

NetZero Pathfinders Quarterly

The transport edition

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NetZero Pathfinders Quarterly Transport

Welcome to the first edition of the **NetZero Pathfinders Quarterly**, a publication highlighting the most effective policies and regulations in a particular sector. By showing what really works through success stories, **Pathfinders equips decisionmakers to implement impactful solutions and mitigate climate change.**

The Pathfinders framework identifies the four pillars of the energy transition. This Quarterly encompasses climate solutions in Pillars 1, 2 and 4 with a focus on the transport sector, including boosting micromobility and public transportation, supporting the electrification of hard-to-abate vehicles and promoting the use of lower-carbon fuels in hard-to-abate sectors. These solutions also touch on enhancing cross-stakeholder coordination and establishing independent bodies focused on climate projects.



Enhancing mobility: Policy plays a vital role in reducing overall dependency on cars through micromobility solutions and modal shifts in cities.

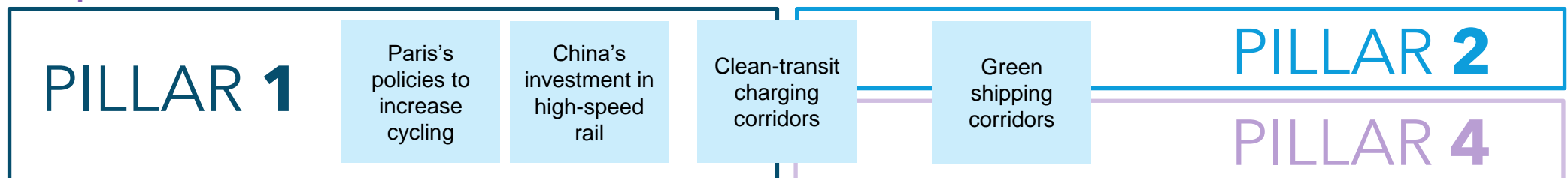


Decarbonizing shipping: Regulatory intervention has lacked uptake in the shipping sector, but public-private coordination presents an opportunity for industry players to step in.



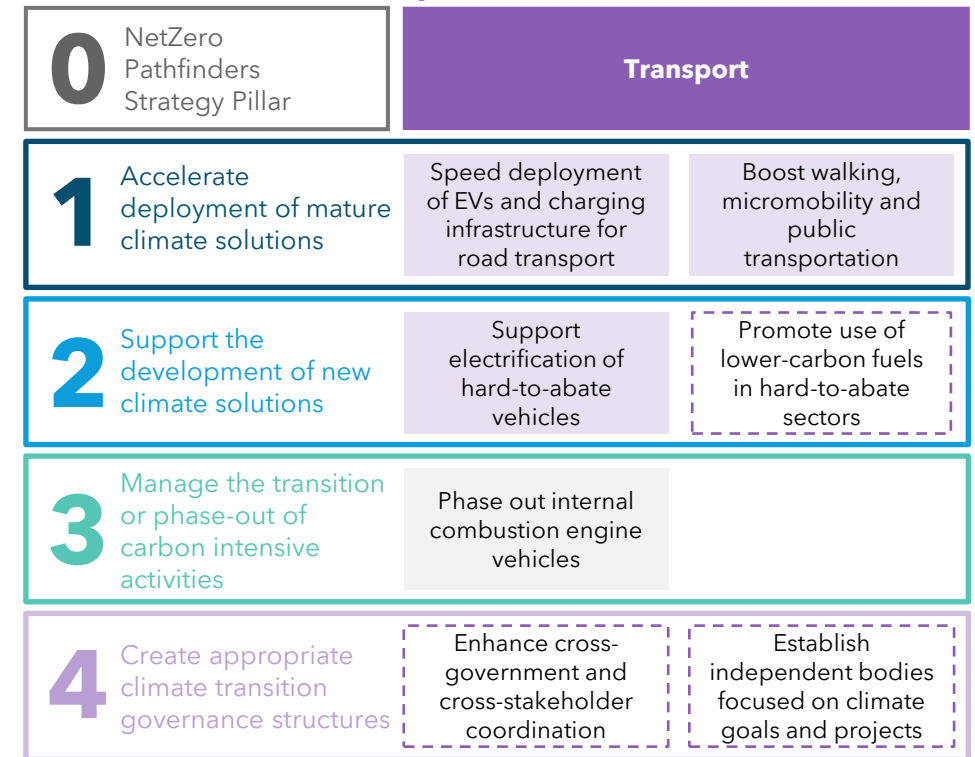
Electrify commercial trucking: Policymakers are aiming to boost the currently low adoption rate of electric trucks, which will require sufficient charging infrastructure along major highways.


Best practices covered in this edition



Source: BloombergNEF. Note: Pathfinders best practices often cut across several pillars. There are no Pillar 3 solutions included in this edition.

Climate solutions and pillars covered in this edition



Key:  Sector-specific solutions  Cross-cutting solutions

Source: BloombergNEF. Note: See the appendix for all sectors and climate solutions. Sector-specific solutions are greyed out if they are not covered in this edition. 'Cross-cutting solutions' are also applicable to other sectors.

