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# VIETNAM

World Bank Group

# COUNTRY CLIMATE AND DEVELOPMENT REPORT

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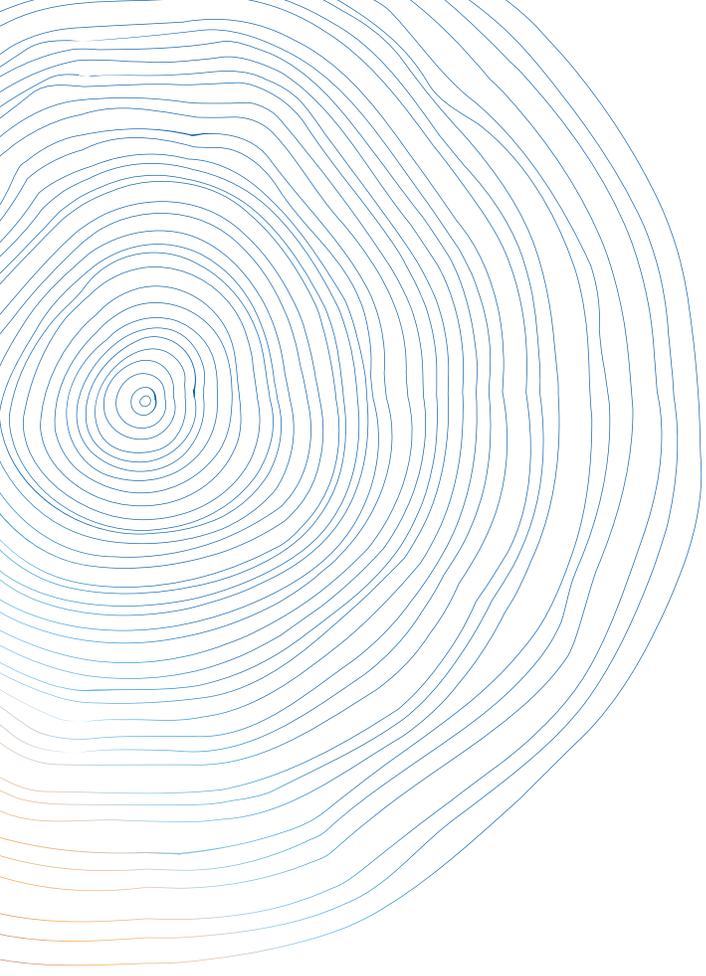
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# VIETNAM

## Reconciling Economic Success with Climate Risks

Country Climate Change and  
Development Report: Overview



# Contents

Reconciling Economic Success with Climate Risks	8
High Costs of Doing Too Little Too Late	10
Developing a Climate-Resilient, Low-Carbon Economy	12
Adapting and Building Resilience to Climate Change	13
Mitigating and Heading for Net-Zero	14
Way Forward—Top Priorities	16
Who Will Pay?	18

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# VIETNAM

## Reconciling Economic Success with Climate Risks

**Vietnam, transformed in a generation from one of the world's poorest nations into a dynamic emerging market, faces growing risks from climate change that could endanger its goal of becoming a high-income economy by 2045.**

Vietnam's 100 million people are among the most vulnerable in the world to the ravages of climate change, facing hazards especially along the country's extensive low-lying coastal and river delta regions caused by rising sea levels, typhoons, and floods.

Climate change poses an escalating threat to Vietnam's agricultural, forestry, and fishery sectors. It will also undermine Vietnam's export competitiveness in global markets in both manufacturing and agriculture.

