revenues
  - ✓ Revenues from user charges
  - ✓ Other charges or fees dedicated to infrastructure

## 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

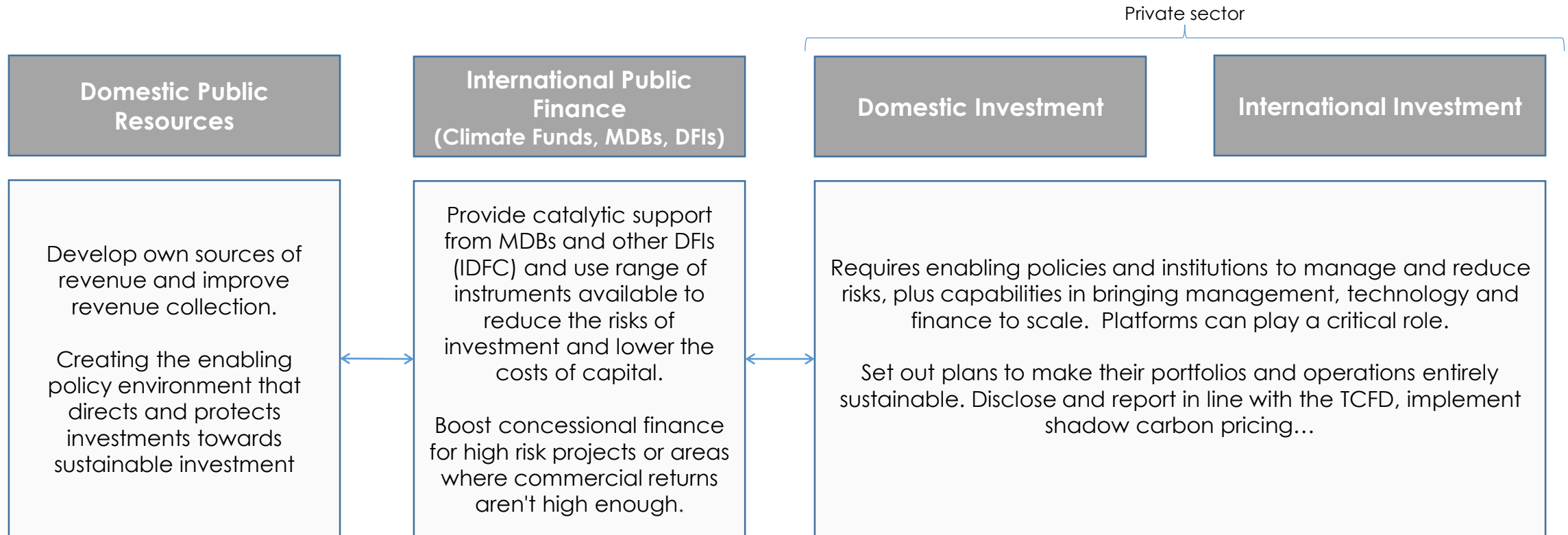
Source: World Economic Forum

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



Source: Yoshino (2019)