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Enhancing mobility

Decarbonization beyond the drivetrain

Enhancing mobility: Paris uses a suite of tools to promote micromobility

Climate solutions covered

1 Accelerate deployment of mature climate solutions

Boost walking, micromobility and public transportation

Source: BloombergNEF NetZero Pathfinders

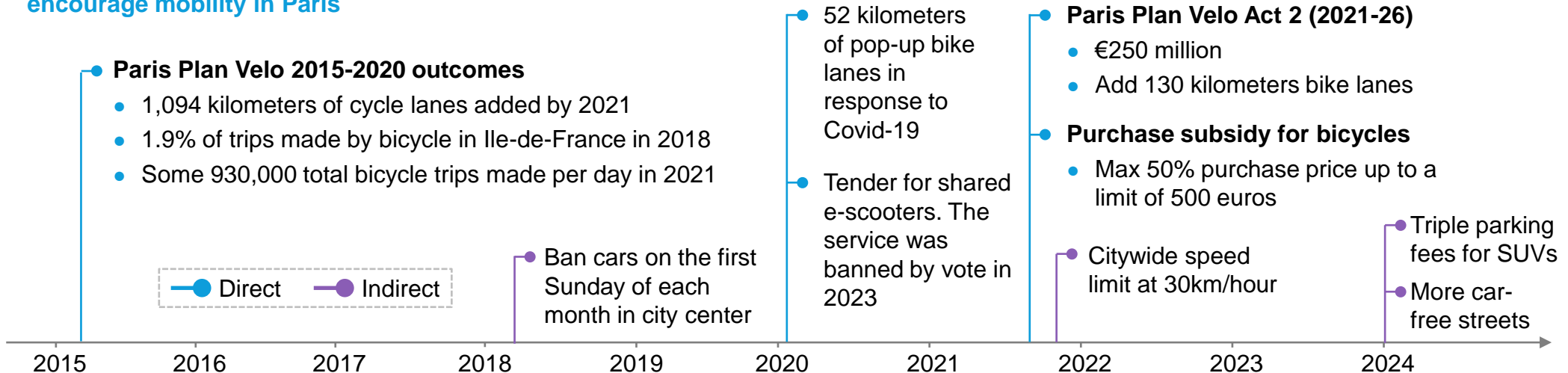
Investments in walking and cycling infrastructure reduce emissions and can deliver direct health and exercise benefits to city residents. Both bike-sharing schemes and the construction of cycling infrastructure create new jobs across the value chain.

Paris's multi-pronged approach to encourage bike usage among residents

Paris has implemented several measures to encourage the use of bikes and scooters, also known as active mobility or micromobility. What appears effective is the use of incentives for micromobility alongside disincentives for car use:

- The city has prioritized budget for rolling out cycle lanes. Paris Plan Velo 2015-2020 (Paris Bicycle Plan 2015-2020) with an investment of more than €150 million (\$170 million). The total length of cycle lanes within the city and suburbs increased from 200 kilometers in 2001 to 1,094 kilometers in 2020. Car trips made within Paris declined by almost 60% in 2018 compared with 2001 levels.
- In 2021 the city released an updated version, Plan Velo Act 2, which aims to make Paris 'completely cyclable' by 2026. With an investment of €250 million by 2026, the plan includes another 130 kilometers of bike-safe pathways in Paris.
- Residents are eligible for bike and e-bike purchase subsidies of up to 50% of the VAT-included purchase price, with a limit of €500.
- The city has also implemented policies targeted at reducing the use of cars, such as car-free streets, speed limits and increased parking fees for large and heavy-polluting vehicles, to encourage mobility shifts towards public transit and bicycles.

Timeline of policies implemented to encourage mobility in Paris



Source: BloombergNEF

Enhancing mobility: China's urban rail investments pay off

Climate solutions covered

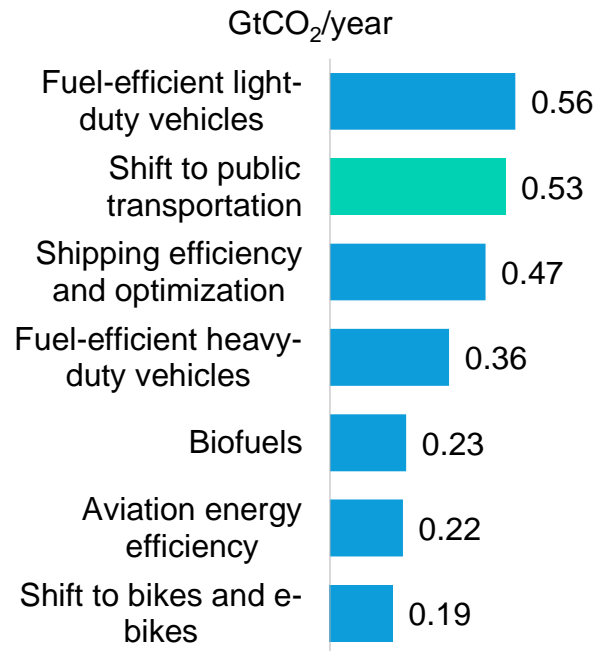
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Accelerate deployment of mature climate solutions