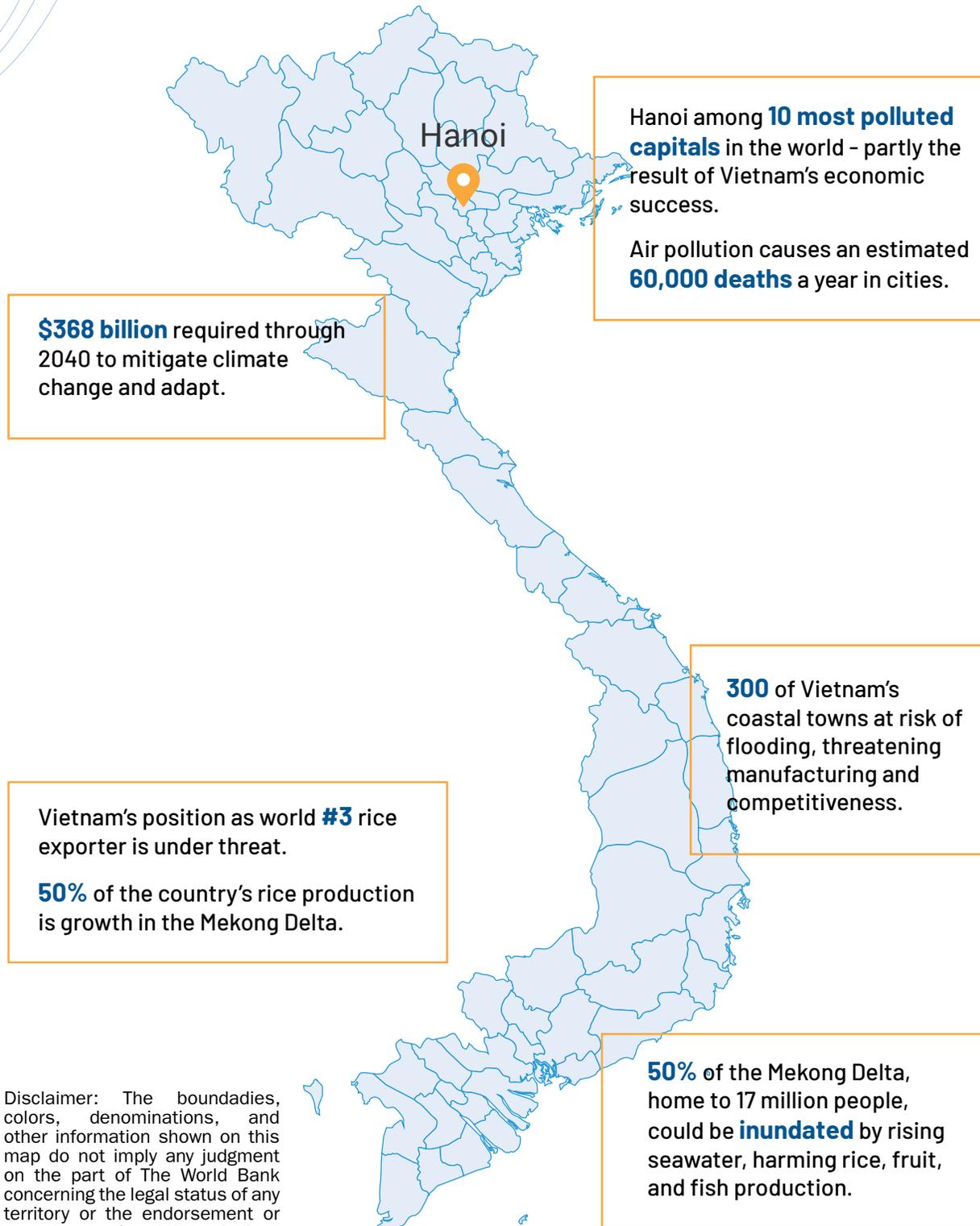
The country's rapid economic growth, urbanization, and industrialization have been powered by coal-dependent energy that creates significant greenhouse gas (GHG) emissions. Vietnam is not a major contributor of GHGs globally, with 0.8 percent of the world's emissions. But over the past two decades, the country has emerged as one of the fastest-growing per capita GHG emitters in the world. From 2000 to 2015, as gross domestic product (GDP) per capita increased from \$390 to \$2,000, carbon dioxide (CO<sub>2</sub>) emissions nearly quadrupled. Moreover, Vietnam's GHG emissions are associated with the toxic air pollution that plagues many of its cities, especially Hanoi, with implications for human health and labor productivity.

To counter these trends, Vietnam should embrace a new development paradigm based on two connected pathways—to adapt to climate change and build resilience, and to mitigate climate change by decarbonizing growth and steering the economy away from carbon-intensive energy. If well designed, these two pathways will help the country achieve its climate objectives while expanding its GDP per capita by more than 5 percent a year—the average rate needed to become high-income by 2045.

However, such a positive outcome will not be automatic. Investments to the tune of \$368 billion (in net present value terms) between 2022 and 2040 will be required to finance spending on infrastructure, new technologies, and social programs to ensure a “just transition” toward a net-zero emission and climate-resilient economy. These represent estimated investments in today's value using a discount rate of 6 percent as per the World Bank guidelines for economic analysis. Social discount rates are normally used to put a present value on costs and benefits that will occur later. In the context of climate change policy making, they are considered very important for working out how much today's society should invest to limit the impacts of climate change in the future. These investments need to be accompanied by structural and policy reforms, including carbon pricing instruments and other institutional reforms, to promote behavioral change among private and public actors.