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



**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.**

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



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

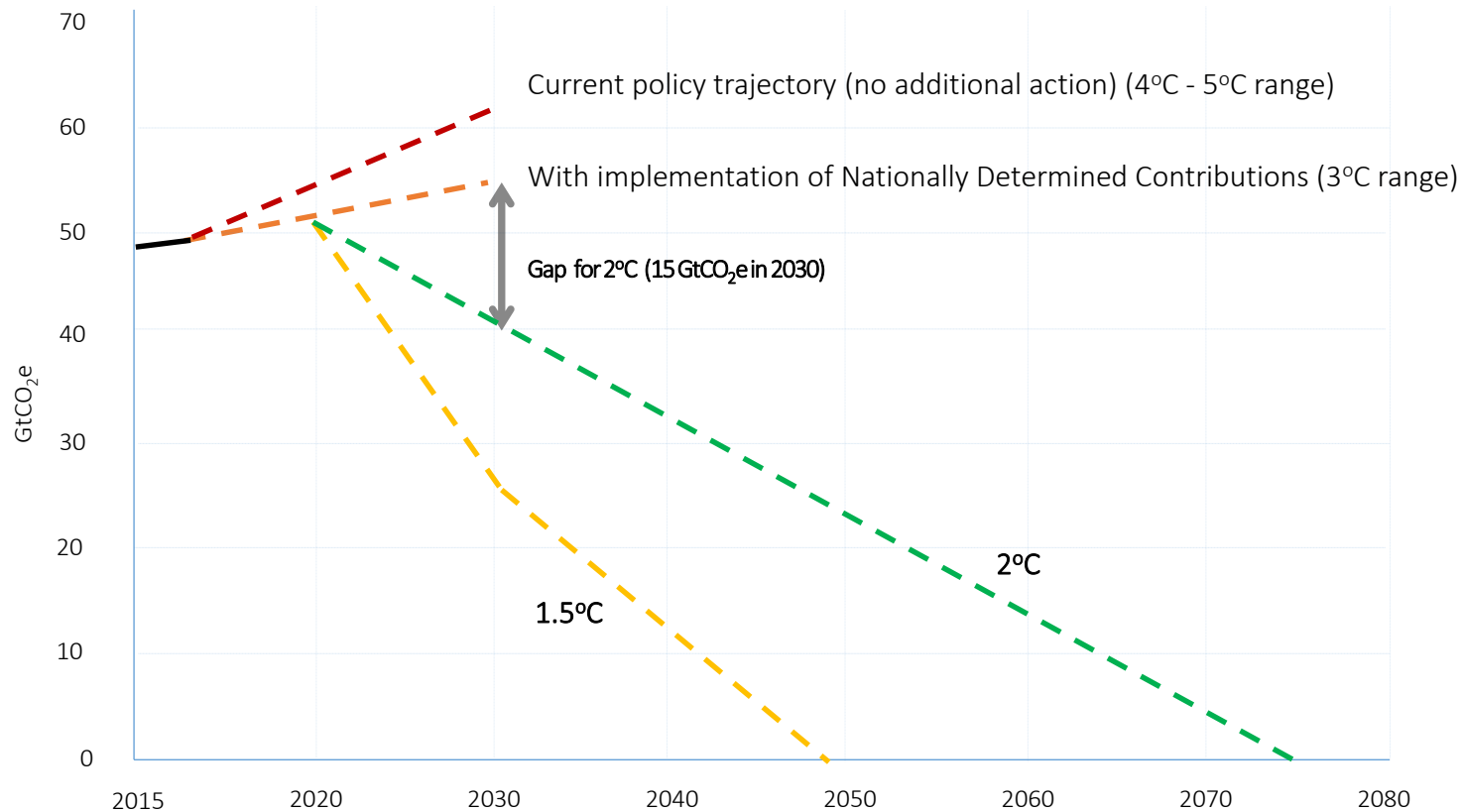
	1.5°C	2°C
Extreme Heat (Global pop. exposed to severe heat at least once every 5 years)	14%	37%
Frequency of rainfall extremes (land)	17%	36%
Average drought length (months)	2	4

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<sub>2</sub> concentrations were similar levels to now, and sea levels were 10 – 20m higher (Foster et al., 2017).

# The current path is far from sustainable



Source: Stern (2019); UNEP (2018)

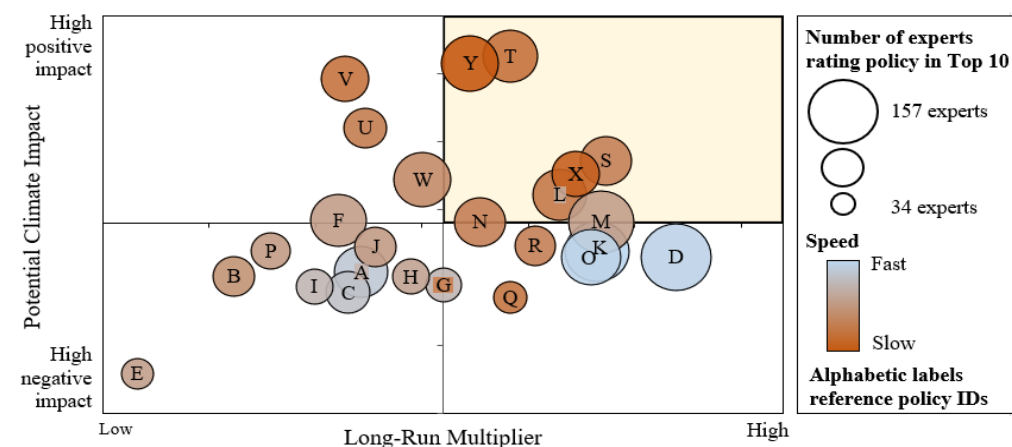
- On the basis of the current NDC commitments, global temperatures are projected to increase by 3°C or more by 2100.
- To limit global warming to 1.5°C, the ambitions of the NDCs need to be sharply raised before the next submissions in 2020.

# Sustainable infrastructure is a key element of building back better

- The world has been transformed by the COVID19 pandemic.
- We face a major risk of world depression. 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 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).