Boost walking, micromobility and public transportation

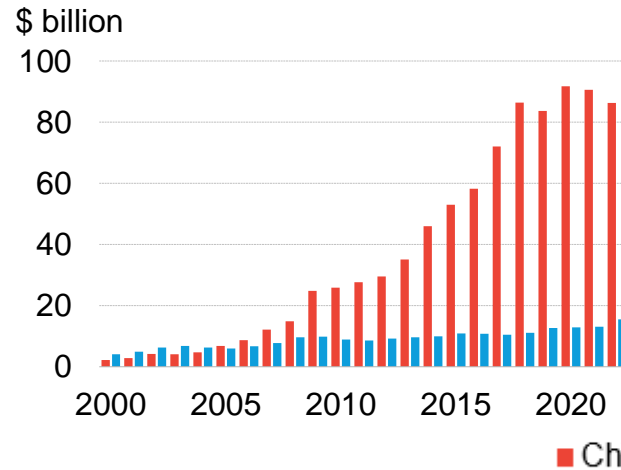
Source: BloombergNEF NetZero Pathfinders

Estimated annual net emission reduction potential of mitigation options costing below \$20/tCO₂e in 2030 in nationally determined contributions



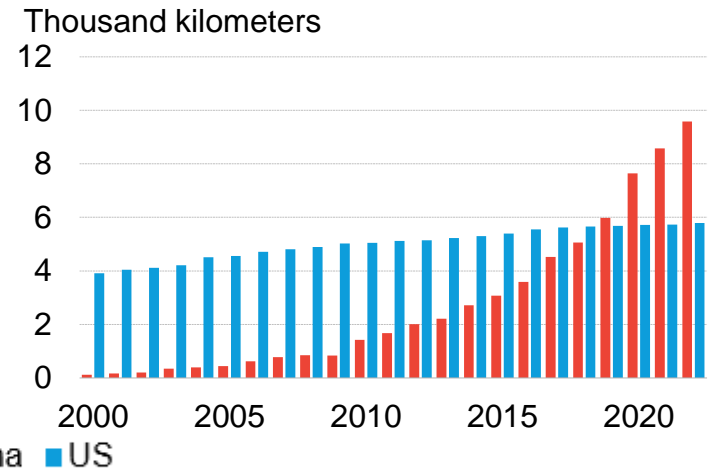
Source: BloombergNEF, United Nations Framework Convention on Climate Change. Note: GtCO₂ is gigatons of carbon dioxide, tCO₂e is metric tons of carbon dioxide equivalent.

Urban rail investment in China and US



Source: BloombergNEF, China Urban-Rural Construction Statistical Yearbook, US Federal Transit Administration. Note: China data reflects fixed asset investment for urban rail. US data reflects capital expenses for public transit services including heavy rail, light rail, streetcar, cable car and monorail.

Urban rail kilometers traveled in China and US



China's urban rail investment and kilometers traveled increase in tandem

- Reducing car usage in favor of public transit has similar decarbonization potential as shifting light-duty vehicles to cleaner and more efficient drivetrains, according to the United Nations. However, public transit uptake faces the challenge of high infrastructure investment and overcoming consumer preference factors such as “car culture”.
- With great investment can come great reward. China invested around \$440 billion in urban rail fixed assets in over 2018-2022 and expanded the network to almost 10,000 kilometers. The US invested less in its urban rail network, at roughly \$65 billion over the same period.
- China's distance traveled by rail increased sevenfold over 2010-2022. In the US, where driving continues to be the faster and more convenient option to get from point A to point B, urban rail use increased more slowly, by around 15% over the same period.



Decarbonizing shipping

Integrating cross-stakeholder coordination

Decarbonizing shipping: Regulating the emissions intensity of shipping fuels

Climate solutions covered

2 Support the development of new climate solutions

Promote use of lower-carbon fuels in hard-to-abate sectors

4 Create appropriate climate transition governance structures

Enhance cross-government and cross-stakeholder coordination

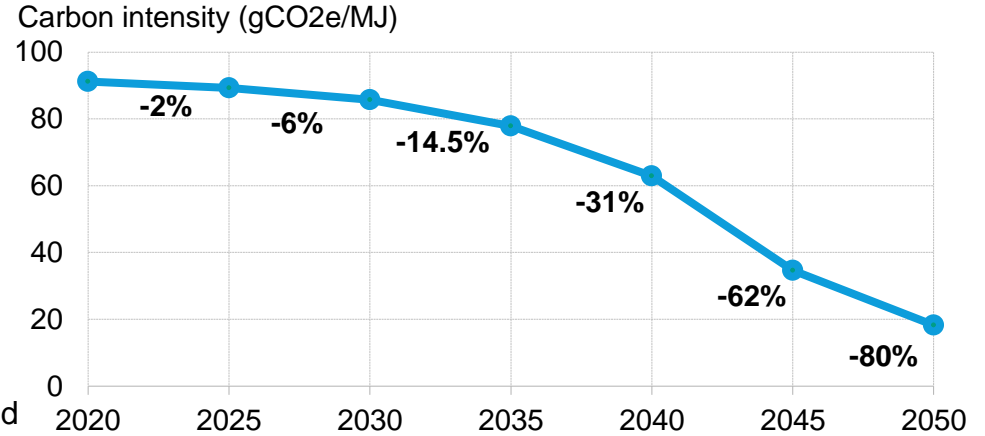
Establish independent bodies focused on climate goals and projects

