



Deep Decarbonization Pathways

DDP Insights



From research to real-world pathways

This edition of *DDP Insights* looks at a new [special issue](#) published in *Climate Policy*, bringing together a set of studies that explore what it takes for countries to reach carbon neutrality in practice.

Rather than focusing only on targets or global scenarios, the research looks inside countries: at how different sectors evolve, how policies shape decisions, and what kinds of changes are needed across the economy.

Building on the analytical framework developed in the [2024 DDP report](#), the special issue's papers bring these insights together to examine how transitions unfold in practice across countries and sectors. The analysis of these insights against the evidence on progress assessed in the [2025 DDP report](#) can serve to define the priorities for national climate action and guide the progressive increase of ambition and effective implementation.

Across eight papers, a [common message](#) emerges: reaching net zero is not about a single solution, but about coordinated transformations across energy, industry, transport, and land use, grounded in national contexts and development priorities. It also points to a clear policy conclusion — that carbon neutrality requires comprehensive, country-specific policy packages, anchored in sectoral realities and supported by international cooperation, to address multiple objectives within a coherent framework.

What the research shows: Evidence from eight papers

The special issue brings together insights across key sectors, highlighting both short and long-term opportunities and challenges.

The [synthesis paper](#) shows that national pathways must link short-term action with long-term transformation, aligning climate goals with development priorities and sector-specific realities. It also emphasizes the need for policy packages that can manage the socio-economic dimensions of the transition — including supporting vulnerable groups and accompanying structural changes across the economy.

In [industry](#), the research finds that around half of emissions can be reduced with existing, low-cost solutions such as improved material efficiency and recycling, but deeper cuts depend on new technologies, investment, and international cooperation (Bataille *et al.*, 2023).

This need for coordination is also reflected at the global level. Another [study](#) highlights that barriers to industrial decarbonization are often political rather than technical, pointing to gaps in international cooperation, market rules, and incentives for low-carbon production.

In [passenger transport](#), the findings stress the importance to go beyond technological change but to also consider organizational dimensions. For passenger mobility, reducing emissions depends not only on cleaner vehicles, but also on how cities are designed — including land use, infrastructure, and access to public transport (Briand *et al.*, 2023).

[Freight transport](#), often overlooked, is shown to be equally critical. The research highlights the need for changes across supply chains, logistics systems, and infrastructure, alongside improvements in vehicles and fuels, to achieve deep emissions reductions.

A complementary policy-focused [study](#) shows that delivering these changes requires a mix of tools, from public investment and regulation to financing mechanisms, tailored to the specific needs of the sector.

Beyond energy and transport, the role of [land use](#) is central. The analysis shows that agriculture, forests, and land use can deliver significant emissions reductions, particularly over the medium and long term, but require careful management of trade-offs with food security, livelihoods, and biodiversity.

Across all pathways, [clean electricity](#) emerges as a core foundation. Scaling renewable power must be matched with system flexibility, institutional capacity, and careful management of existing fossil assets to support wider electrification across the economy.

What this tells us

Taken together, the research points to a clear conclusion: net zero is a systems challenge.

Progress depends not only on deploying clean technologies, but on how different parts of the economy evolve together, from infrastructure and markets to behavior and governance.

While many countries have made progress over the past decade, the studies highlight persistent gaps: too little preparation for long-term infrastructure and behavioral change, and limited alignment between climate, industrial, and social policies.

The next phase of the transition will depend on closing these gaps through coordinated, sector-specific strategies that are grounded in national realities.

Explore the special issue

This edition of *DDP Insights* draws on the special issue on deep decarbonization pathways published in *Climate Policy*.

[👉 Read the blog on IDDRI](#)

[👉 Explore the special issue](#)

About DDP Insights

DDP Insights builds on the work of the Deep Decarbonization Pathways (DDP) Initiative, drawing on country-driven analysis to explore how national climate goals translate into real-world transformation.



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