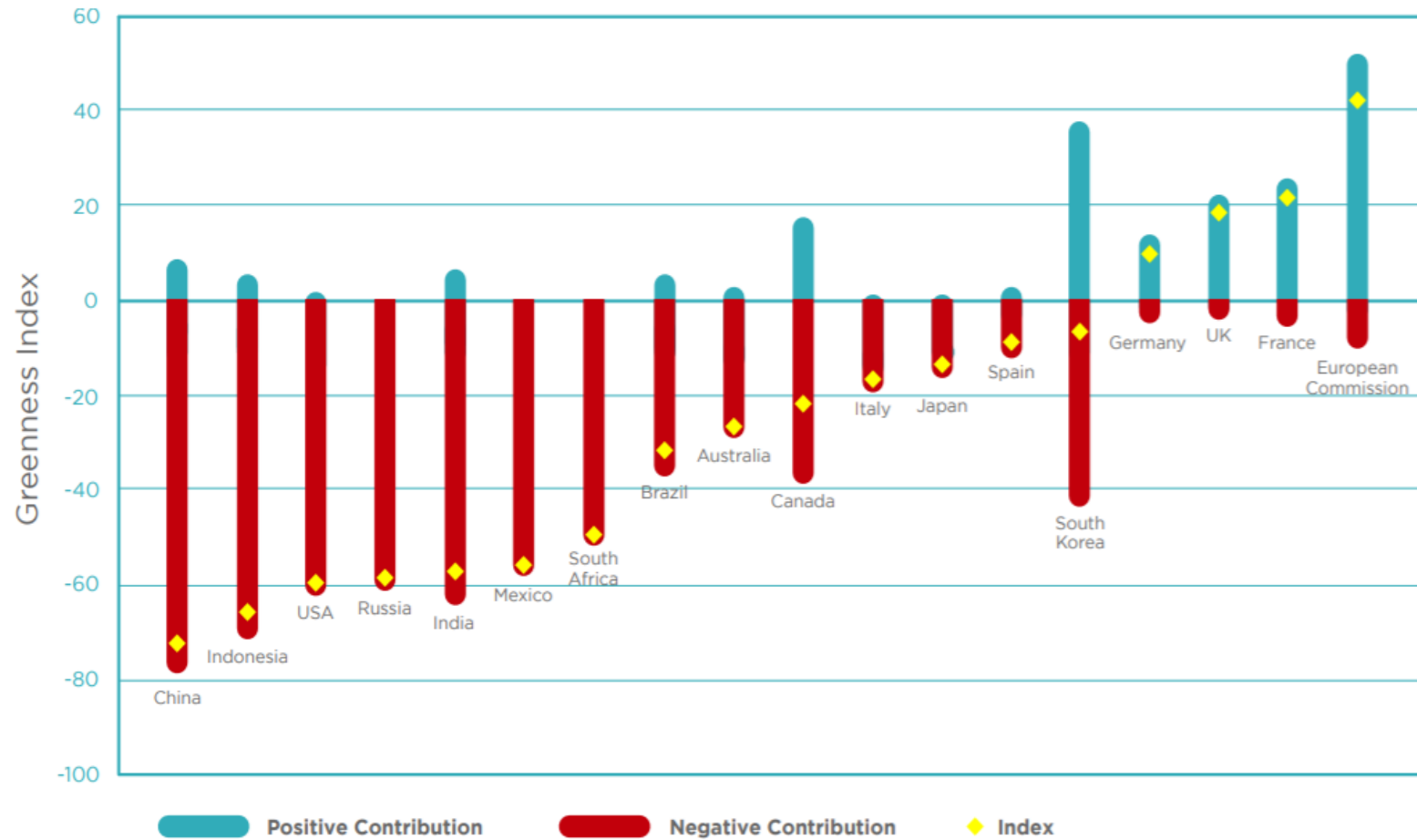


A	Temporary waiver of interest payments	N	Worker retraining
B	Assisted bankruptcy (super Chapter 11)	O	Targeted direct cash transfers or temporary wage increases
C	Liquidity support for large corporations	P	Rural support policies
D	Liquidity support for households, start-ups and SME's	Q	Traditional transport 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.**

# Initial spending has not been green



Source: Vivid Economics (2020)

