

## Making it happen: national pathways to net zero

Immediate actions in  
national pathways to net zero

### MANAGING THE SOCIO- ECONOMIC TRANSITION

*National pathways to net zero require short-term measures to prevent development delays, with a focus on supporting disadvantaged and vulnerable populations during the transition. These measures, which must be tailored to the unique contexts of each country, can be macroeconomic or sectoral in nature, possibly involving international cooperation.*

National pathways to net zero entail socio-economic challenges in the transition, primarily driven by price increases that can undermine the affordability of basic needs (e.g., energy and transport) in the absence of short-term substitution opportunities. Such price surges can occur even without climate policies; however, ambitious climate action, if not managed carefully, can trigger rapid price surges alongside constraints on carbon, particularly affecting energy. These effects disproportionately affect the disadvantaged and vulnerable, who are more sensitive to cost fluctuations and may therefore lose access to basic services. If not addressed specifically, such a situation can significantly exacerbate inequalities and undermine the acceptability of the low-carbon transition.

This calls for the adoption of policy packages, combining mitigation measures aimed at reducing emissions with social and economic measures constructed to ensure a sustainable and equitable transition. These policy packages must be country-specific and tailored to the unique circumstances of each country. They are particularly crucial in the short-term to mitigate the socially negative impacts of stringent mitigation actions needed to initiate the low-carbon transition on a large scale.

Given this acknowledgment, the introduction of carbon pricing, whether through taxes or quotas, which will be one of the critical policy levers to reduce CO<sub>2</sub> emissions in all countries, must be considered alongside accompanying measures that address its potentially disproportionate impacts on low and middle-income households. These accompanying measures could include macroeconomic and fiscal reforms, such as using tax revenues to reduce labour taxes or providing direct transfers to the most affected households. This overall package can be consistent with efforts to reduce inequalities while simultaneously reducing emissions ([Case study - Brazil](#)).

#### CASE STUDY – BRAZIL

##### **Bridging the gap - carbon markets and the promise of a fairer Brazilian economy**

Brazil's labour market is characterized by high and distortive taxes alongside rigid laws that significantly impact its dynamics. These labour taxes, among the highest in the world, combined with stringent labour laws, contribute to considerable economic distortions. Despite recent labour market reforms in Brazil, many of these laws, established decades ago, are now outdated and ill-suited to the evolving nature of work in the 21<sup>st</sup> century. They often fail to address the flexibility required by modern businesses and the gig economy, leading to a high rate of informal employment. These factors underscore a critical need for reform in Brazil's labour regulatory framework to better align with current and future economic realities. In Brazil's DDS scenario, revenues generated from the carbon market present a strategic opportunity to address these distortions in the current fiscal system and directly assist low-income families who are likely to be impacted by rising prices of goods and services due to carbon pricing. Utilizing carbon tax revenues to reduce labour taxes is one effective approach. This reduction can incentivize job creation and has significant potential to decrease informal labour and reduce income inequalities, which is crucial since wages are the primary source of income for the poorest classes. By reducing labour taxes using the funds received from carbon-intensive sectors, more labour-intensive sectors will disproportionately benefit. In the long term, this approach will contribute to a shift in the economic structure towards a more sustainable and low-carbon economy.

Additionally, allocating a portion of carbon revenues for direct government transfers (perhaps using the existing structure of Bolsa Familia) to the poorest segments of the population is another viable strategy. These transfers would help offset the increased costs of living caused by higher prices, thereby helping to maintain or even improve the purchasing power of these vulnerable groups. This dual approach not only promotes a fairer transition to a low-carbon economy but also supports

economic inclusivity, ensuring that the transition does not disproportionately burden those least able to bear the associated costs.

Data presented in the **Figure 17** highlights significant long-term gains in purchasing power across all household classes in Brazil by 2050, especially for the poorest 20%, whose purchasing power is projected to more than double. This aligns with strategies to use carbon market revenues for reducing labour taxes and providing direct transfers, suggesting that such fiscal adjustments could accelerate economic inclusivity and resilience in transitioning towards a low-carbon economy. These strategic measures promise to enhance the lives of the most vulnerable, making Brazil's economic growth more equitable and sustainable.

The accompanying measures can also involve implementing voluntary policies and actions to offer alternative, more affordable options if basic needs become too expensive under ambitious mitigation strategies. Along the same lines, measures can be taken to enhance the affordability of low-carbon options for low-income households through targeted policy instruments. For example, in passenger transport, targeted measures can be adopted to develop efficient, low-carbon options such as public transport, enabling low-income households to substitute their car travel with this cost-effective alternatives. Furthermore, financial support can be provided to help low-income households purchase low-carbon vehicles under preferential conditions that would make these typically more expensive options accessible. Examples of such

accompanying measures include subsidies and investments as well as comprehensive policies promoting sustainable transport, or financial incentives, such as rebates and zero-interest loans, which can be reserved for specific household categories (**Case study - United States**).

**CASE STUDY – UNITED STATES**

**Accompanying measures in the low-carbon transition of the passenger transport sector**

The DDS envisions the expansion of public transit systems and subsidized mobility options to get a more equitable distribution of economic gains. The reduction in mobility costs will significantly benefit low-income populations and is a direct result of improved public transit infrastructure and the promotion of more affordable, sustainable transport options. In addition, state land-use reforms and zoning initiatives aim to create compact, less car-dependent communities. These efforts are expected to decrease the need for personal vehicle use and lower overall mobility demand compared to the current policy projection.

