



EUROPE AND
CENTRAL ASIA

TÜRKIYE

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

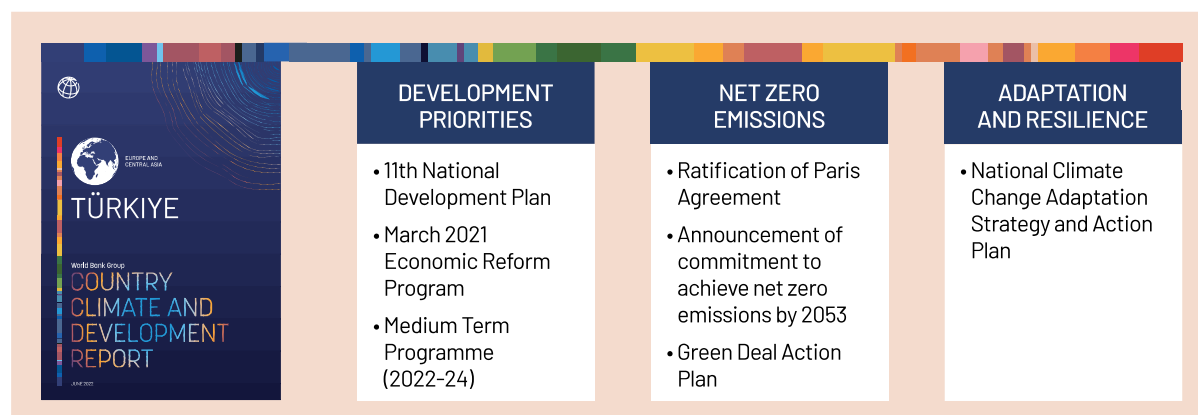
EXECUTIVE SUMMARY

Executive summary

As a country that faces significant vulnerability to the impacts of climate change, Türkiye has made ambitious climate change commitments, ratifying the Paris Agreement in October 2021 and committing to net zero emissions by 2053. The country is establishing new institutional arrangements for climate change issues, including the recently formed Ministry of Environment, Urbanization and Climate Change (MoEUCC), and is updating its National Climate Change Action Plan. The intensification of climate-related events in recent years—including floods, forest fires, and sea pollution—and the potential implications of the European Union (EU) Green Deal for Türkiye’s economy have contributed to the urgency of the country’s climate change agenda. Most recently, the war in Ukraine and attendant energy supply disruptions and price increases highlight risks for countries like Türkiye that rely on fossil fuel imports, underscoring the urgency of climate action in support of energy security and affordability.

This Country Climate and Development Report (CCDR) explores opportunities and trade-offs for aligning Türkiye’s development goals with its recent commitments on climate change. It explores how climate action—in line with the country’s mitigation goal of achieving net zero emissions by 2053 as well as its adaptation and resilience needs—would affect Türkiye’s growth and development. It looks at how climate action can help achieve the country’s development objectives, capture opportunities offered by green technologies and sectors, protect the economy against longer-term risks, such as large-scale disasters or carbon lock-in as the world transitions toward reduced greenhouse gas emissions, and support a just and inclusive transition (figure S.1).