Source: BloombergNEF NetZero Pathfinders

FuelEU Maritime Regulation

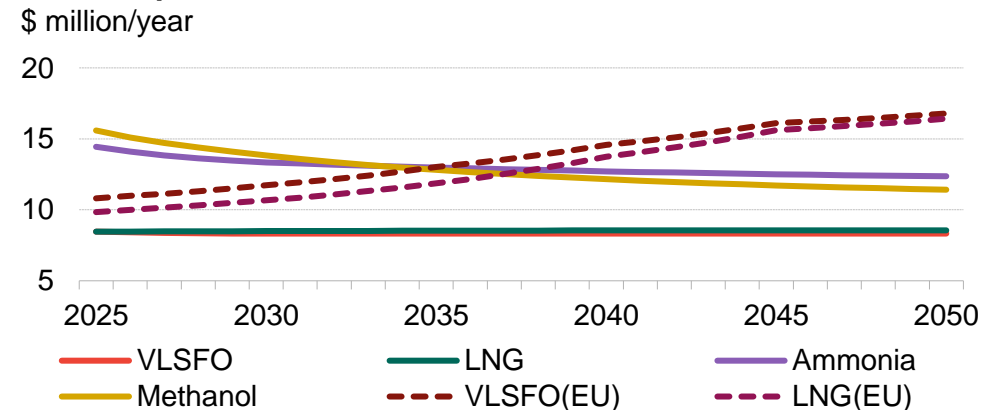
- FuelEU Maritime aims to regulate the emissions intensity of fuels used by the shipping sector, starting with a 2% reduction in 2025 relative to 2020 levels, and ramping up to an 80% reduction in 2050. The measure is technology-neutral, allowing the market to decide which fuels should be used as the emissions thresholds are lowered.
- The measure is expected to become the largest additional cost for containership owners as the emissions intensity thresholds tighten over time – outstripping even the cost of carbon under the EU Emissions Trading Scheme (EU ETS).
- The carbon bill from the EU ETS for a new-build vessels running on very-low-sulfur fuel oil (VLSFO) from European Economic Area (EEA) ports to those outside the EEA could make up around 10% of the total costs of ownership by 2035, while FuelEU Maritime could account for 26% of the total costs for the same vessel. Taken together, these two regulations can act as a powerful decarbonization incentive.
- BNEF expects that by 2035 in the EU, the combination of regulations will make methanol- and ammonia-fueled ships cheaper on voyages from EEA-ports to non-EEA ports than those running on VLSFO, a traditional marine fuel.

FuelEU Maritime targets relative to 2020 level



Source: BloombergNEF, International Maritime Organization, European Union.
 Note: gCO₂e/MJ is grams of carbon dioxide equivalent per megajoule.

Containership total cost of ownership between EEA and non-EEA port



Source: BloombergNEF. Note: VLSFO is very-low-sulfur fuel oil, LNG is liquefied natural gas. VLSFO(EU) includes the impact of EU ETS and FuelEU Maritime, which cover 50% of the emissions for voyages between EEA ports and non-EEA ports. EEA refers to the European Economic Area, which includes the EU, Iceland, Liechtenstein and Norway.

Decarbonizing shipping: Coordinating industry for green corridors

Climate solutions covered

<p>2 Support the development of new climate solutions</p>	<p>Promote use of lower-carbon fuels in hard-to-abate sectors</p>
<p>4 Create appropriate climate transition governance structures</p>	<p>Enhance cross-government and cross-stakeholder coordination</p> <p>Establish independent bodies focused on climate goals and projects</p>

Source: BloombergNEF NetZero Pathfinders

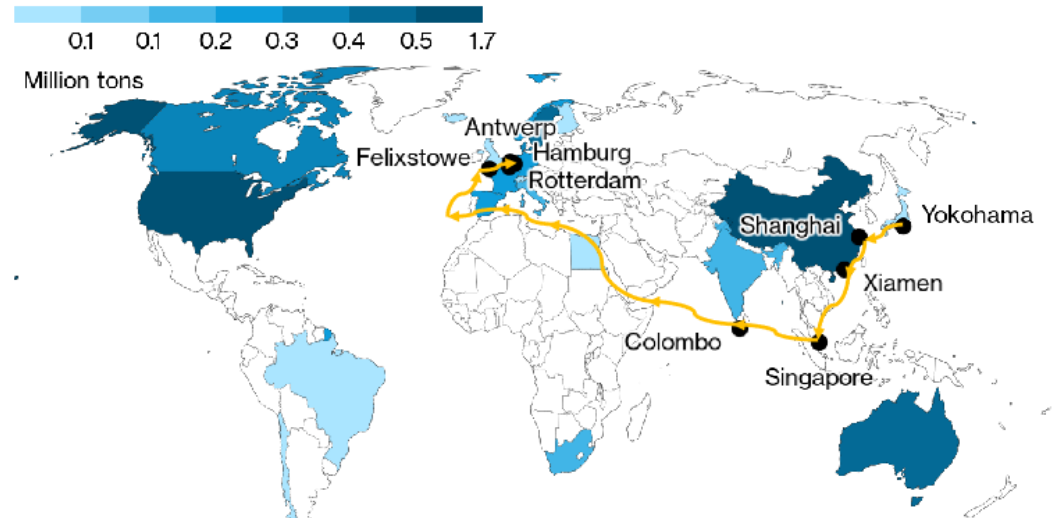
Emergence of green corridors

Green corridors are defined as routes on which stakeholders across the value chain collectively agree to adjust port and vessel infrastructure such that ships can be powered by lower-carbon fuels. The concept of green shipping corridors was created at COP26 in 2021, where 22 signatories agreed to create six green corridors by 2025, under what's known as the Clydebank Declaration.

