Global Infrastructure Hub

Transition Pathways for Sustainable Infrastructure

Presentation to the ecologiQ Greener Infrastructure Conference

September 2023

A G20 INITIATIVE

Today's presentation

1. What are transition pathways for sustainable infrastructure? How are G20 governments investing?

2. Goals & Strategies: Deep dive into decarbonising transport

3. Lessons from the G20 initiative

Image source: IADB

Global Infrastructure Hub – the infrastructure entity for the G20

The infrastructure for 2050 is being planned, designed, and built today.

We accelerate sustainable infrastructure investment, from advanced economies to EMDEs.

We work with partners to create these positive impacts.

DATA & TOOLS

REFORMS

PROGRAMS

1. What are transition pathways? How are G20 governments investing?

USD12.4tn will be invested by G20 into infrastructure between 2020-2030

Four objectives

- **Decarbonisation and mitigation**
- **Resilience and adaptation**
- **Inclusion and social outcomes**
- **Pathway amplifiers**

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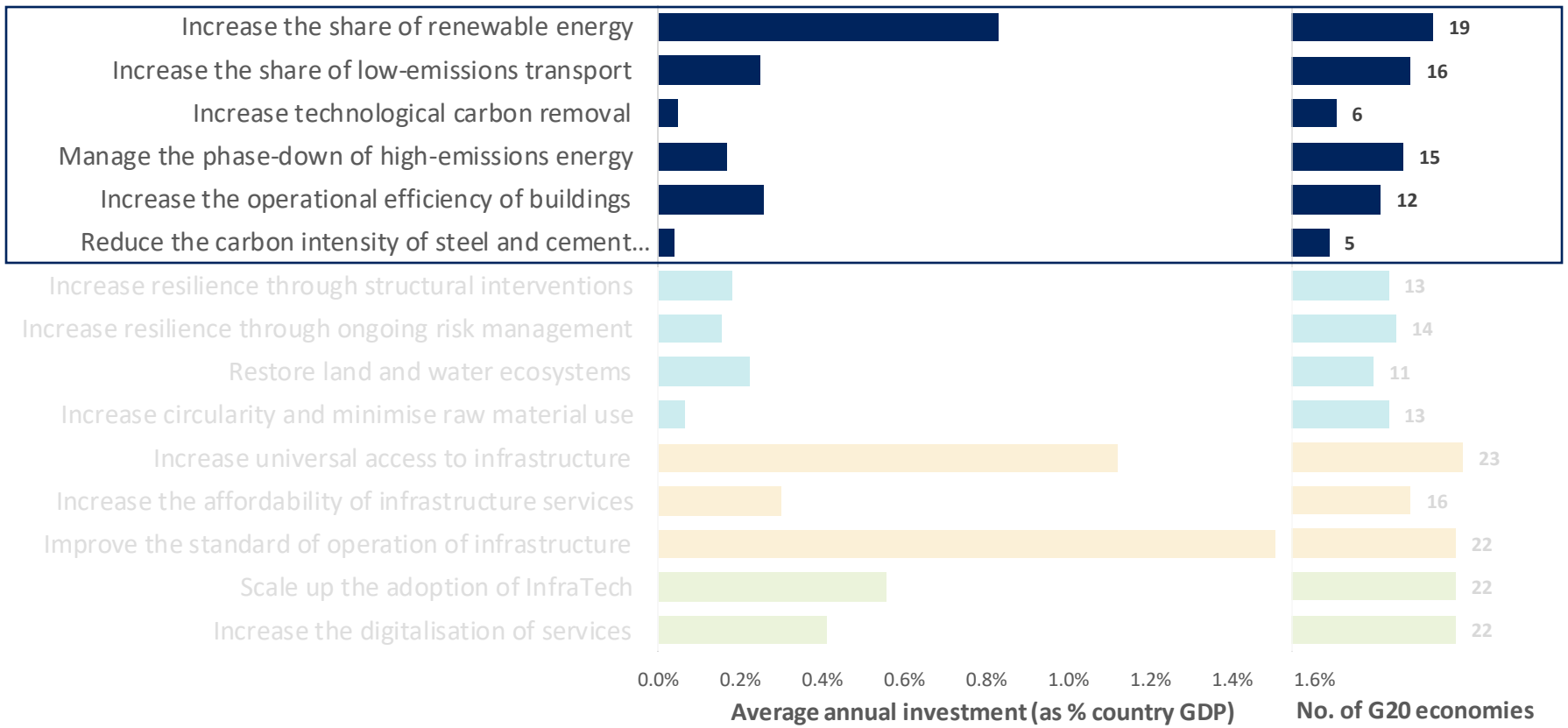