# 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

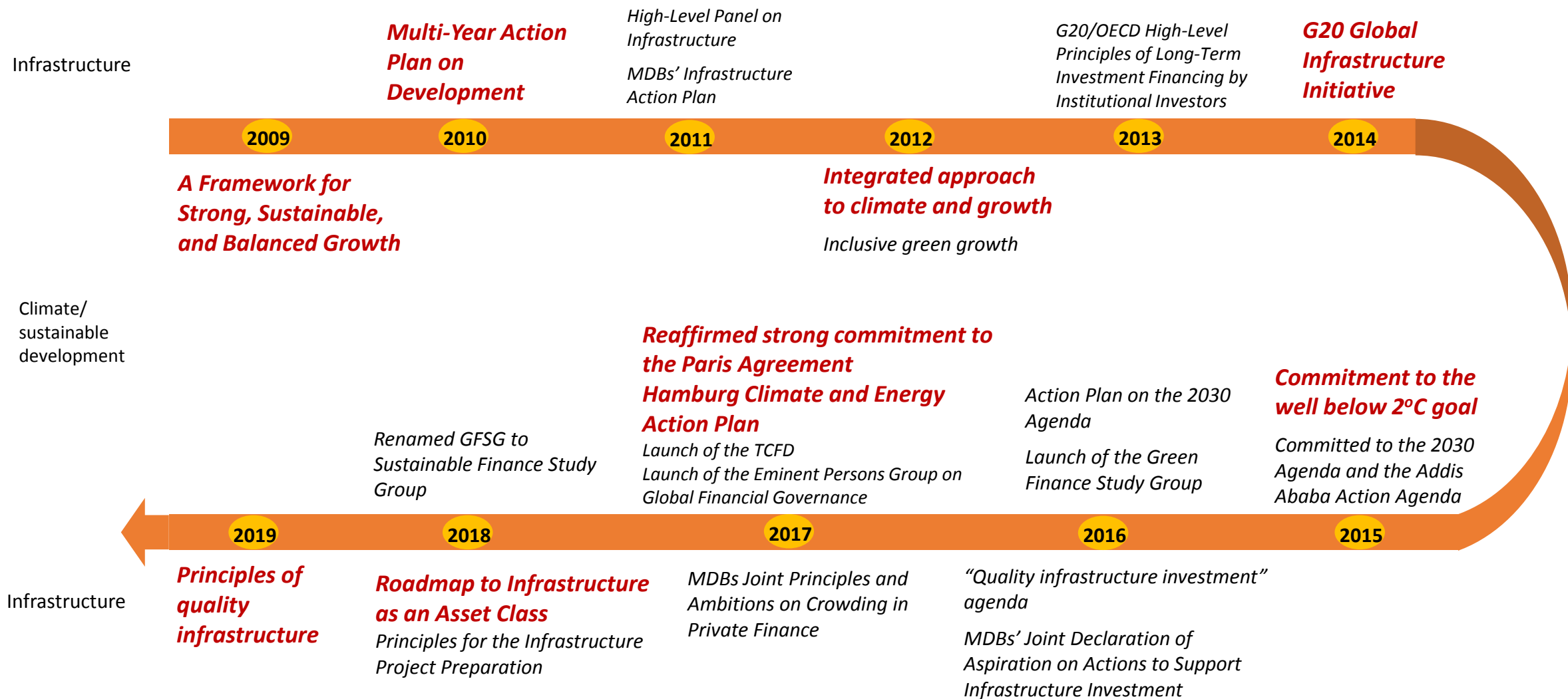


Low-carbon is the only feasible longer-run growth on offer; high carbon growth self destructs.

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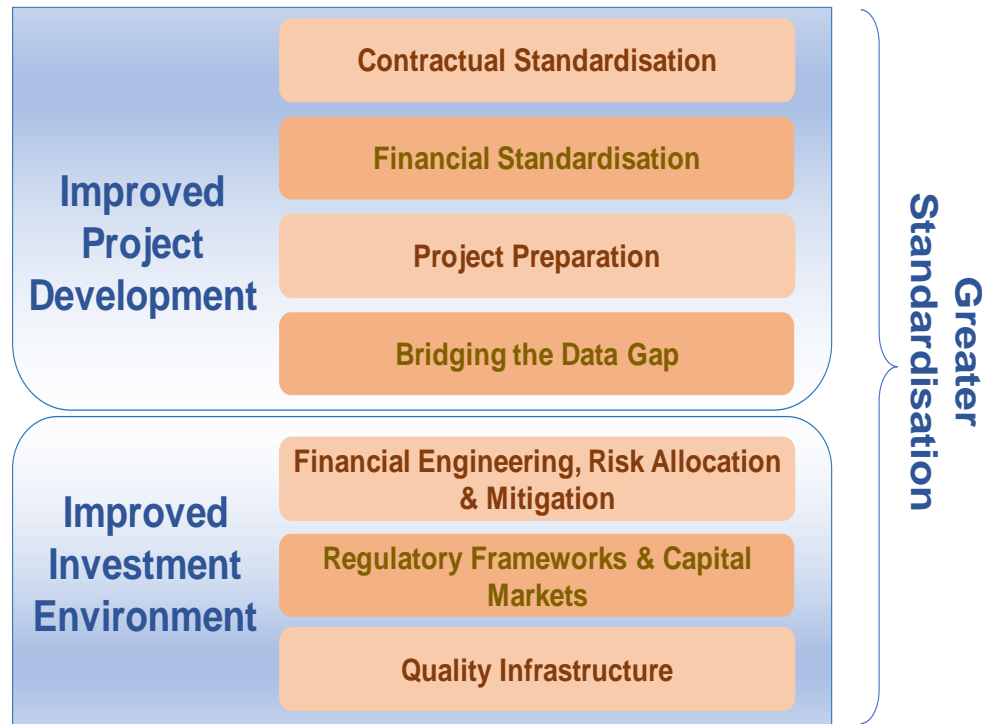


# The G20's agenda on infrastructure and climate



# The G20 is proposing a set of principles for quality infrastructure investment under the Japan presidency

## *Roadmap to Infrastructure as an asset class (2018)*



Source: G20 (2018)