East Asia-Europe green corridor

- The proposed East Asia-Europe corridor has high decarbonization potential, as this route alone contributes around 3% of shipping emissions. The first low-carbon fuel-powered container ship on the route utilized the Singapore-Rotterdam portion of this corridor in September 2023.
- Emissions on this route fall partially under the EU ETS and FuelEU compliance thresholds, so the establishment of this green corridor could serve as a key incentive for investors across the value chain to engineer bunkering solutions for ports far from production hubs, such as Singapore.

East Asia-Europe green corridor and green methanol capacity in 2027



Source: BloombergNEF, Global Maritime Forum. Note: Data as of 2023. Capacity data shown for distinct economies.

Key building blocks and challenges for a successful green corridor

- Ensure a viable fuel pathway.** Ports require new or retrofitted storage facilities to store and deliver new maritime fuels, such as methanol and ammonia.
- Establish customer demand for green shipping.** Until stricter policy kicks in, it's still more expensive to source green fuels, making green fuel demand from shipping companies a challenge.
- Enable a policy and regulation landscape.** Beyond the EU ETS and the FuelEU Maritime, there is very little regulatory oversight in the shipping industry.
- Enhance cross-value and stakeholder coordination.** In the multi-stakeholder shipping world, reaching a consensus remains difficult.

Source: BloombergNEF, Global Maritime Forum.



Electrifying commercial trucking

Federal funding for charging infrastructure

Electrifying commercial trucking: Funding for charging and fueling infrastructure

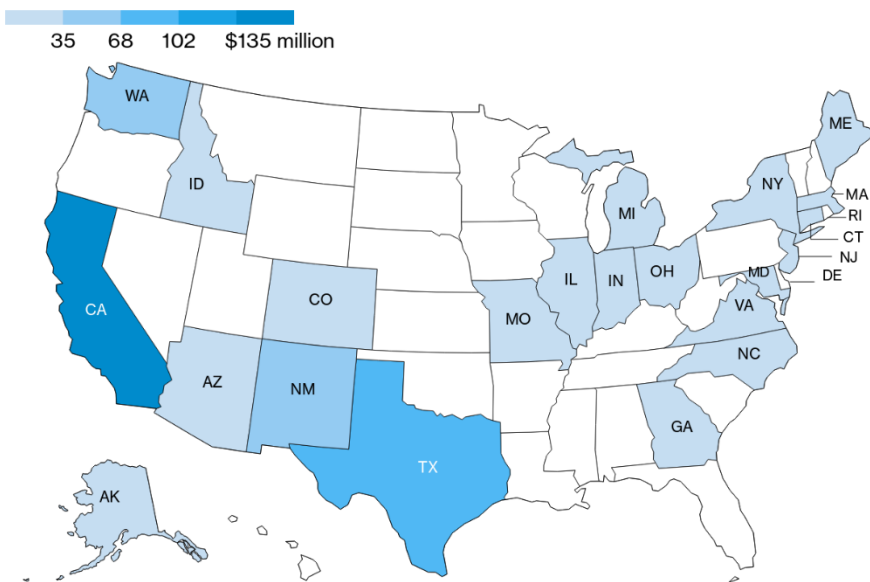
Climate solutions covered

<p>1 Accelerate deployment of mature climate solutions</p>	<p>Speed deployment of EVs and charging infrastructure for road transport</p>
<p>2 Support the development of new climate solutions</p>	<p>Support electrification of hard-to-abate vehicles</p>

Source: BloombergNEF NetZero Pathfinders

Charging and Fueling Infrastructure Grant funding for clean communities and corridors