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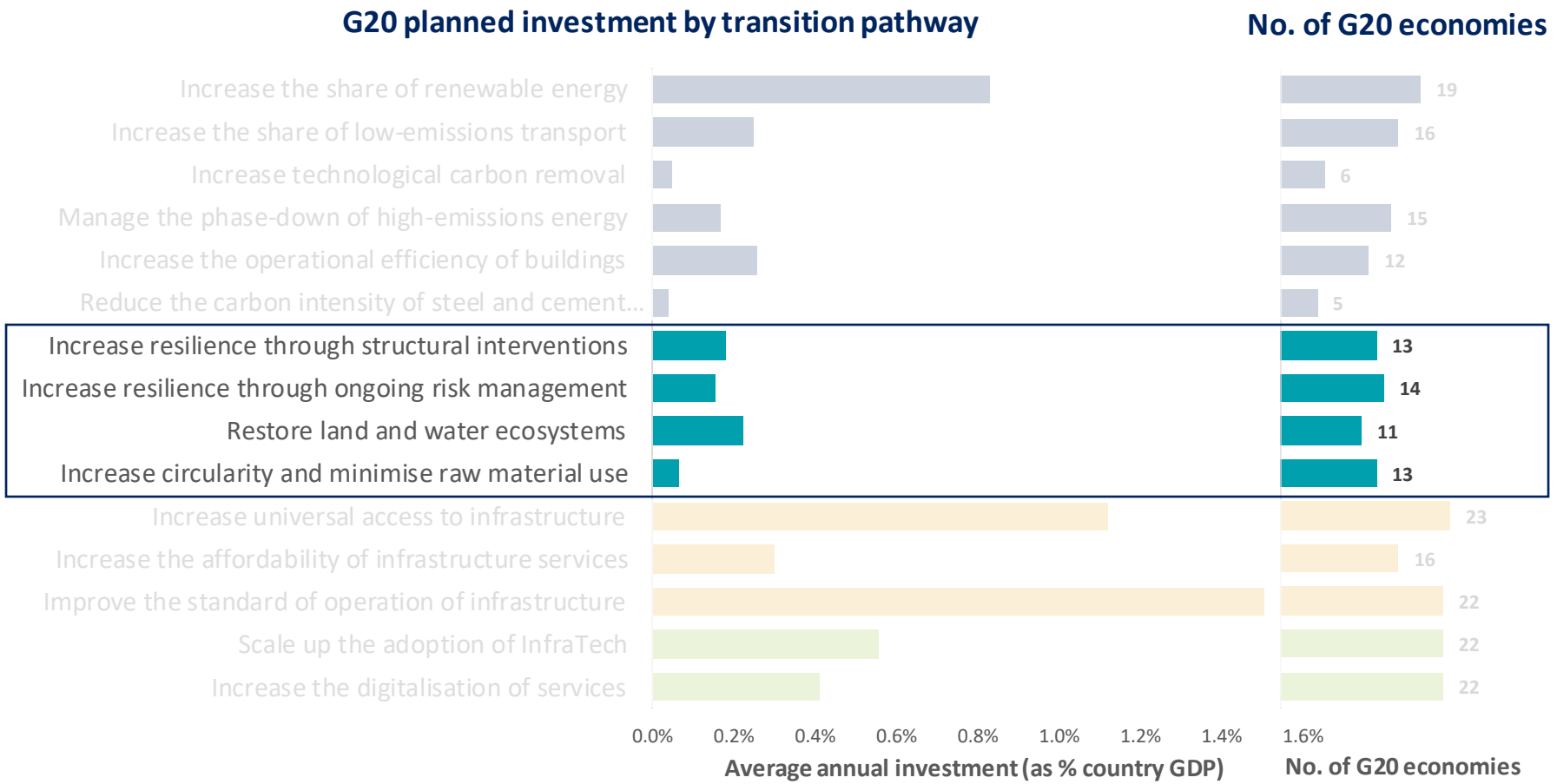

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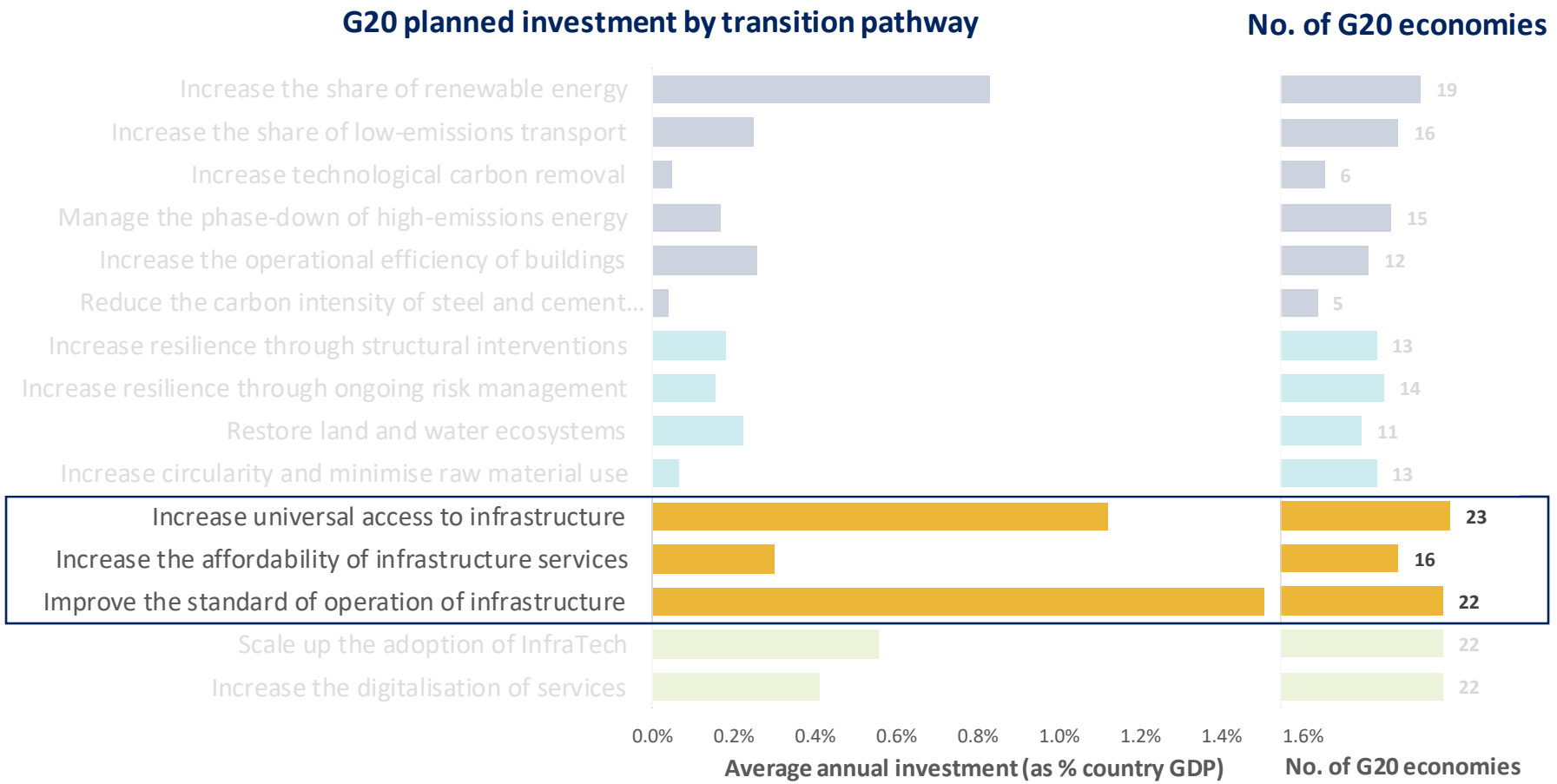