Figure S.1: Türkiye’s development and climate objectives

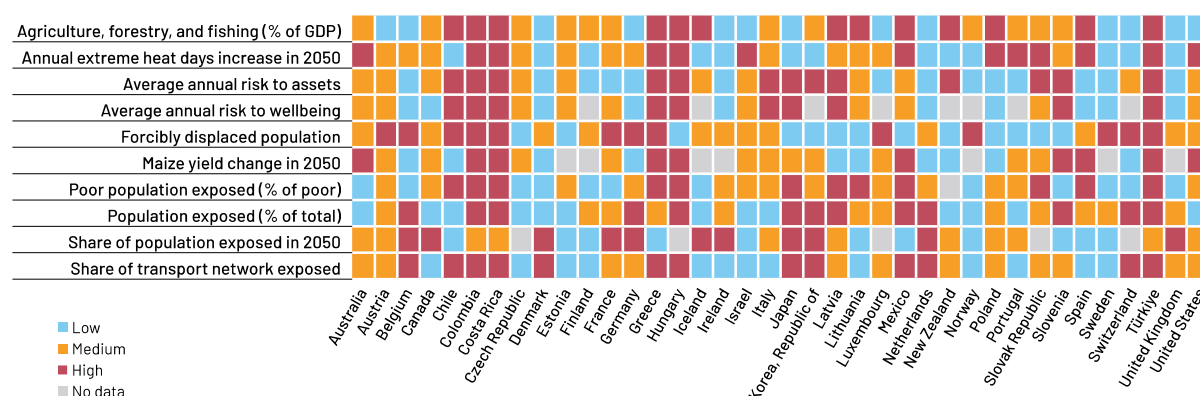


Türkiye has made considerable development progress since 1990, but macrofinancial volatility jeopardizes future progress. Rapid economic growth tripled income per capita to a peak of \$12,000 in 2015, making Türkiye the world’s 19th largest economy. However, since 2016, macroeconomic shocks and adverse geopolitical events have slowed the country’s development progress. Unemployment has remained high—over 10 percent since 2015—and is compounded by low labor force participation, especially for women and youth. High labor informality persists, and, with a few exceptions, jobs are growing faster in low-productivity sectors. Foreign direct investment is estimated to have dropped from over 3 percent of gross domestic product (GDP) in 2008 to around 1 percent in 2019, with more than half going to real estate in the last two years. Low capital growth combined with low and declining total factor productivity growth have lowered potential growth to around 4 percent in 2021. In April 2022, consumer and producer price inflation reached a two-decade high of 70 and 122 percent year-over-year, respectively. While gross general government debt to GDP fell to a low of 28 percent in 2016, currency depreciation, COVID-19 outlays, and rising borrowing costs drove it to 42 percent in 2021, narrowing the government’s fiscal space.

Although the increase in Türkiye’s greenhouse gas (GHG) emissions has been slower than economic growth and its per capita emissions are lower than in the Organisation for Economic Co-operation (OECD) or EU countries, there is a strong case for a forceful mitigation agenda in Türkiye. The energy sector—which includes the power, transport, building, and industrial sectors—is the country’s single largest contributor to GHG emissions, accounting for three-quarters of total emissions. Türkiye’s power, transport, and agriculture sectors are less carbon-intensive than the EU average—partly due to the large penetration of renewable energy (RE) in Türkiye’s power system and low motorization rates. However, coal dependency is high and set to increase further under current investment plans. And the building sector (residential and non-residential) is less energy-efficient than the EU average. Manufacturing is more carbon-intensive than the EU average, exposing Türkiye to risks if the EU introduces the Carbon Border Adjustment Mechanism (CBAM). Türkiye’s forested landscapes act as carbon sinks, reducing the country’s net carbon emissions.

Türkiye’s geographic, climatic, and socioeconomic conditions make it highly vulnerable to the impacts of climate change and other environmental hazards, making adaptation and resilience high priorities. Türkiye has high vulnerability in 9 of 10 climate vulnerability dimensions, compared with a median of 2 of 10 in other OECD countries (figure S.2). Its transport system is more vulnerable than those of comparable countries, and the country is experiencing food security issues, increasing water stress, and unprecedented disaster events, such as the 2021 forest fire season. This vulnerability is due to a combination of climate factors, population exposure (for example, the share of the population exposed to floods and forest fires), and socioeconomic factors (such as the share of agriculture in the economy).

Figure S.2: Climate risk and vulnerability in Türkiye and other OECD countries



Notes: Countries are rated using a benchmark approach: those rated at high risk (red) are in the top third, medium risk (yellow) are in the middle third, and low risk (blue) are in the lowest third.