# VIETNAM

## faces high costs of climate change



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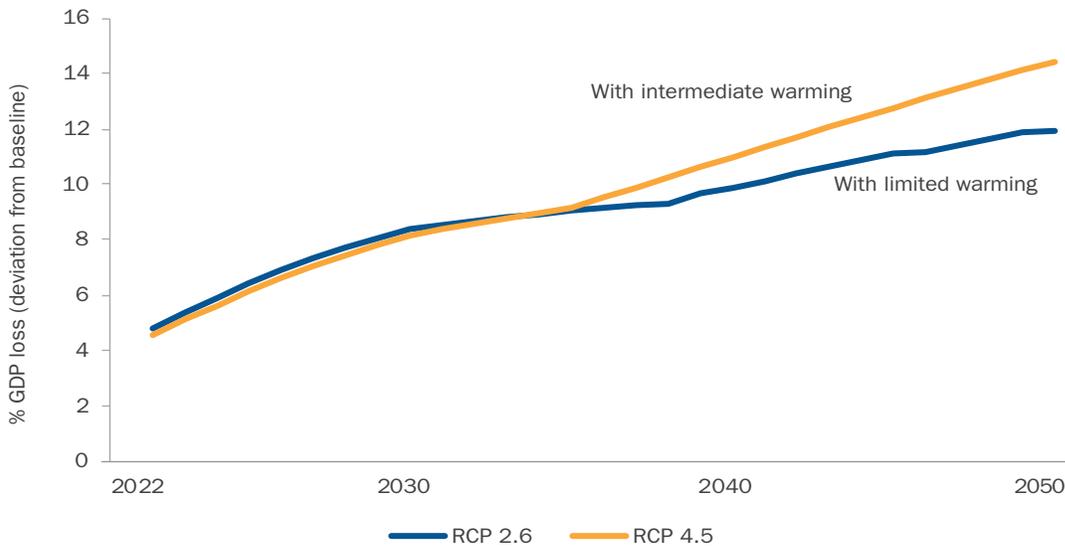
## High Costs of Doing Too Little Too Late

Without rapid adaptation and disaster risk reduction, Vietnam will pay a high cost in terms of damage to the economy and harm to most-vulnerable populations. The vulnerability of poor communities to climate change could result in up to one million more people living in extreme poverty by 2030.

Two forecasting models indicate that total economic losses associated with climate change could reach 12–14.5 percent of GDP per year by 2050, putting huge burdens on both public and private finances (figure 1). The damage will vary across regions:

- In the North, rising temperatures are likely to trigger productivity losses caused by heat stress and shorter plant growth cycles, with severe water shortages curbing annual yields.
- In the Center, coastal areas and cities will be increasingly exposed to flooding from typhoons and tropical storms.
- In the South, the vast Mekong Delta region—where much of the nation’s rice, fruit, and fish is harvested—is particularly at risk from rising sea levels. Almost half the delta will be inundated if sea levels climb by 75–100 centimeters above 1980–99 averages, threatening economic losses from increased salinity and rendering the production of some crops impossible (box 1 and figure 2).

**Figure 1: If nothing is done, the economic losses due to climate change could reach 14.5% of GDP by 2050**



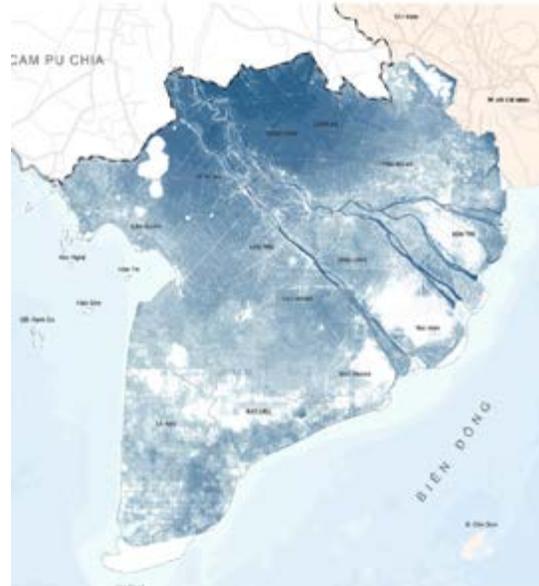
Note: Limited warming is under Scenario RCP 2.6, and intermediate warming is under Scenario RCP 4.5.

### Box 1: Economic Importance of the Mekong Delta

The Mekong Delta contributes:

- 1/3** of Vietnam's agricultural GDP
- 50%** of the country's rice production
- 90%** percent of exported rice
- 65%** of aquaculture production
- 60%** of exported fish
- 70%** of fruit production