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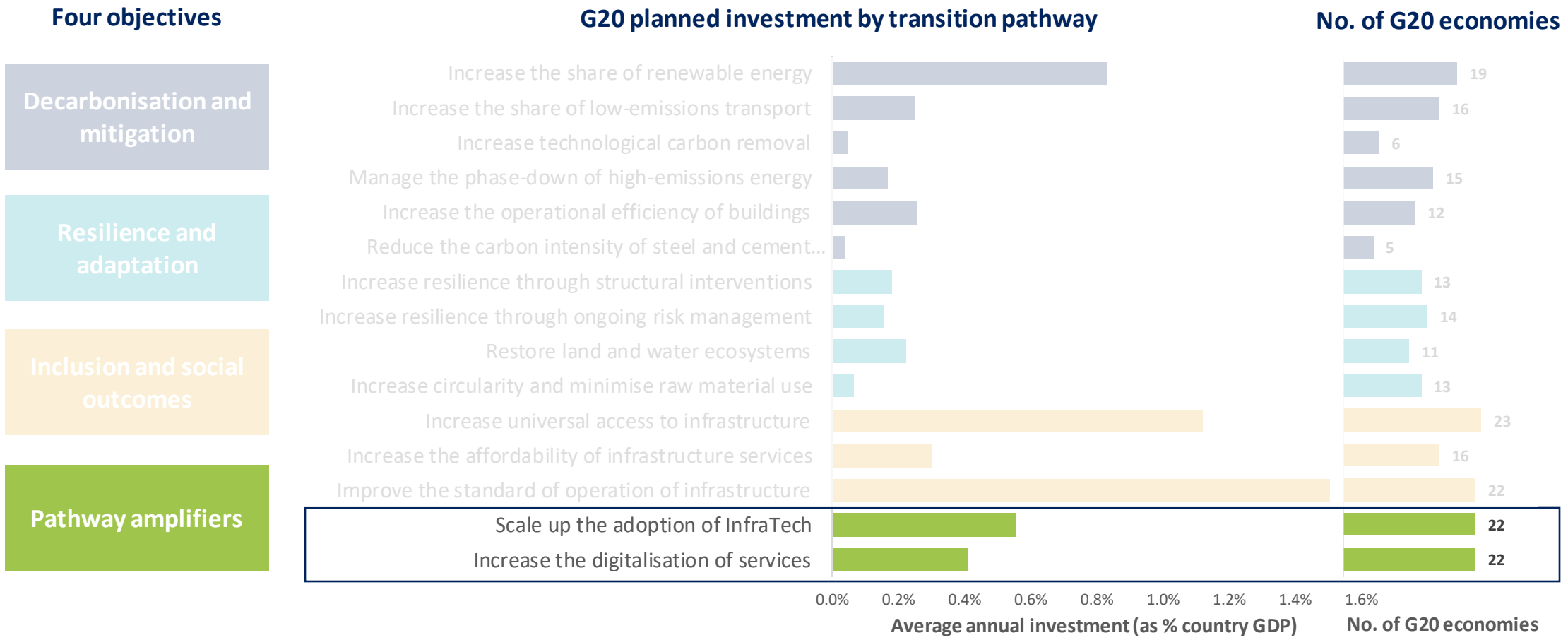
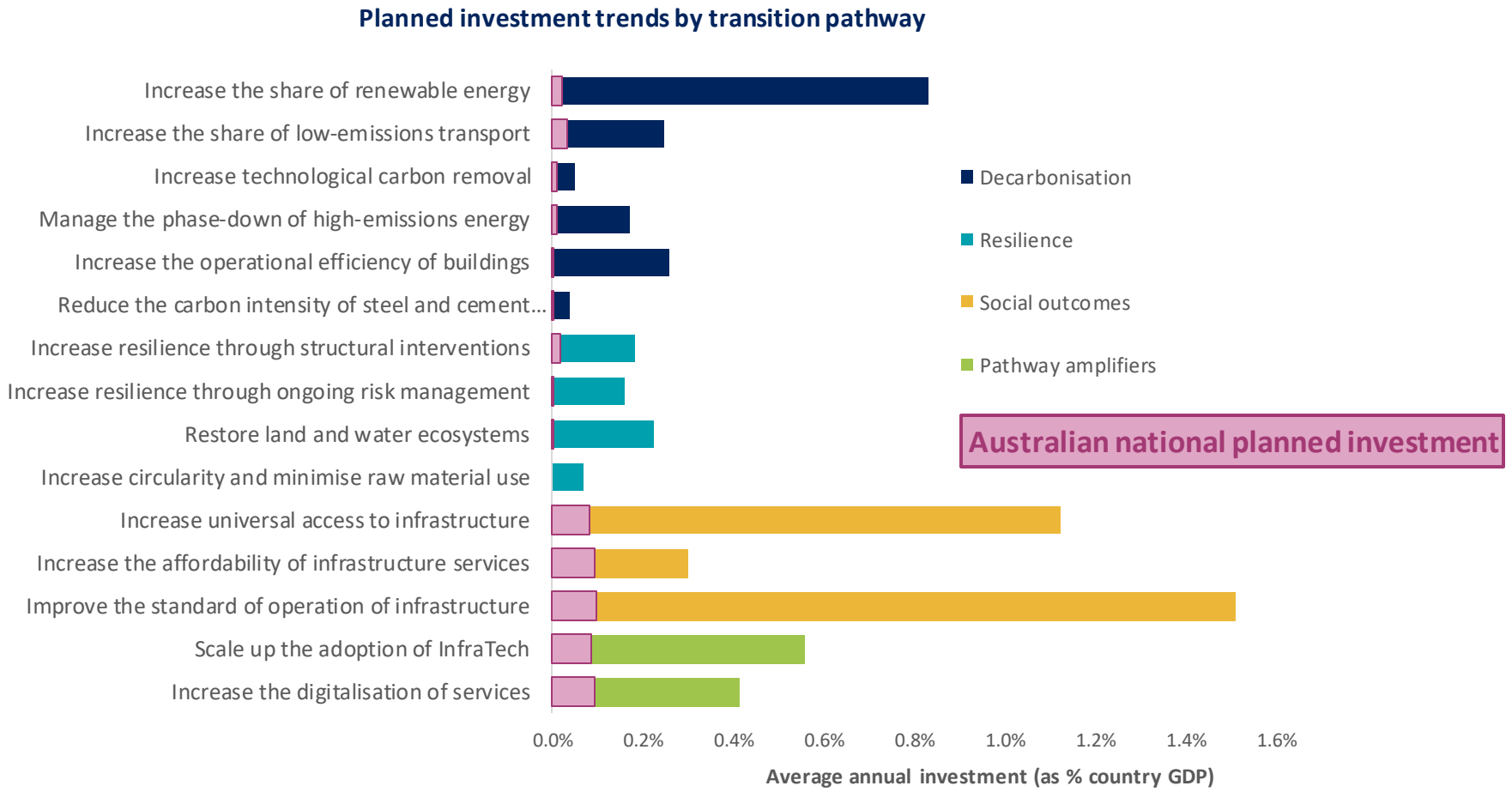
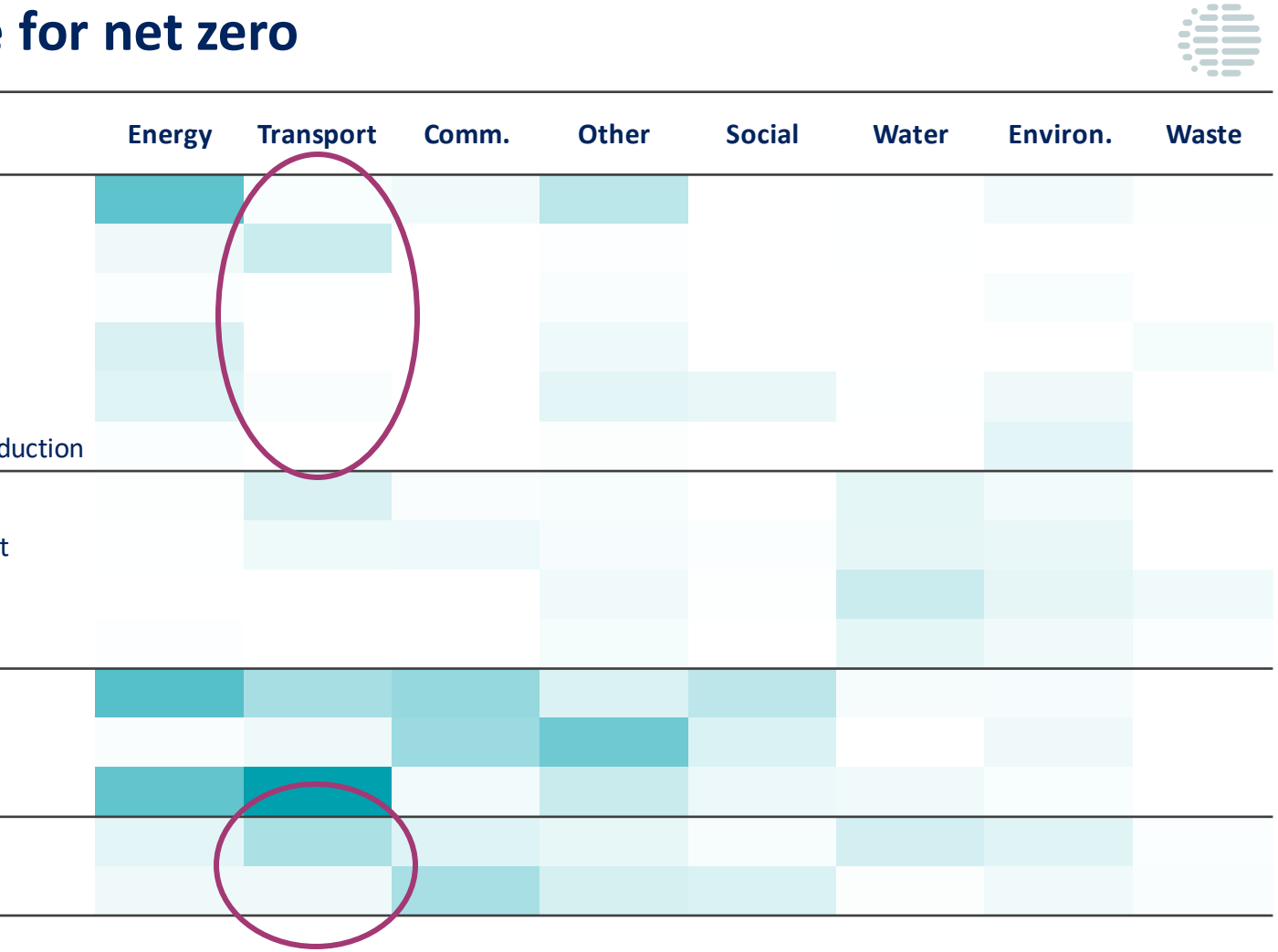