A resilient and net zero pathway can help Türkiye achieve its development and climate objectives but implies a significant departure from current trends and important policy changes

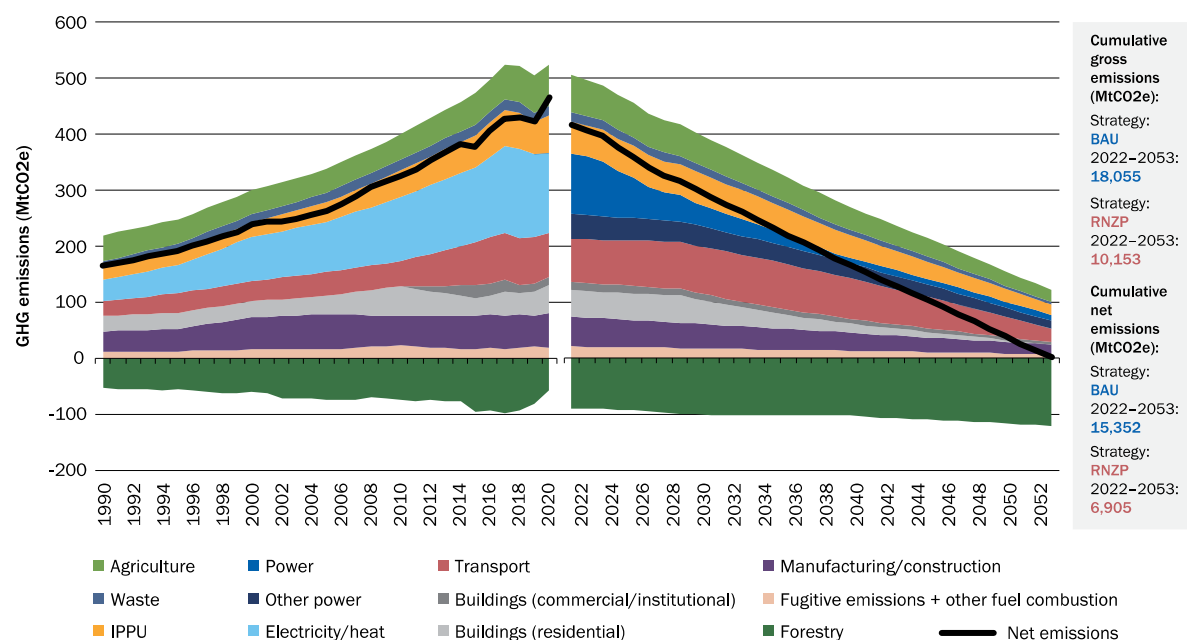
There are multiple possible paths for aligning Türkiye’s development and climate objectives. To explore feasibility, costs, and benefits, we developed an illustrative resilient and net zero pathway (RNZP) that combines adaptation and resilience actions with the 2053 net zero pledge. The RNZP is based on two main principles:

- **Boosting resilience and adaptation requires a whole-of-economy strategy and a supportive socioeconomic environment.** The RNZP prioritizes supporting adaptation in the private sector by ensuring access to information, technology, and finance. It includes actions to enhance the resilience of critical public assets and services, agriculture systems and land use plans, water

resource management, and financial resilience (including insurance and adaptive social protection and the integration of climate and disaster risks in macroeconomic and fiscal policies).

- **Türkiye can achieve its 2053 net zero emissions target (figure S.3) but this will require major changes in many economic sectors.** The transformation includes deep decarbonization of the power sector; a combination of energy efficiency and electrification in buildings; modal shift, energy efficiency, and electrification in transport; a change in current practices to maximize carbon sequestration from forest landscapes; and emissions reduction efforts in the rest of the economy (including industries, agriculture, waste management, and water management).