Significant subsidies and investments in public transport are designed to further reduce the direct costs of bus and rail trips, making these options more competitive with private car usage. Enhanced public transit systems, supported by comprehensive policies promoting sustainable transport, lead to a lower proportion of disposable income being spent on transportation, encouraging a shift towards more cost-effective and low-carbon modal choices. Public transport authorities and

**Figure 17.** Projected impact on purchasing power across household income classes

	2015	2020	2030	2050
Purchasing power HH1 (2015=1) (Poorest 20% of households, below the extreme poverty line in 2015)	1.00	1.05	1.46	2.46
Purchasing power HH2 (2015=1) (40% of households, below the poverty line in 2015)	1.00	1.04	1.38	2.17
Purchasing power HH3 (2015=1) (30% of households)	1.00	1.01	1.29	1.93
Purchasing power HH4 (2015=1) (Richest 10% of households)	1.00	0.98	1.23	1.80

private companies are investing heavily in electric buses and trains as part of comprehensive efforts to decarbonize public transport systems.

There is also expected to be a more aggressive decline in the purchase prices of zero-emission vehicles (ZEVs) due to intensified government policies and subsidies, increased investment in renewable technologies, and enhanced international cooperation on technology development and climate initiatives. Financial incentives, such as rebates and zero-interest loans, are extensively used to make these vehicles accessible to a broader range of consumers. Moreover, the technical energy efficiency of vehicles continues to improve due to breakthroughs in battery density and regenerative braking systems.

The drive towards ZEV production is strengthened by stringent emissions regulations, significant government funding for clean vehicle research, and a shift in consumer preferences towards sustainability. These factors converge to position ZEVs as a central focus of the automotive industry's future development plans.

Both public and private EV infrastructure are expected to further develop nationally, supported by the enhanced Bipartisan Infrastructure Law (BIL) National Electric Vehicle Infrastructure funding program, along with building code reforms that facilitate the development of residential charging infrastructure. Moreover, exemplary ZEV promotion policies, such as California's Light-Duty Vehicle (LDV) and Medium/Heavy Duty Vehicle (M/HDV) ZEV sales targets and mandates, as well as subsidies for low-income communities like the ones established under the California Electric Vehicle Infrastructure Project, are envisioned to be adopted by numerous states.

The accompanying measures that specifically address the social dimensions of the transition may also be linked to international cooperation. This is particularly relevant when accompanying measures involve financial mechanisms, such as de-risking instruments or soft loans, which lower the cost of investments in the low-carbon transition and facilitate access to low-carbon options at reduced costs in low-income countries (*Case study - Argentina*). These internationally-driven

accompanying measures can be combined with national industrial policies that focus on restructuring the domestic economy to better align it with the needs of the national population (cf. message 2.3).

#### CASE STUDY – ARGENTINA

### The role of international cooperation in reducing the Levelized Cost of Energy (LCOE) and preventing negative impacts of decarbonization pathways

Decarbonizing the energy sector in Argentina will require significant investments in both supply (Renewable Energy (RE) power generation and transmission capacity) and demand (appliances and other final use electric devices). The Green Exports Scenario (GES) will demand at least \$15 billion compared to the CPS to meet electrification requirements. In addition, private and public stakeholders in Argentina have identified financing as one of the sector's main barriers.

The increase in electricity costs resulting from a higher share of renewable energy is important for developing countries. According to IRENA (2023)<sup>54</sup>, the Cost of Capital (CoC) is a major determinant of the total RE price, while the regional average CoC in mature markets, e.g. Europe (4.4%) and North America (5.4%) is lower than in emerging markets, e.g. Latin America (6.9%), primarily due to differences in country risk premiums. There is a need for a redefinition of financial markets to support energy decarbonization in low and medium-income countries. De-risking investments is essential in countries that typically receive low credit ratings, leading to high interest rates on loans.<sup>55</sup> Development banks can significantly lower the CoC in emerging markets, as they have done in developed markets. In line with this approach, the GES models international cooperation as soft loans, which provide lower CoC for wind, solar, hydro and nuclear power plants. This results in a lower cost of electricity relative to other Scenarios,

<sup>54</sup> [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/May/IRENA\\_The\\_cost\\_of\\_financing\\_renewable\\_power\\_2023.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/May/IRENA_The_cost_of_financing_renewable_power_2023.pdf)

<sup>55</sup> Dixon-Declève, S., Rockström, J., Ghosh, J., Gaffney, O., Randers, J., & Stoknes, P. E. (2023). Earth for all. Actes Sud.

and higher growth rates for GDP and per capita GDP.

There are other costs associated with the transition, particularly related to technology substitution, which may have significant impacts and require additional policies. For example, soft loans aimed at facilitating the acquisition of electric appliances and targeted policies for low-income households are essential. This technological shift could also have a negative impact on the trade balance as many energy-efficient devices are imported into Argentina, highlighting the demand for additional industrial policies to counterbalance the effects.