Australian planned national investment vs. G20 average

Australia: Significant infrastructure investment at sub-national level!



The current state – infrastructure for net zero



Legend: White cells = No investment identified

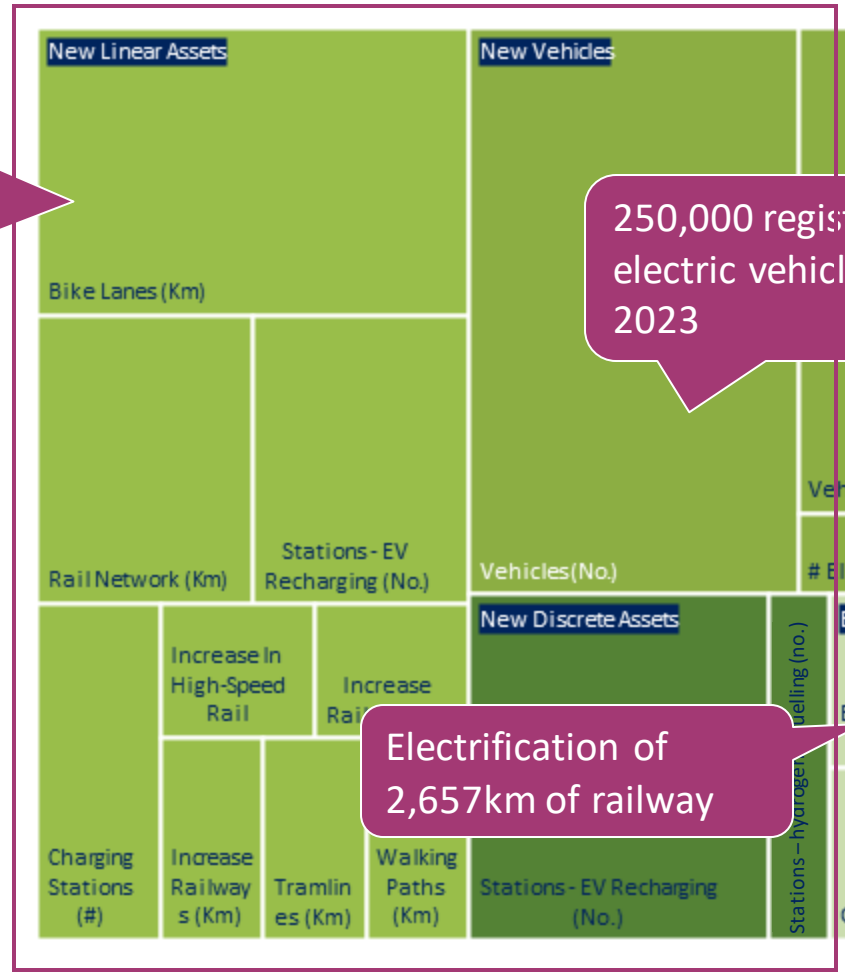
Lowest average annual investment (as % country GDP)

Highest average annual investment (as % country GDP)

2. Transition pathways for decarbonising transport

Goals: What are G20 governments' goals for decarbonising transport?