Figure S.3: Historical emissions (left) and RNZP emissions (right)



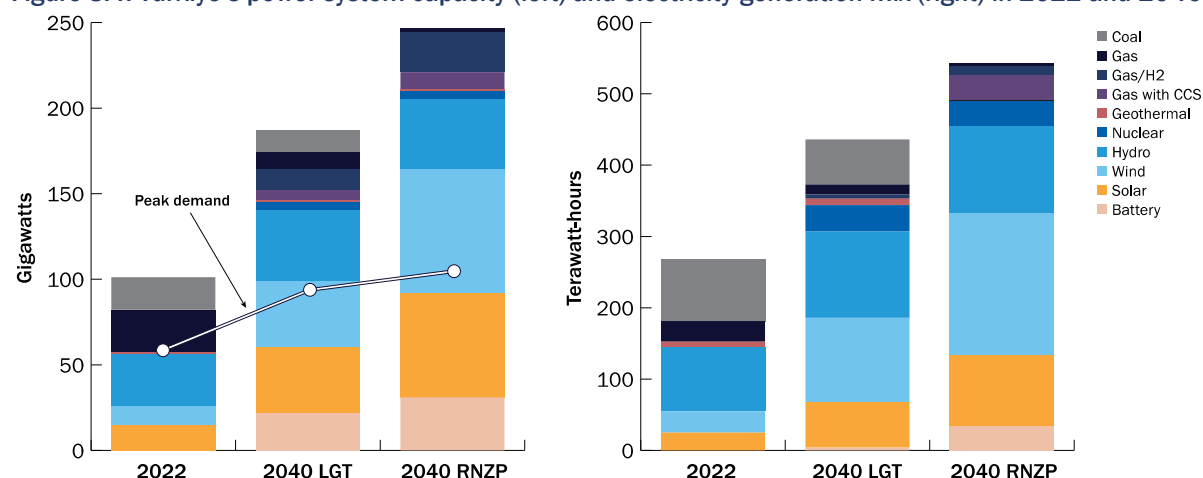
Notes: BAU = business as usual; RNZP = resilient and net zero pathway.

The RNZP emphasizes several priority areas for boosting economy-wide resilience and adaptation.

These include the need to facilitate adaptation by firms and people, for example by expanding public provision of climate and disaster risk information; adapting land use plans and protecting critical public assets and services, including strengthening resilience to severe and growing water-related risks; and mainstreaming adaptation, resilience, and disaster risk finance in macrofiscal policies, including by assessing the economic costs of climate change and disasters, and reflecting contingent liabilities in fiscal policies, budget allocation, and public investment.

In the RNZP, emissions from the power sector are significantly reduced by 2040, despite an increase in demand from electrification of end-use sectors (figure S.4). Even without a carbon constraint, new coal power plants are neither needed nor the least-cost option to meet growing electricity demand. Instead, Türkiye can achieve energy security through an accelerated pace of least-cost investments in domestic solar and wind—building on its track record of tripling renewable energy capacity in the last decade—and investing in energy efficiency, battery and pumped storage, geothermal, and gas generation with carbon capture and storage (as well as completion of the nuclear plant under construction). This would enable the country to meet a doubling of energy demand by 2053 to fuel its growth ambitions, with the added benefit of lowering emissions and improving energy security by reducing reliance on imported coal, gas, and oil.

Figure S.4: Türkiye's power system capacity (left) and electricity generation mix (right) in 2022 and 2040



Note: LGT = least-cost option including plants under construction and the government's RE target but with no emissions constraint; RNZP = resilient and net zero pathway.

By enabling Türkiye to achieve net zero emissions with significant residual emissions in hard-to-abate sectors, negative emissions from forest landscapes play a key role in the RNZP, but they also create risks. Forest carbon storage is vulnerable to economic and climatic factors, such as forest fires. A robust strategy toward net zero must therefore consider how to do more in emitting sectors if negative emissions from forests prove impossible—for example, due to increasingly frequent forest fires.