## *Principles for Quality Infrastructure Investment (2019)*

- Maximize positive impact of infrastructure to achieve sustainable growth and development while preserving fiscal sustainability
- Raise economic efficiency with the focus on life-cycle cost
- Build resilience given increased vulnerability to natural disasters and other risks
- Integrate environmental considerations over the entire life-cycle
- Emphasize social considerations and ensure open access including for women
- Strengthen governance including enhanced transparency and strong integrity

# Sustainable development and climate outcomes need be better linked to the quality infrastructure agenda

*The recommendations of the T20 TF 4:  
Economic Effects on Infrastructure Investment and its Financing*

## Maximize the Impact of quality infrastructure investment

- Develop an integrated approach to quality infrastructure (including upstream policy and institutional foundations, high quality standards for projects, project preparation platforms, and financing)
- Create viable revenue models by tapping spillover effects
- Strengthen collaboration between the MDBs as well as other development partners

## Boost quality infrastructure development by integrating impactful environmental solutions

- Promote upstream planning for quality infrastructure that fully incorporates social and environmental risks and costs
- Establish common financing principles, standards and frameworks that minimize ecological footprints
- Promote research, policies, and commitments that advance deforestation-free development models and restoration of landscapes

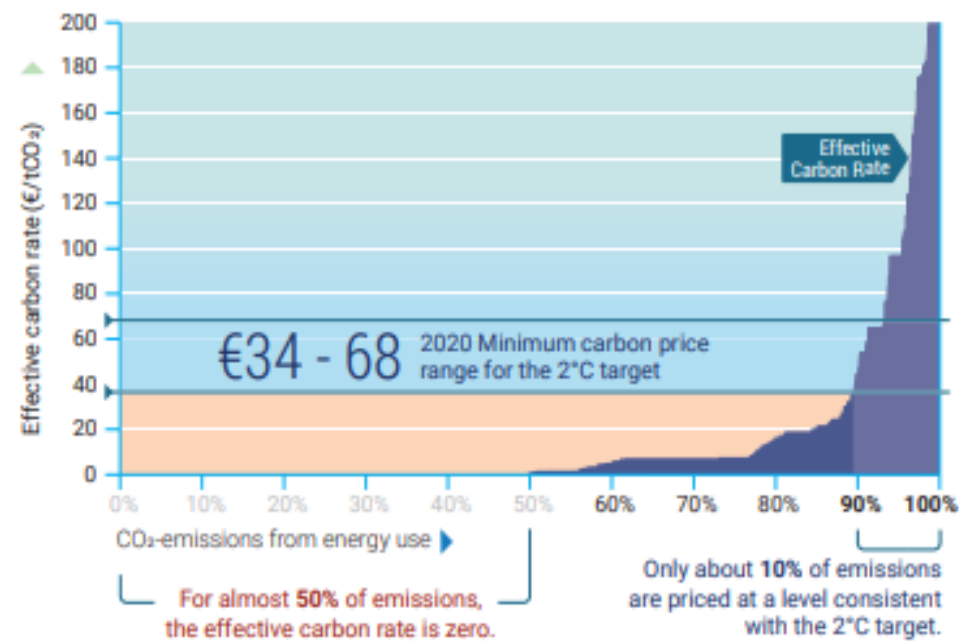
## Develop strategies for enhancing resilient infrastructure development

- Incorporate spatial vulnerability and impact of climate change into infrastructure planning and design
- Accelerate policies for low-carbon and climate resilient growth
- Develop and share national and urban strategies for promoting resilience

- The G20 principles provide an important opportunity on the quality infrastructure agenda, but special emphasis must be given to climate impact and resilience and natural capital.
- Need to build a broad-based partnership for accelerated learning and implementation of sustainable infrastructure agenda.