>1000miles of safe and direct cycling and walking networks delivered by 2025



250,000 registered electric vehicles by 2023

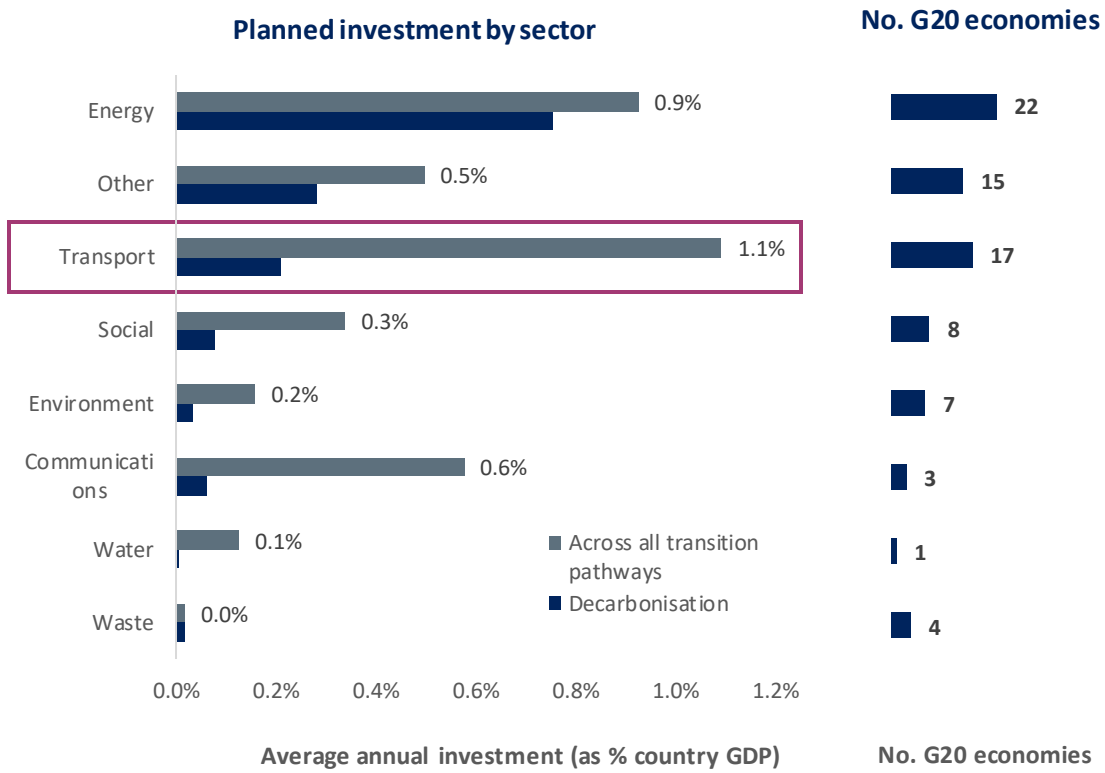
Electrification of 2,657km of railway

Reduce GHG emissions from federal government facilities and fleets by 40% by 2030

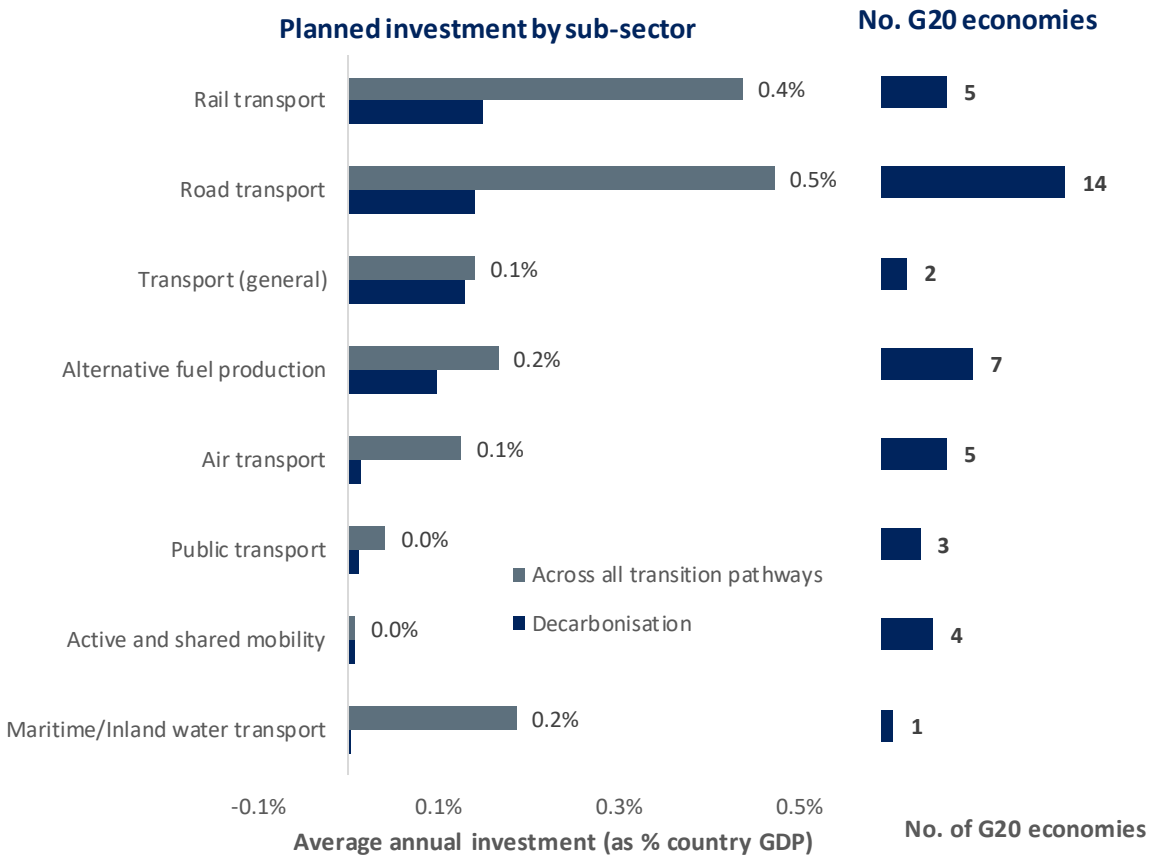
End the sale of new petrol and diesel cars and vans by 2030