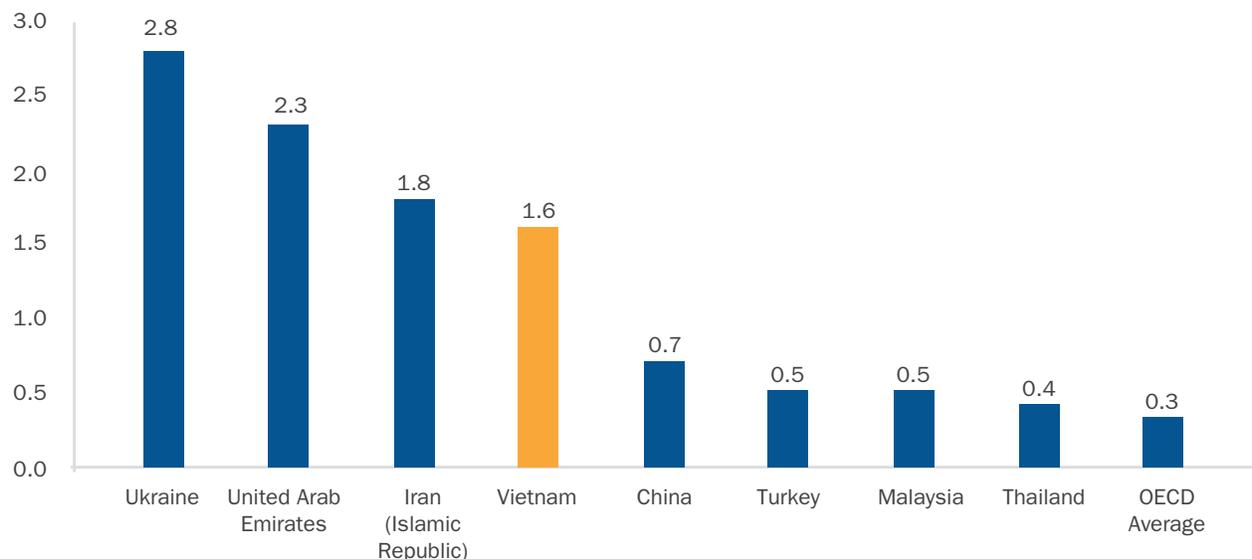
Figure 2: Under water—Almost half of the Mekong Delta region could be flooded at high tide in 2050



Concurrently, rising GHG emissions will increase air pollution, with negative impacts on people's health and labor productivity.

These rising emissions will also affect two key drivers of Vietnam's economic growth: rice production and manufacturing exports. The high carbon footprint of these two sectors will reduce their competitiveness in international markets (figure 3). Key importing markets, such as the European Union, are considering carbon levies at their borders. Foreign direct investment could also fall. Several multinationals, including some operating in Vietnam, have already made commitments to decarbonize in the coming years, which is indicative of future trends.

Figure 3: The carbon intensity of Vietnam's manufacturing exports is more than twice China's



## Developing a Climate-Resilient, Low-Carbon Economy

After more than two decades of steady growth, Vietnam has set an ambitious goal of reaching high-income status by 2045. To reach this goal, Vietnam recognizes the need to shift its economic model and has initiated actions to cope better with climate change and combat rising GHG emissions.

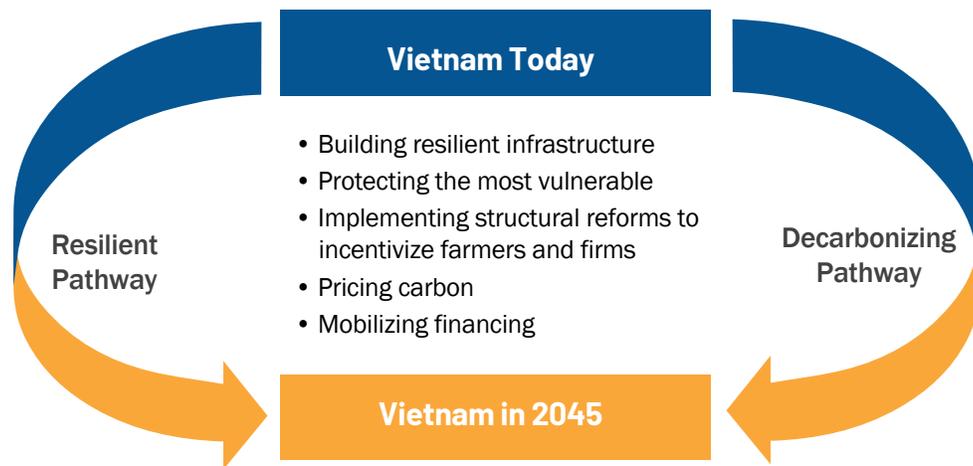
At COP26 in Glasgow in November 2021, Vietnam's Prime Minister made a series of commitments, including a target of net-zero GHG emissions by 2050. The government has started to revamp its planning and legal framework, with an action plan for its green growth strategy. The private sector is also embarking on the energy transition, with record investments in solar energy in the past two years.

Vietnam is among the world's very vulnerable countries, ranked 127 out of 182 by the Notre Dame Global Adaptation Initiative (ND-GAIN), and 13 highest among 180 countries by the Germanwatch Global Climate Risk Index for 2000–19. It is also ill-prepared to cope with extreme events, hotter temperatures, and rising sea levels (ranked 91 of 192 by the ND-GAIN Readiness Index).

Given its high vulnerability to climate change, the adaptation needs cannot be overstated. In fact, the threat of insufficient investments in adaptation is a greater concern than climate mitigation in Vietnam. The country needs to quickly build up the resilience of its natural assets, its infrastructure, and its people.

Overall, Vietnam needs to better balance its development goals with growing climate risks by pursuing two connected pathways of reinforcing resilience and decarbonizing growth.