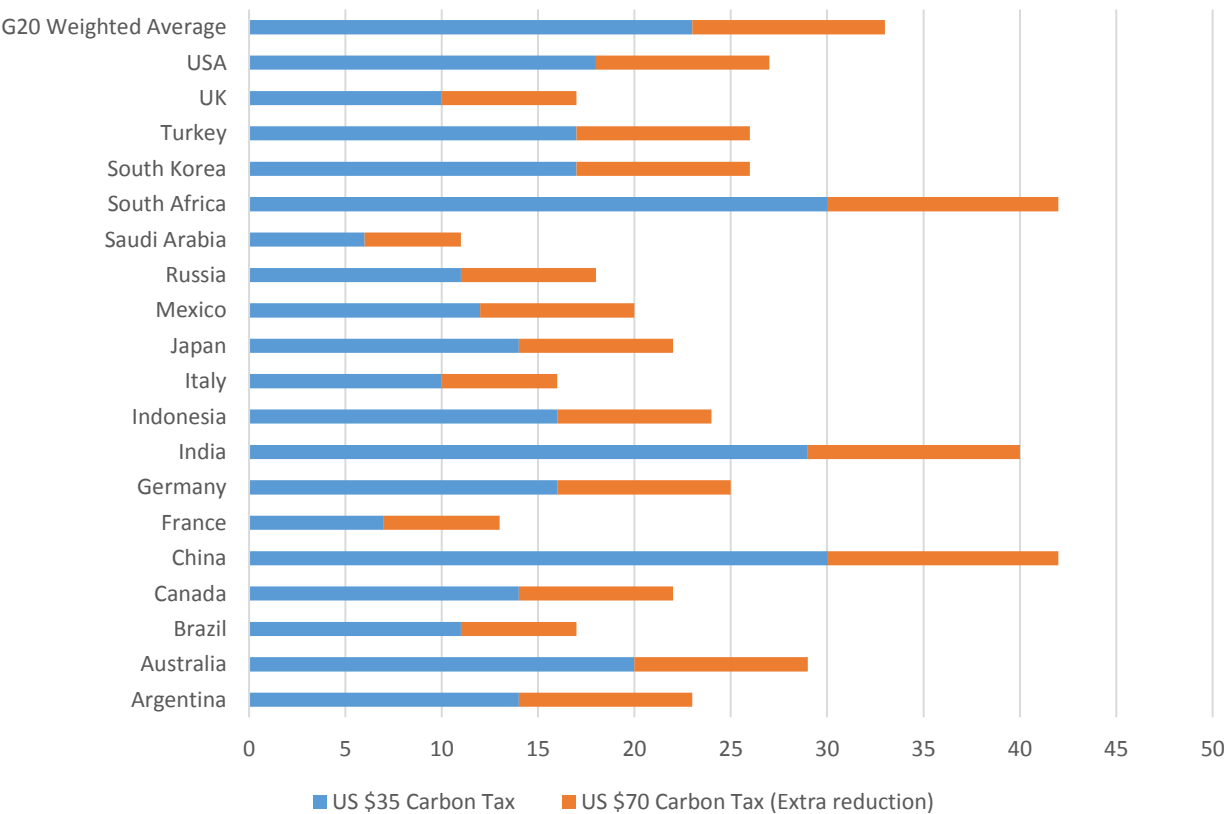
# G20 countries need ambitious carbon pricing targets to meet the goals of the Paris Agreement

Effective carbon rates on energy use across 42 OECD and G20 countries and the minimum carbon price range needed in 2020 for the 2°C target.



Source: UNEP (2018)

CO<sub>2</sub> reduction from comprehensive carbon pricing in G20 countries



Source: IMF (2019)

# G20 countries need to accelerate 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

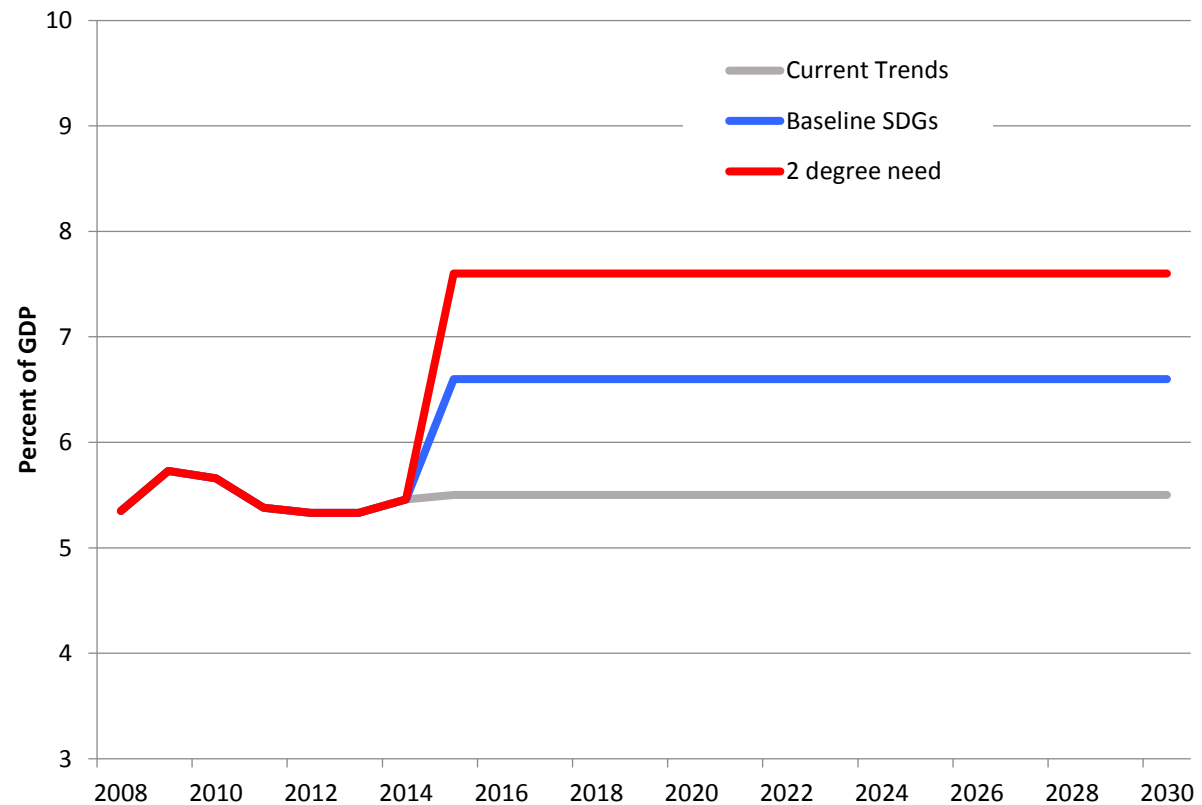
- Encourage financial institutions to operate on sustainable principles and build their sustainable development programs.
- Accelerate the growth of green and sustainable bond markets, and develop taxonomy and standards for sustainable finance