Strategies: Transition pathways for decarbonising transport

Transition Pathway	Description
Increase the share of renewable energy	Increasing renewable energy generation and decarbonising power consumption
Increase the share of low emissions transport	Increasing the uptake of low-emissions transport to reduce fossil fuel combustion and tailpipe emissions
Increase technological carbon removal	Deploying carbon-capture technology to capture and store or re-use carbon dioxide emitted from large-point sources
Increase the operational efficiency of buildings	Retrofitting, modernising, and sustainably operating buildings to optimise and reduce water and energy use

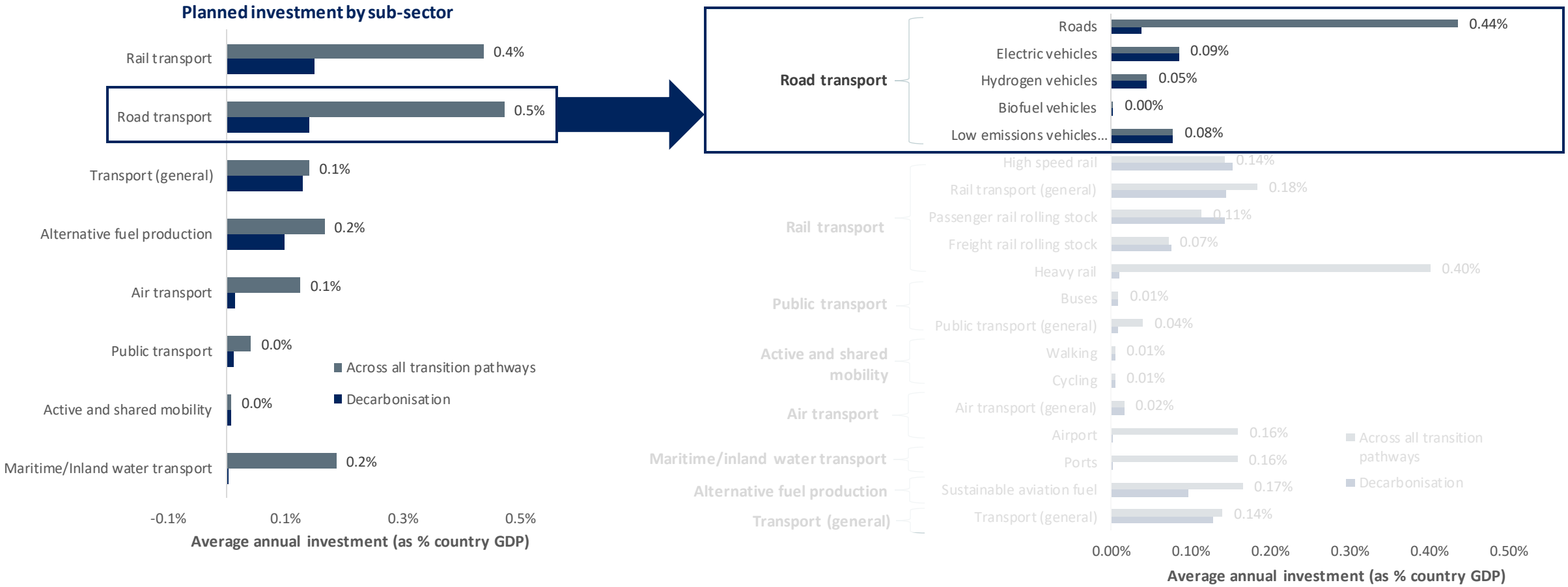


Strategies: Asset classes for decarbonising transport



[10] Of course, the data on resilience pathways can be 'cut' in many different ways. Other analyses on infrastructure sectors, sub-sectors and assets can also be undertaken if desired.