- **Adapting to Climate Change – the Resilient Pathway:** The high vulnerability of Vietnam's infrastructure, productivity, and social capital to climate risks will limit the country's ability to achieve long-term development goals and will require adaptation measures. Extreme events such as storms and floods, compounded by the degradation of ecosystem services due to the loss of mangroves or wetlands, have already put multiple billions of dollars of the country's assets at risk. Strategic locations, such as the Mekong Delta and Ho Chi Minh City—and economic activities, such as rice farming and industrial parks—are exposed to rising temperatures, shifting rainfall patterns, and saltwater intrusion. Increasing climate resilience is therefore vital to future development. The resilient pathway implies adaptation to climate risks but also the ability to acquire new capabilities and perhaps emerge stronger from climate shocks.
- **Mitigating Climate Change – the Decarbonizing Pathway:** Although Vietnam contributes only about 0.8 percent of global GHG emissions, mitigation measures are still in its national self-interest. Measures that reduce GHG emissions would also abate severe air pollution in the main urban centers, which the World Health Organization estimates to cause about 60,000 deaths annually, imposing large economic costs through health and productivity losses. Multinational companies and consumers in Vietnam's main export markets are shifting toward a low-carbon economy. To remain competitive, Vietnam will need to decarbonize its energy sector and take action in the agriculture, transport, and manufacturing sectors. Decarbonization refers here to the policies being implemented to mitigate climate change as specified in the Paris Agreement.



## Adapting and Building Resilience to Climate Change

**A more resilient economy will protect the country’s private assets, public infrastructure, and people**

Adaptation measures should focus on the country’s most vulnerable sectors and locations, particularly agriculture, transport, trade/industry, coastal areas, and the Mekong Delta region. Significant investments will be needed to upgrade and retrofit public assets and infrastructure. Protective investments to manage rising sea levels will also require substantial financing. And responding to extreme climate events will require upgrading early warning systems and expanding post-disaster assistance.

Complementary policy reforms in the fiscal and financial sectors can stimulate investments from both the public and private sectors. These reforms will have to improve public investment management and intensify coordinated action across provinces to enable economies of scale in designing, implementing, and resourcing infrastructure projects. Horizontal coordination at both central and local levels can align annual budget planning with medium-term investment planning—and recurrent spending (for operation and maintenance) with capital spending. And reliable flows of financing can support the private sector’s adaptation to climate change. Reforming state-owned enterprises and creating a level playing field will be important to encourage greater private sector investment in green technologies and business practices.

Building resilience will not be cheap. Total financing needs are estimated at around \$254 billion from 2022 to 2040 (or approximately 4.7 percent of GDP per year), including about \$219 billion for upgrading private assets and public infrastructure, plus \$35 billion for social programs.

# Mitigating and Heading for Net-Zero

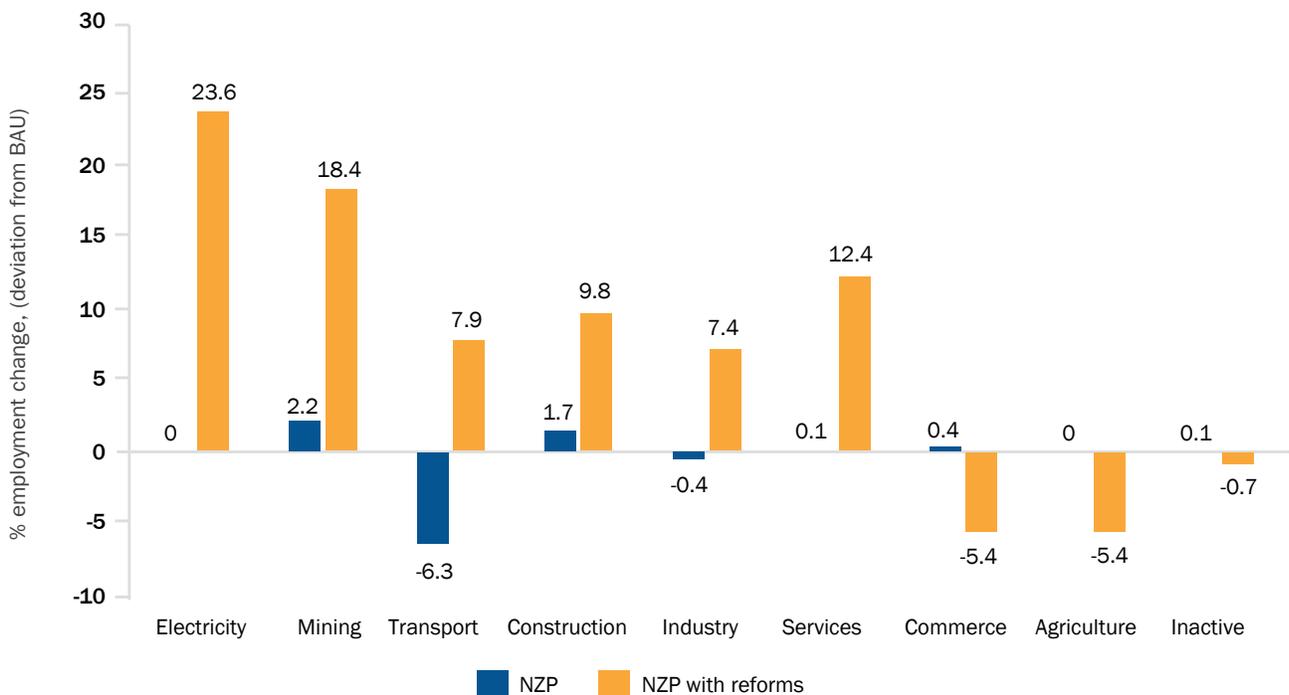
## The decarbonizing pathway will bring Vietnam toward net-zero GHG emissions by 2050