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# The GDP-Brookings paper found that the global community is not on pace to meet even the upper bound 2°C Paris scenario

- Sustainable infrastructure investments are falling short of investment needs by USD 3.2 trillion per year.
- MDBs are currently providing around USD 50 billion per year in financing for sustainable infrastructure or just 1.5 percent of the prospective needs of EMDCs.
- National development banks and other development finance institutions play a larger role in sustainable infrastructure, at roughly USD 88 billion per year, but are dominated by major players.
- Private capital flows from G20 countries into sustainable infrastructure is also very small, just 0.5 percent of the total global need.

Investing in Quality and Sustainable Infrastructure:  
Global Trends vs. Climate Goal Needs

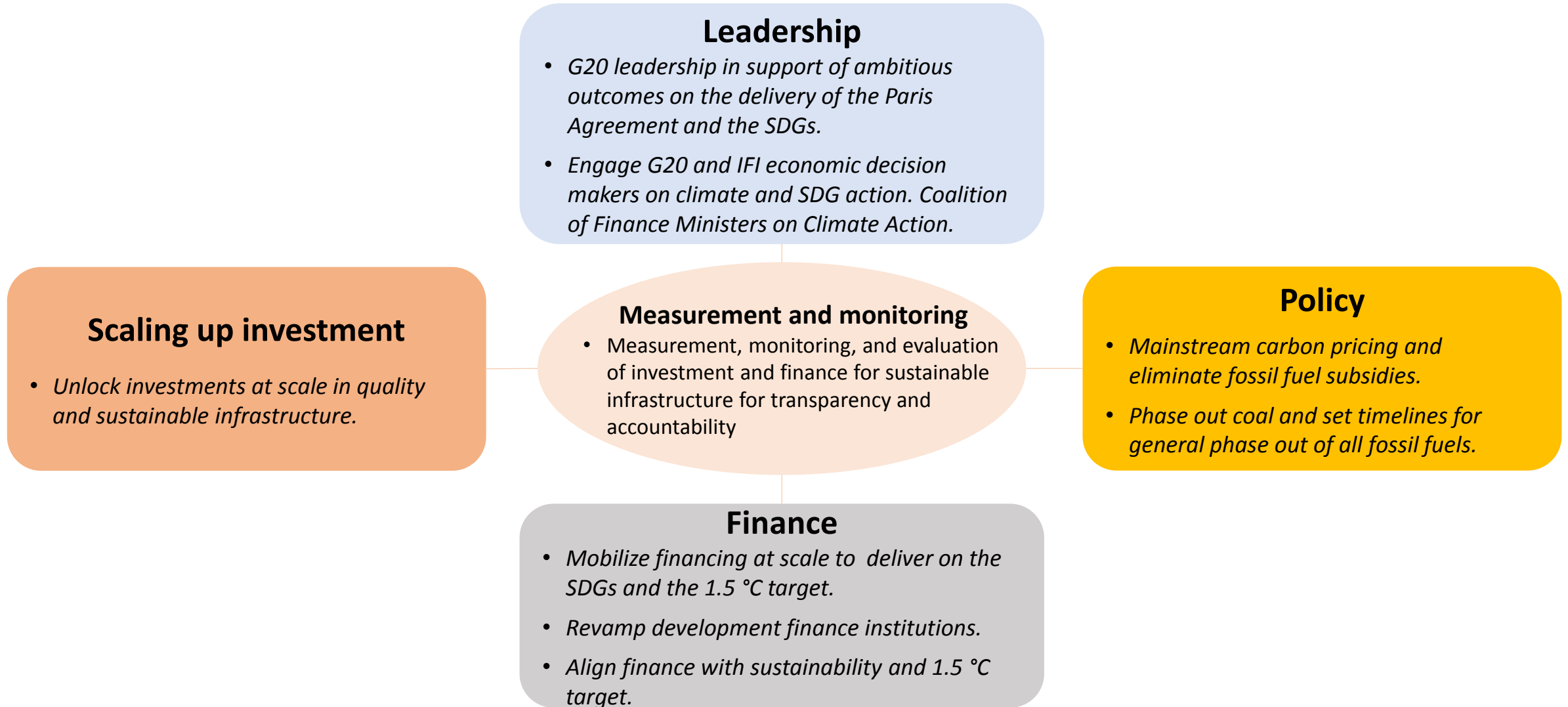


Note: Shaded area represents unknown infrastructure investment needs for reaching 1.5 °C and full SDGs.