Strategies: Asset classes for decarbonising transport



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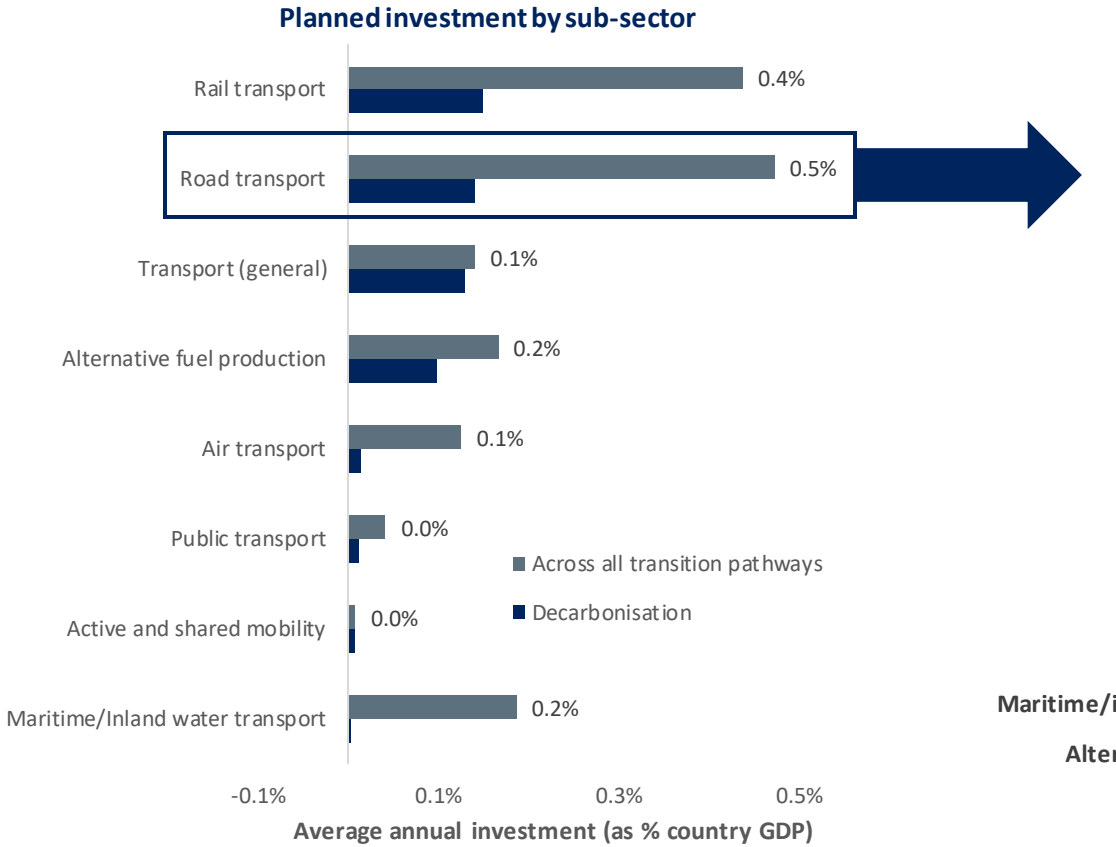
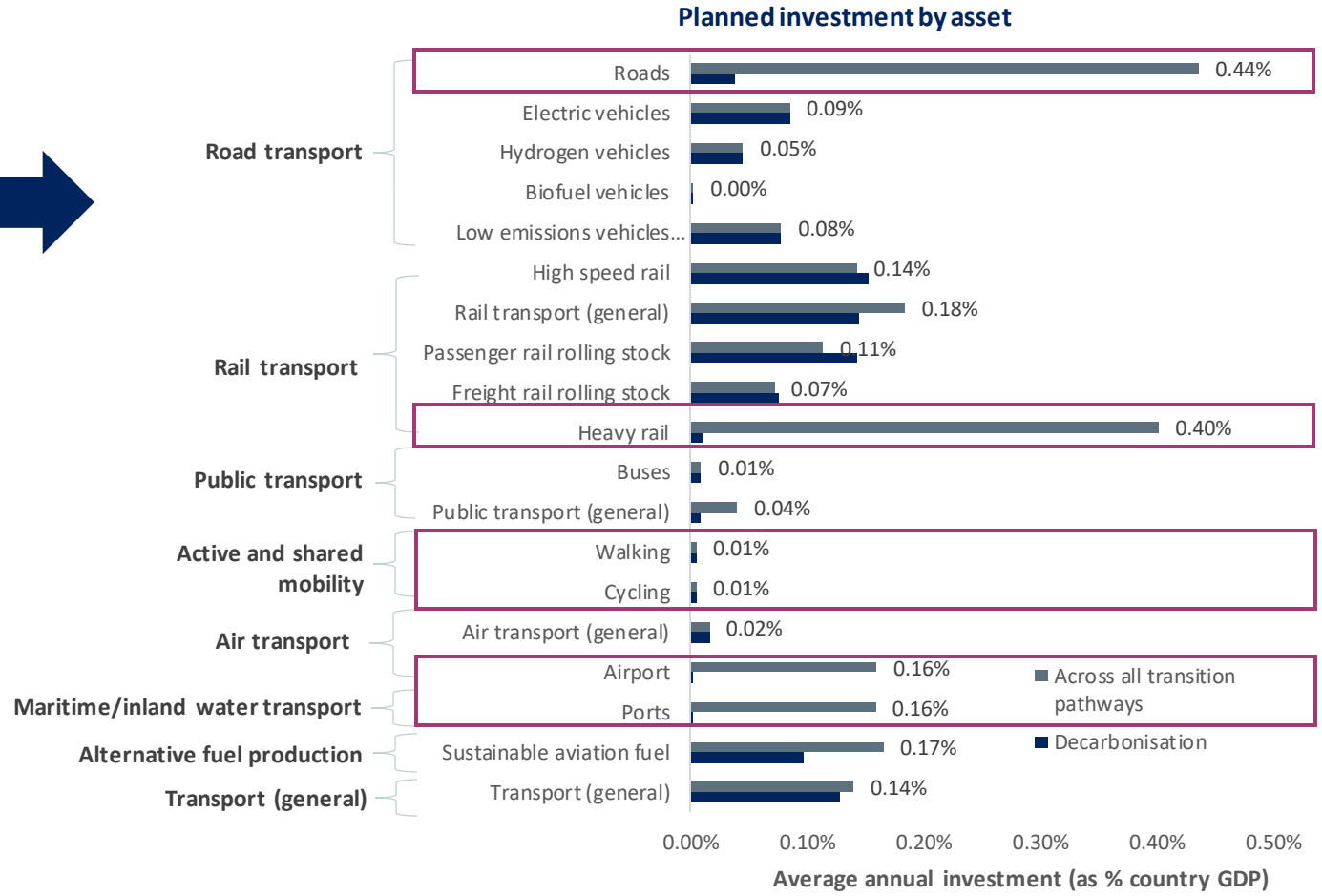
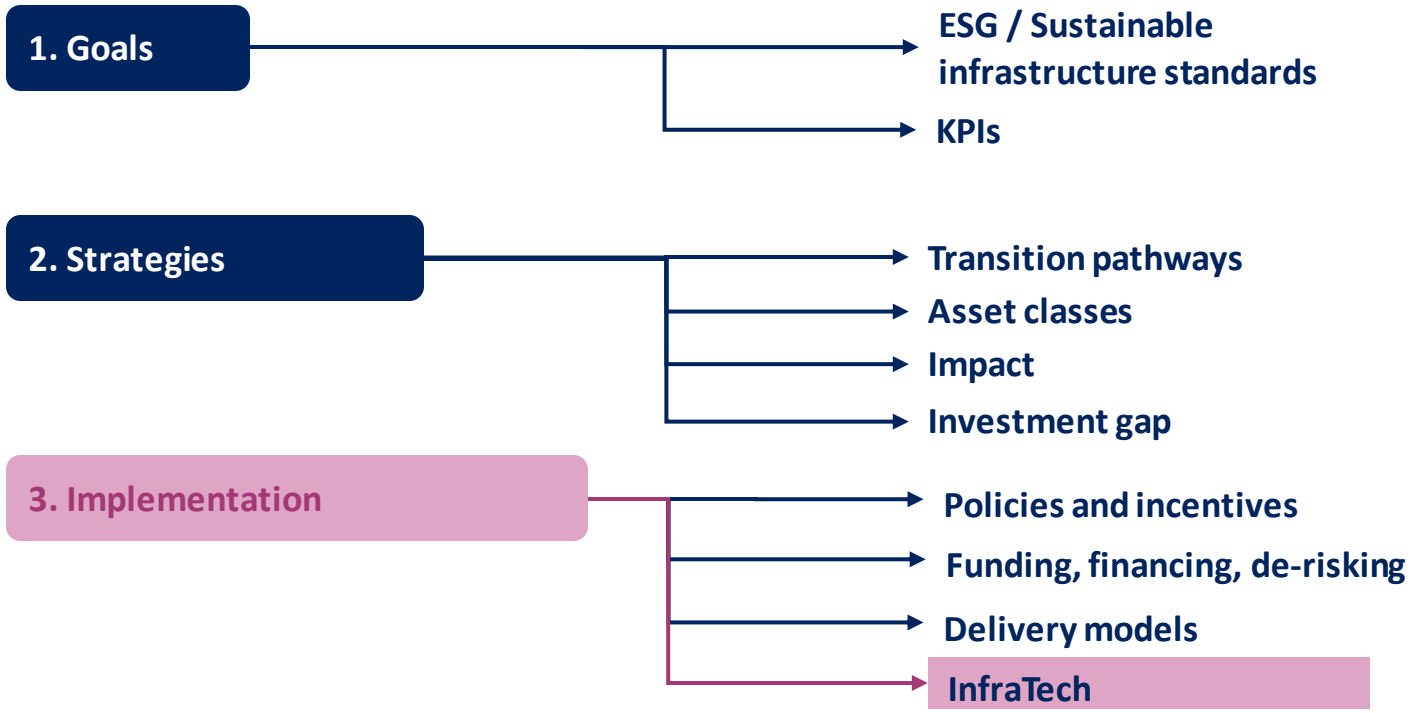