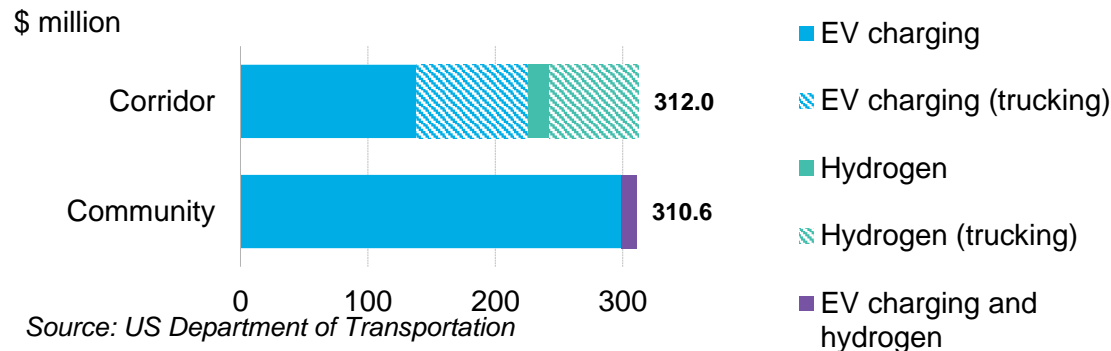
Round 1: Fiscal year 2022-23



Source: US Department of Transportation

Bloomberg

Charging and Fueling Infrastructure funding by project type, fiscal year 2022-23



Source: US Department of Transportation

Federal funding

- The US Bipartisan Infrastructure Law includes a \$7.5 billion electric vehicle charging package to build a national charging network and charging infrastructure, with the goal of at least 500,000 publicly available chargers by 2030, compared with roughly 166,000 at the time of writing. The package is focused on communities and locations with limited private investment in charging.
- The funding package includes the Charging and Fueling Infrastructure Grant Program (CFI) which will deploy up to \$2.5 billion over five years for “corridor” (defined as close to a highway) and “community” (rural) charging and hydrogen fueling projects. In early 2024, the federal government announced \$623 million of funding for grant recipients in the first round, equally distributed between community and corridor projects.
- Half of the corridor funding was deployed specifically for truck charging projects, a sector that has received less private investment than charging for light-duty vehicles. In this, California and Texas were the big winners. Whether projects are hydrogen- or electricity-based depends on the location – funds deployed in Texas were hydrogen-based, while West Coast projects were charging-based in this round.

Electrifying commercial trucking: Electric trucking with charging corridors

Climate solutions covered

1 Accelerate deployment of mature climate solutions

Speed deployment of EVs and charging infrastructure for road transport

2 Support the development of new climate solutions

Support electrification of hard-to-abate vehicles

4 Create appropriate climate transition governance structures

Enhance cross-government and cross-stakeholder coordination

Establish independent bodies focused on climate goals and projects

Participating utility partners along I-5



Deploying charging infrastructure that is reliable and evenly distributed along major freight routes will play a key role in supporting the adoption of electric truck fleets.

West Coast Clean Transit Corridor Initiative



Source: BloombergNEF NetZero Pathfinders

West Coast Clean Transit Corridor Initiative

- The West Coast Clean Transit Corridor Initiative (WCCTCI) is a coalition of 16 utilities aiming to accelerate the deployment of electric truck charging along Interstate 5 (I-5), the main highway connecting states along the US West Coast. The initiative plans to deploy 34 charging sites and five hydrogen fueling stations, each 50 miles apart; that's up from just four charging stations and three hydrogen fueling stations in 2024. The coalition estimates that by 2030, electric trucks will make up 8% of the truck fleet using I-5.
- The initiative is led by the private sector, with backing from public funding. The CFI funding cycle for fiscal year 2022-23 included \$56 million to support 85 direct-current fast chargers for medium- and heavy-duty EVs in San Joaquin Valley, located on the I-5 corridor. Over \$12 million was also deployed in Washington State to build the world's largest EV charging hub, linking three major counties located along I-5.
- The transportation agencies of the West Coast states submitted a joint application for the first time in June 2023 for \$700 million from the second round of CFI funding, for the fiscal year 2023-24, to continue building on this initiative.