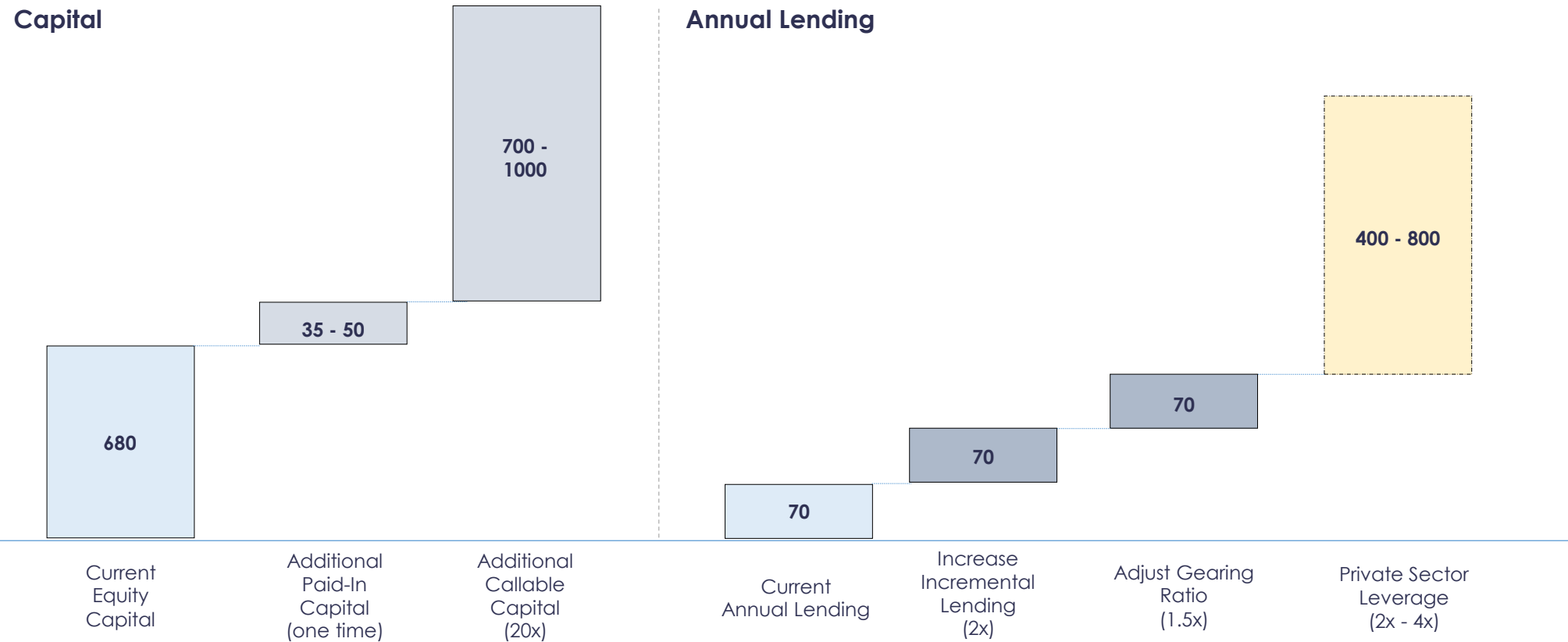
Source: authors calculations based on Oxford Economics, 2019; OECD, 2017; McKinsey, 2016; Bhattacharya *et al.*, 2016, and NCE 2014.



# Build a strong coalition of G20 countries that are strongly committed to the scale and urgency of action needed



# Development banks can play a key role to moving from “billions” to “trillions” to finance the new global agenda



The MDBs have a crucial role to play in helping reduce government-induced risk through the use of their instruments (global equity, long-term loans, and guarantees), thereby reducing the cost of capital. They also bring trust and convening power in supporting projects and platforms.

The MDBs have a central role to play in reaching the \$100 billion commitment.

# Can it be done? Four forces present us with a special opportunity to deliver at scale



Historically low interest rates and no shortage of global savings.  
Search for growth.



Rapid technological change and falling costs  
(digital, materials, biotech...)



International agreements and a broad engagement of non-state actors show that collaboration is possible and will continue



Strong movements of **young people** across the world

Opportunities exist now to finance the transition with low interest rates; excess global savings and new, changing technology.

Seizing the opportunity requires a radical change. Most of what we currently do will have to be done differently (technologies, institutions, business models, city planning processes, natural resource management...)

Have in our hands a much more attractive sustainable and inclusive form of growth and development; do we have the political will/capability?