To achieve net-zero, Vietnam will have to make substantial investments in its main emitting sectors: energy, transport, agriculture, and industry. Dynamic strategies will be required to curb emissions, especially in the energy sector, where renewables should be promoted.

Sectoral investments will need to be supported by carbon pricing, either as a tax or an emissions trading system, to incentivize businesses and households to shift their behavior toward low-emitting activities. Pricing instruments will also be required to help finance the technological transition. For example, an increase in the carbon tax to \$29 per ton of carbon dioxide equivalent (tCO<sub>2</sub>e) by 2030 and \$90 per tCO<sub>2</sub>e by 2040, would generate \$80 billion in additional revenue.

While such policies would help Vietnam reduce its GHG emissions, they could also affect the country's growth trajectory and generate changes in the composition of GDP, creating winners and losers. During the transition, special attention must be given to mitigating the impacts of rising electricity prices on vulnerable households. While the net-zero pathway (NZP) is expected to create more jobs, some workers will have to move within sectors (from coal to renewables) or across sectors (from agriculture to services), requiring (re)skilling and employment support (figure 4).

Figure 4: Changes in labor market composition by 2040 thanks to the net-zero pathway



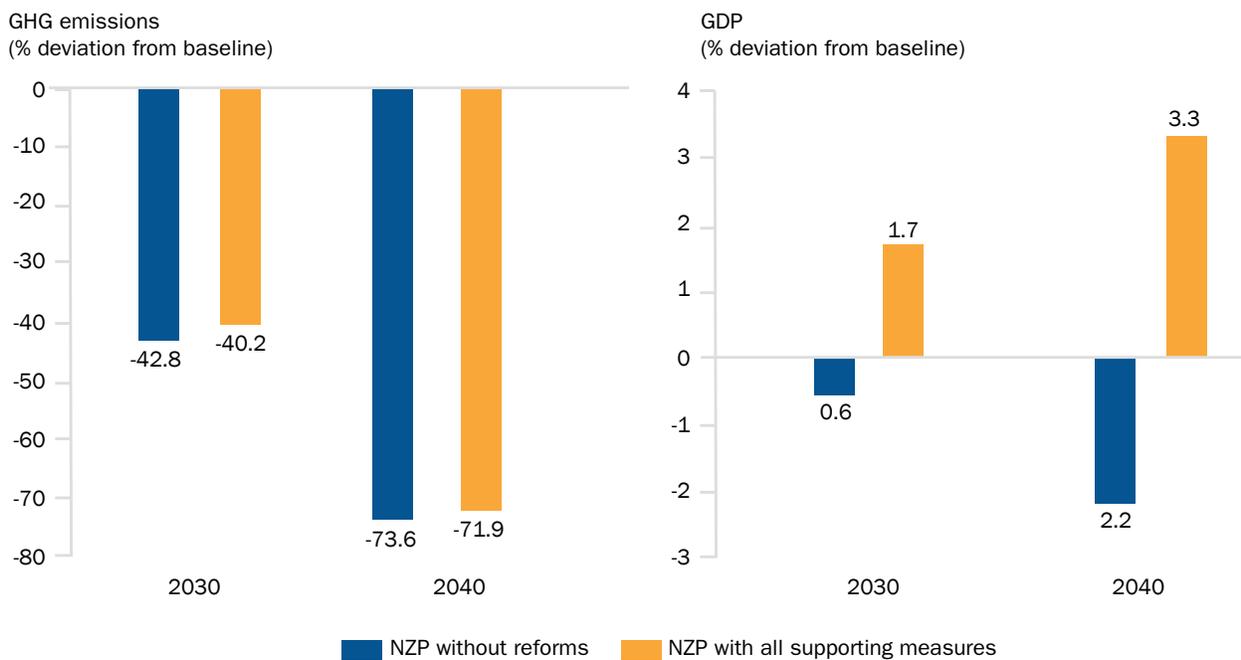
Still, the economic benefits can outweigh the costs if supportive measures reduce local air pollution, improve labor mobility, and bolster Vietnam’s competitiveness in a decarbonizing world. Efficiency improvements and foreign assistance can, in turn, ensure that major investments aimed at decarbonization are not at the expense of other, equally important productive investments.