Implementation: InfraTech to make roads more sustainable



Implementation: InfraTech to make roads more sustainable

- Enhancing the efficiency and affordability of road projects
- Transforming the environmental and safety impact of roads
- Making road projects more feasible and more appealing to investors

Ensure roads continue to operate during disasters and extreme weather events

Enable more accurate measurement and analysis of operational and embodied emissions

Mitigate operational and embodied emissions during design, construction, and operation

Minimise the loss of human lives by improving road safety

Prevent critical asset failures by enabling more affordable road maintenance

Implementation: InfraTech to make roads more sustainable

1 Needs Assessment & Call for Submissions

2 Taxonomy and Prioritisation Framework

Prioritisation framework

We asked MDBs to prioritise their desired use case > theme > application (select up to three).

We used this information to rank the technology submissions and identify any gaps from the market sounding process.

Step 1: Select use case

Step 2: Select theme

Step 3: Select application

Step 4: Input three combinations of use case > theme > application in the survey

Heat map of technology submissions

1 — 4

7 Themes	5 Use cases: Decarbonisation and cleaner air	Smarter asset management	Better safety	Increased Climate resilience	Better CO2 measurement and analysis
AI-enabled decision support tool	• Decision support tool	• Multi-mode modeling • AI or ML-enabled Predictive Analytics	• AI or ML-enabled Predictive Analytics	• Decision support tool	• Decision support tool
Digital platforms and ICT	• Intelligent Transportation Systems • Advanced Traffic Management Systems • Building Information Management (BIM) • Digital twin • Mobility as a Service solution	• Intelligent Transportation Systems • Advanced Traffic Management Systems • Smart Asset Management Systems • Building Information Management (BIM) • Geographic Information Systems (GIS) • Cyber security systems	• Intelligent Transportation Systems • Advanced Traffic Management Systems • Building Information Management (BIM) • Digital twin • Vehicle-to-infrastructure (V2I) Communication	• Intelligent Transportation Systems • Advanced Traffic Management Systems • Asset Management Systems • Building Information Management (BIM) • Geographic Information Systems (GIS) • Digital twin • Weather monitoring and prediction • Vehicle-to-infrastructure (V2I) Communication	• Intelligent Transportation Systems • Advanced Traffic Management Systems • Building Information Management (BIM) • Digital twin
Asset monitoring	• Fixed CO2 sensors • Mobile CO2 sensors • Air Quality Monitoring Stations • Satellite-enabled decisionmaking • IoT Monitoring	• 3D Scanning • Unmanned Aerial Vehicles • Electro-optical technologies • IoT Monitoring • Wireless sensor networks • Piezoelectric sensors • Satellite-enabled decisionmaking	• Geo-fencing • Smart pavement (embedded sensors) • Anti-collision warning systems • Real-time safety alert system	• Remote monitoring and control systems • Satellite-enabled decisionmaking • IoT Monitoring	• Fixed CO2 sensors • Mobile CO2 sensors • Air Quality Monitoring Stations • Satellite-enabled decisionmaking
Advanced materials	• Low Carbon Pavements • Low carbon reinforced concrete		• High Friction Surface Treatment • Solar paint	• Cool Pavement • Carbon Fibre Reinforced Polymer • Geosynthetics • Porous Pavements	
Robotics and automation		• Assistive robotics • Autonomous Ground Vehicles • Connected autonomous vehicles • Swarm robotics	• Assistive robotics • Autonomous Ground Vehicles • Connected autonomous vehicles	• Autonomous ground vehicles	
AR / VR / Wearables		• Virtual inspections	• Immersive 3D models • Smart personal protective equipment		• Wearable CO2 monitor
Physical structures	• Zero Emission Vehicles • Electric vehicle infrastructure • New/Alternative Fuel Technologies refueling infrastructure • Solar roadways • Carbon sequestration				

Note: Larger version in Annex 2

Implementation: InfraTech to make roads more sustainable

3 Top 5 Selection

- Advanced materials for decarbonisation and cleaner air
- AI-enabled decision support tools for smarter asset management
- Advanced materials for increased climate resilience

detektia

iris

CNRG TECHNOLOGIES

COLAS

TRL THE FUTURE OF TRANSPORT

4 Pitching Session

5 Estimating impact

Up to 100 projects

Leverage $1.5bn of investments

40% reduction in fatalities

93% reduction in CO2 emissions

40% reduction in maintenance budget

4. Lessons from the G20 initiative

Lessons from our work on transition pathways

Plenty of work ongoing in decarbonisation & mitigation

Biggest data gap is on decarbonisation potential of infrastructure assets

Supports a common definitions for decarbonising infrastructure

InfraTech has clear potential to boost impact

Global Infrastructure Hub

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