Achieving Türkiye's climate commitments would yield net economic gains, but require large public and private investments

The RNZP illustrates the feasibility and overall benefits of aligning development with climate-related goals. As Türkiye imports 99 percent of its gas and 93 percent of its oil, energy efficiency and renewable energy could generate major benefits by reducing air pollution, energy imports and expenditure, and vulnerability to disruptions in global energy markets. When all costs and co-benefits are accounted for, the net economic impact of the RNZP is positive over 2022–30, and it increases when considering longer-term horizons: the RNZP leads to a net \$15 billion gain over 2022–30 and a \$146 billion gain over 2022–40, largely due to reduced fuel imports and health benefits from decreasing air pollution (table S.1).

Large investments would be required, but remain manageable, when compared with the size of the Turkish economy. Compared with the baseline scenario that does not include climate objectives, Türkiye would need to invest an additional \$68 billion over 2022–30 (in present value terms) in the RNZP; that is 1.0 percent of discounted cumulative GDP over the period. Over 2022–40, this number grows to \$165 billion, or 1.2 percent of discounted cumulative GDP. These investments add 21 percent to the existing \$319 billion needed over 2022–30 in key sectors: power (\$52 billion), residential (\$243 billion), and transport (\$24 billion), and 34 percent to the \$482 billion needed over 2022–40.

We can expect about half of these investments to come from the private sector. The ability to mobilize private capital depends on the macroeconomic context, sectoral regulations, financial sector deepening, and access to long-term capital. While the World Bank Group's forthcoming Country Private Sector Diagnostic (CPSD) will investigate these opportunities in more detail, this CCDR uses assumptions based on current shares of private investments, the need for publicly funded incentives to redirect and trigger private investments (for example, the public sector would provide half of the

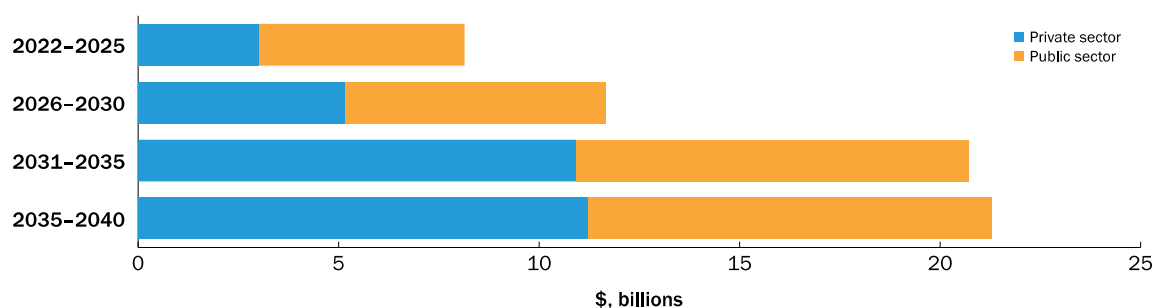
financing needed for residential buildings to attract the rest from private sources), and the needs for compensation and social expenditures, especially to manage the consequences of early closing of coal power plants and mines. With these assumptions—equivalent to a broadly 50-50 public-private investment split on average—the analysis finds that additional annual (undiscounted) public investment needs for the RNZP could be around \$5 billion until 2025, and \$6 billion by 2030 (figure S.5). These estimates can be compared with the 2020 public investment budget, which covers all sectors and totals 2.6 percent of GDP, or around \$18 billion per year.