With the right mix of policies and strategies, Vietnam can leverage its decarbonization efforts to advance development objectives, so that achieving net-zero does not reduce GDP growth (figure 5). Proactive measures would include:

- Improving energy efficiency.
- Reducing air pollution and maximizing health benefits.
- Improving domestic labor market mobility to facilitate the movements of workers within and across sectors.
- Bolstering international competitiveness through partnerships with exporting companies to reduce the carbon footprint along value chains.
- Reducing the impact on other investments by making public spending more efficient.

On the decarbonizing pathway, total financing needs amount to \$114 billion from 2022 to 2040 (or 2.1 percent of GDP per year), mainly to support the energy transition (about \$64 billion in new investments in renewables and to compensate for stranded assets)—and to a lesser extent in industry, transport, and agriculture (\$17 billion), and in supportive social programs (\$33 billion).

**Figure 5: The net-zero pathway (NZP), with and without supportive measures, will affect the country’s growth trajectory**



## Way Forward—Top Priorities

This CCDR presents a set of **five priority policy packages** that require the most immediate attention by government and the most urgent public and private investments to achieve Vietnam’s adaptation and mitigation goals.

- **Priority Package #1: A coordinated regional program for the Mekong Delta.**<sup>1</sup> This program should focus on stemming land subsidence and saltwater intrusion by curtailing sandmining and groundwater extraction, adapting farming practices, increasing freshwater flow and aquifer recharge, and restoring mangroves. Existing physical assets should also be retrofitted to become less vulnerable to inundation, while the Land Law, including on land use planning, should be amended to prevent further encroachment on natural vegetation cover. Moreover, new developments should account for climate risks through systematic environmental assessments. All these measures will require strengthening the Regional Coordination Council and correcting the deficit in public investment of the recent past. They will also involve revising existing transfers from the central to local governments, while encouraging the use of specific instruments, such as green bonds, to finance new projects.
- **Priority Package #2: An integrated coastal resilience investment program for main urban centers and connecting infrastructure.** Central coastal areas are prone to extreme weather events, highlighting the need to upgrade road and power assets to climate-resilient design standards. Building the resilience of coastal areas will also depend on effective land-use planning and investments in afforestation. Special emphasis should be on strengthening and enforcing policies and regulations for industry resilience, including in industrial parks, and envisioning relocation when necessary. Cities should invest more in digital technologies for improving weather-risk management and early warning systems. In addition, since it is impossible to eliminate all risks, expanding the use of insurance and risk-hedging instruments should be priorities.
- **Priority Package #3: A targeted air pollution reduction program in the Hanoi airshed to reach the WHO interim target by 2030 and enhance labor productivity gains.** Data from the World Air Quality Report indicates that air pollution in the capital city already exceeded the WHO 2.5 guideline by at least five times for half of the year between 2018 and 2021.<sup>2</sup> PM2.5 concentrations are predicted to increase, given the absence of adequate air pollution regulations and the planned expansion of coal capacity. According to government plans, 10 new coal-fired power plants will be put in operation in the Northern region by 2030. Agricultural pollution is also expected to grow in the absence of policies targeting agricultural residue burning and fertilizer use. Effective improvements in Hanoi’s air quality will require urgent actions in close coordination with neighboring provinces. Priorities should include reducing the reliance on coal—for example, by repurposing the 100 MW plant in Ninh Binh. Other measures will have to be put in place to incentivize farmers to use fewer polluting inputs and burn less waste, improve public transportation systems, and apply tougher standards on motor vehicle emissions.

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1 The CCDR focuses on interventions under the responsibility of Vietnam, but strong coordination will be required with other riparian countries of the Mekong River Basin to ensure a proper flow of the river and reduce impoundment of sediment by river dams.

2 IQAir, 2021: World Air Quality Report.

- **Priority Package #4: Acceleration of the clean energy transition.** The energy sector accounts for about 60 percent of the country's GHG emissions, and the government is currently working to align investments in the power sector with its COP26 net-zero commitment. This is an immediate task, given the lead time for implementing energy sector investments. Renewable energy deployment (in particular, offshore wind) could be accelerated by improving the regulatory framework, including transparent and competitive procurement procedures (auctions), to encourage private sector participation. Bankable power purchase agreements aligned with international standards can mobilize much-needed private investment in the sector. Ensuring investments in the capacity of the power grid, which can provide flexibility to absorb additional renewable energy will be important. Accelerating implementation of energy efficiency plans—including through effective pricing policies such as a carbon tax or an emissions trading system—is also a priority. In addition, encouraging low-carbon energy sources by monitoring the carbon footprint of large private companies, including along their value chains, will be vital. Many companies have already committed to their own net-zero targets. The government could link support to state-owned enterprises with actions that accelerate low-carbon energy consumption.
- **Priority Package #5: A new social contract to protect the most vulnerable people.** Climate change tends to disproportionately affect poorer households in vulnerable areas or those less prepared to cope with the consequences. Some of the mitigation actions proposed above could also have a regressive impact, such as through the broadening of carbon tax or the greater inability of unskilled workers to secure a new job during the transition to cleaner technologies. As part of the government's program, implementing a modern, scaled-up adaptive social safety net can improve the effectiveness of post-disaster assistance. The priority should be to protect the most vulnerable segments of the population against price increases in transport and energy that will result from the energy transition and the use of carbon pricing instruments. This could be achieved by transferring part of the carbon tax revenue to social programs. Investment will also be needed in skills development programs to support workers exiting the labor market involuntarily. Beyond this, a comprehensive national skills program should be developed to correct skills mismatches in green industries by reforming educational training. Protecting the most vulnerable must be underpinned by advance information and citizen participation in public debates about the adaptation and mitigation measures envisaged nationally and locally.