Source: West Coast Clean Transit Corridor Initiative

Appendix

NetZero Pathfinders Pillars

NetZero Pathfinders Framework

Four pillars of net-zero strategies

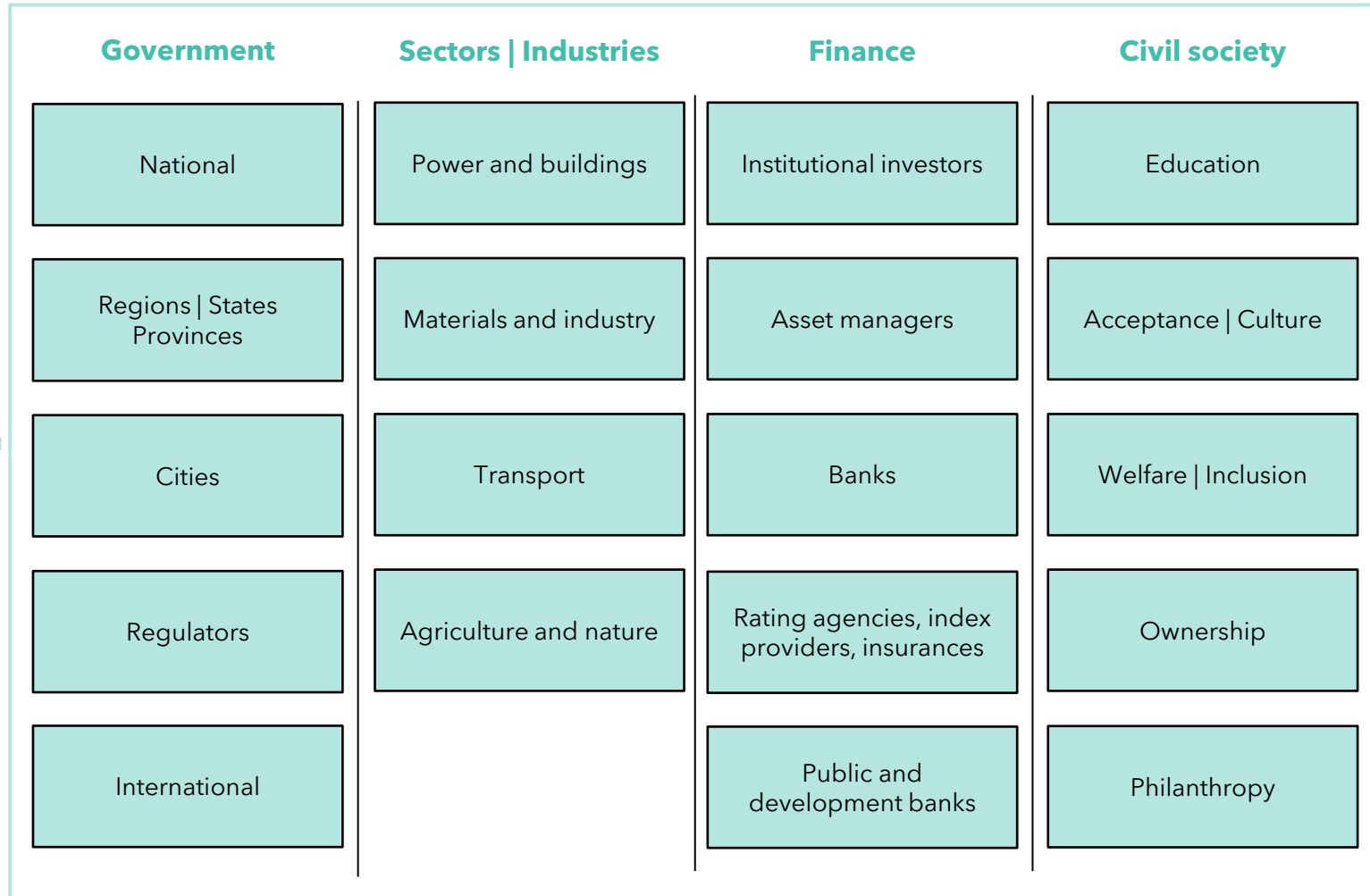
Stakeholders in the race to net zero

1 Accelerate deployment of mature climate solutions

2 Support the development of new climate solutions

3 Manage the transition or phase-out of carbon intensive activities

4 Create appropriate climate transition governance structures



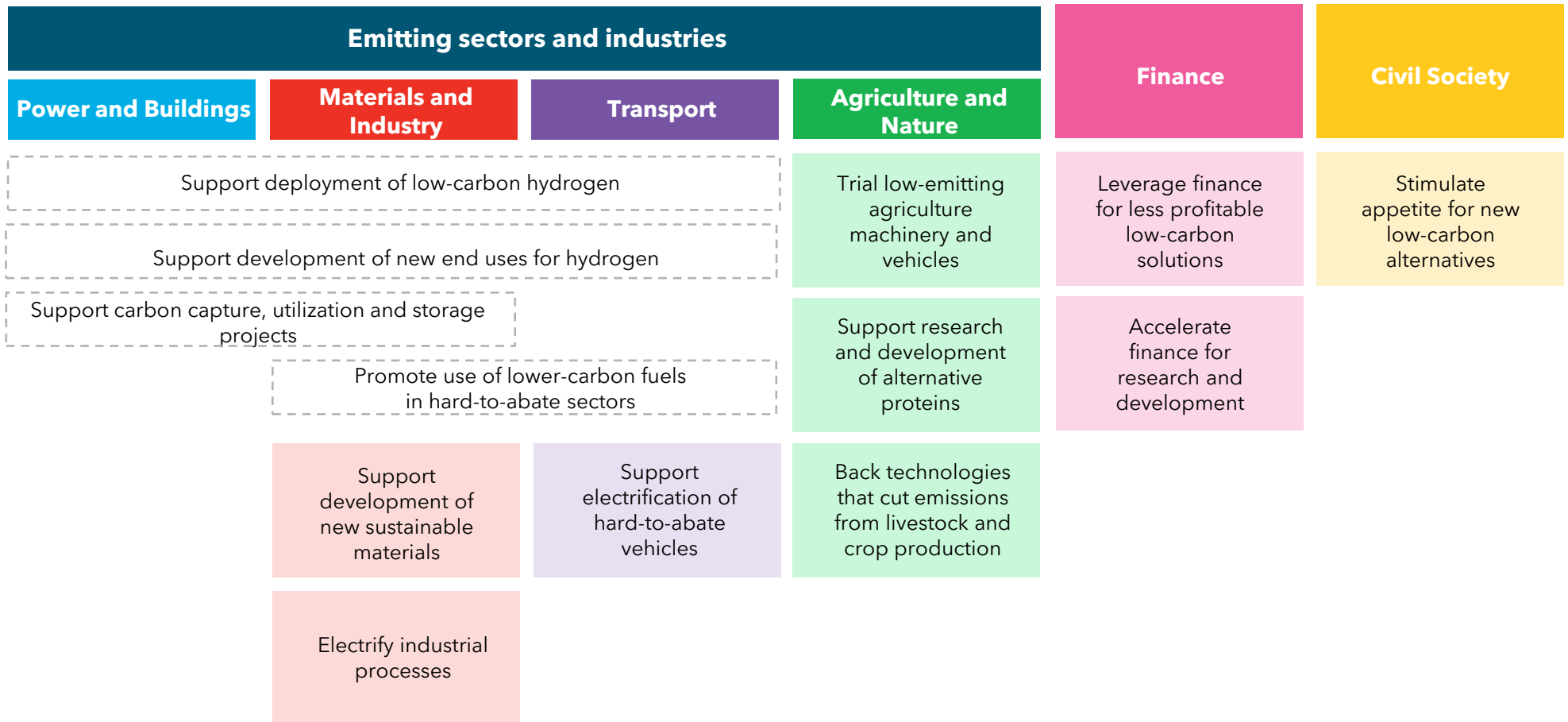
NetZero Pathfinders Framework

1. Accelerate deployment of mature climate solutions

Emitting sectors and industries				Finance	Civil Society
Power and Buildings	Materials and Industry	Transport	Agriculture and Nature		
Speed construction of clean power plants	Embed goal of a 'circular economy' in all appropriate decision-making	Speed deployment of EVs and charging infrastructure for road transport	Implement sustainable management systems	Replicate proven private investment models in more mature markets	Support public acceptance and understanding of clean alternatives