Efficient implementation will require institutional reforms to address the political economy risks and the fragmentation of decision-making that may slow implementation along the twin pathways.

Top institutional priorities include:

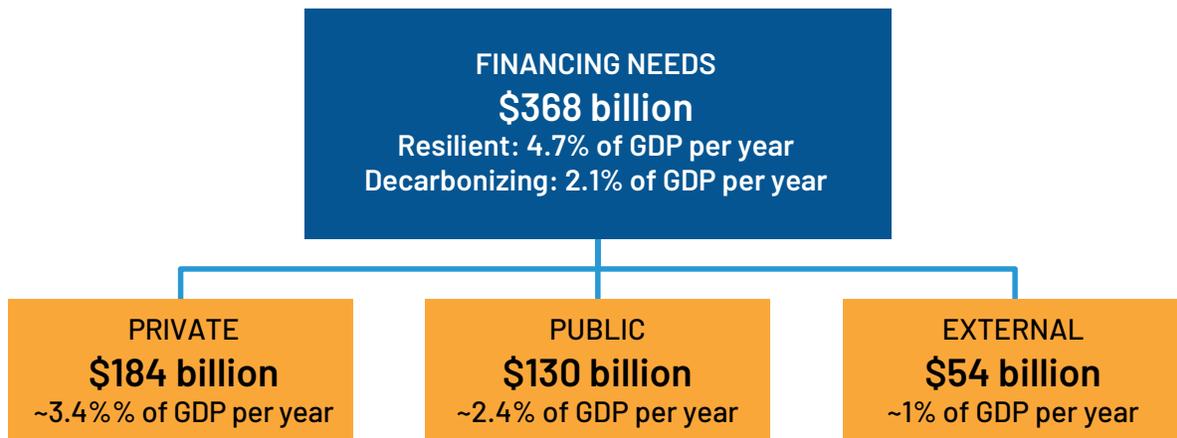
1. Strengthening the leadership of the Prime Minister's National Climate Change Committee that should coordinate actions within the government, including by harmonizing various existing climate strategies and assigning clearer responsibilities.
2. Establishing new institutional frameworks for addressing cross-provincial climate challenges such as the vulnerability of the Mekong Delta and the air pollution in the Hanoi metropolitan region.

## Who Will Pay?

**How will this ambitious plan be paid for? Mobilizing domestic finance is possible but external support is needed**

Overall, Vietnam’s total incremental financing needs for the resilient and decarbonizing pathways could reach \$368 billion over 2022–2040, or approximately 6.8 percent of GDP per year (figure 6). The resilient pathway alone will account for about two-thirds of this amount as substantial financing will be required to protect the country’s assets and infrastructure as well as vulnerable people. The cost of the decarbonizing pathway will mainly arise from the energy sector—investments in renewables and managing the transition away from coal might cost around \$64 billion between 2022 and 2040. All the figures are in net present value terms at a discount rate of 6 percent.

**Figure 6: Meeting Vietnam’s financing needs requires external support**



Satisfying the funding gap associated with implementing the resilient and decarbonizing pathways will require a reallocation of domestic private savings toward climate-related projects, an increase in public savings, and external financial support.

Aggressive efforts could help mobilize private financing in the range of 3.4 percent of GDP per year. This can be achieved by mobilizing green credit by banks, developing market-based instruments such as green equities and green bonds, and applying de-risking tools. Green finance is in its infancy in Vietnam, and public policy has an important role in helping banks overcome internal and external bottlenecks through regulatory reforms and incentives to both credit providers and borrowers.

This CCDR suggests that about 2.4 percent of GDP per year can be financed from the additional revenue generated by the carbon tax (1.4–1.5 percent of GDP per year) and by borrowing in domestic markets. It will be important to keep public debt within the limit required to avoid future debt distress for the government. External financing can come from institutional investors and multilateral and bilateral donors, in addition to tapping foreign direct investment and inward remittances. Creating a climate fund to mobilize potential international private and public funders to support Vietnam’s COP26 commitments could facilitate investment management.