Accelerate buildout of current energy storage technologies	Speed up use of bioplastics in consumer and business products	Boost walking, micromobility and public transportation	Encourage sustainable food consumption	Accelerate public investment in less mature markets	Make clean solutions easy to choose
Proliferate heat pumps and other clean technologies to buildings	Establish and enforce industrial energy efficiency standards		Support targeted fertilizer usage and use of low-carbon products		
Promote efficiency retrofits for homes and commercial buildings					

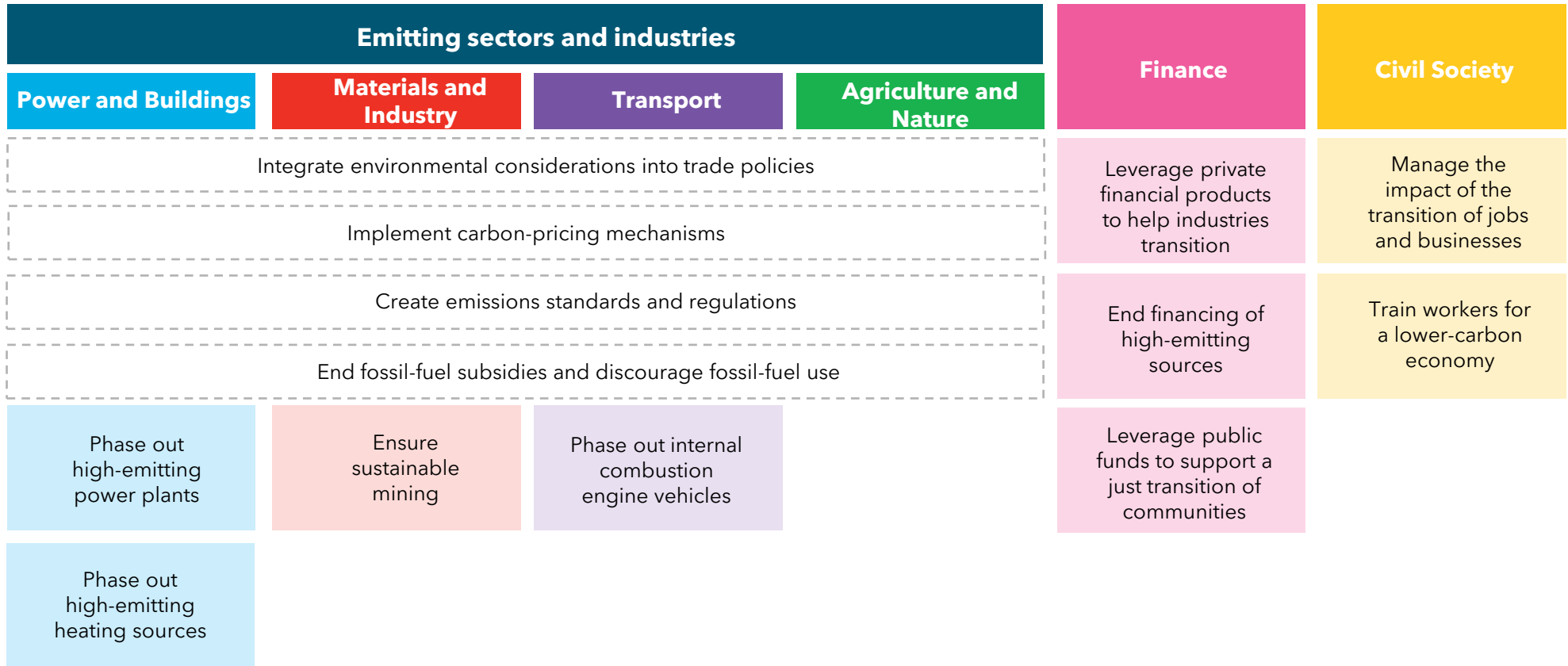
NetZero Pathfinders Framework

2. Support development of new climate solutions



NetZero Pathfinders Framework

3. Manage the transition or phase-out of carbon-intensive activities





NetZero Pathfinders Framework

4. Create appropriate climate transition governance structures



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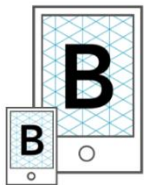
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