Table S.1: Investment needs and economic costs in the RNZP (additional compared with baseline)

	2022–30 (\$, billions)	2022–40 (\$, billions)
POWER		
Additional investment: new generation and storage capacity	+5	+33
Additional investment: transmission and distribution	+8	+14
Other economic costs: operational and fuel costs	-9	-23
Other economic costs: air pollution externality costs from coal	-9	-38
Other economic costs: decommissioning of coal plants and mines	< +1	+1.4
RESIDENTIAL		
Additional investment: energy efficiency, electrification, and resilience	+45	+100
Other economic costs: gas imports	-11	-46
Other economic costs: lives lost and injuries	-1	-3
TRANSPORT		
Additional investment: new resilient infrastructure	+8	+15
Other economic costs: fuel imports	-12	-36
Other economic costs: cost of disruptions	-3	-11
Other economic costs: air pollution, congestion, and road fatalities	-40	-171
FOREST LANDSCAPES		
Additional investment: restoration, reforestation, and fire management	+2	+3
Other economic costs: loss of harvest revenues	+1	+5
AGRICULTURE		
Other economic costs: on-farm emissions reductions	< +1	-
INDUSTRY AND MANUFACTURING		
Other economic costs: cement, iron, and steel	-	+11
TOTAL INVESTMENTS AND ECONOMIC COSTS		
Net economic costs	-15	-146
includes: additional investment	68	165

Notes: All amounts are discounted using a 6 percent discount rate. Decommissioning costs do not include the social expenditures to facilitate the transition of affected workers and communities. Numbers in red are net costs; numbers in green are net benefits.

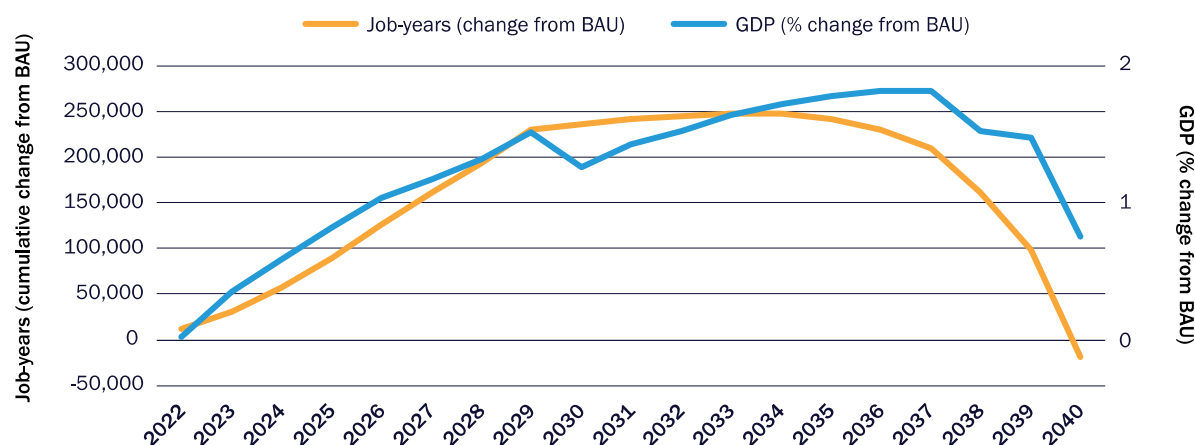
Figure S.5: Additional annual investment needs for the RNZP



Integrating development and climate objectives would lead to higher growth and employment, but could create significant transition challenges for exposed sectors and their workers

Even without considering benefits from avoided climate change impacts, we expect the RNZP to increase GDP growth and employment, thanks to large investments, energy efficiency, technological upgrading, and reduced fuel costs (figure S.6). Türkiye's GDP grows faster in the RNZP, in which sectoral roadmaps are combined with economy-wide interventions, including carbon taxes with appropriate recycling. However, this growth benefit would be lower if carbon tax revenues are not recycled in a way that supports private sector investment and if additional investments in the RNZP crowd out other investments. Growth benefits are also markedly lower after 2035, as decarbonization of the power system gradually leads to higher electricity prices. The net impact on jobs is small, with 230,000 more jobs in 2030 in the RNZP, but with the growth slowdown after 2035 erasing these gains.

Figure S.6: Impact of the RNZP transition on GDP (right axis) and cumulative jobs (left axis), 2022–40



Note: BAU = business as usual; GDP = gross domestic product.

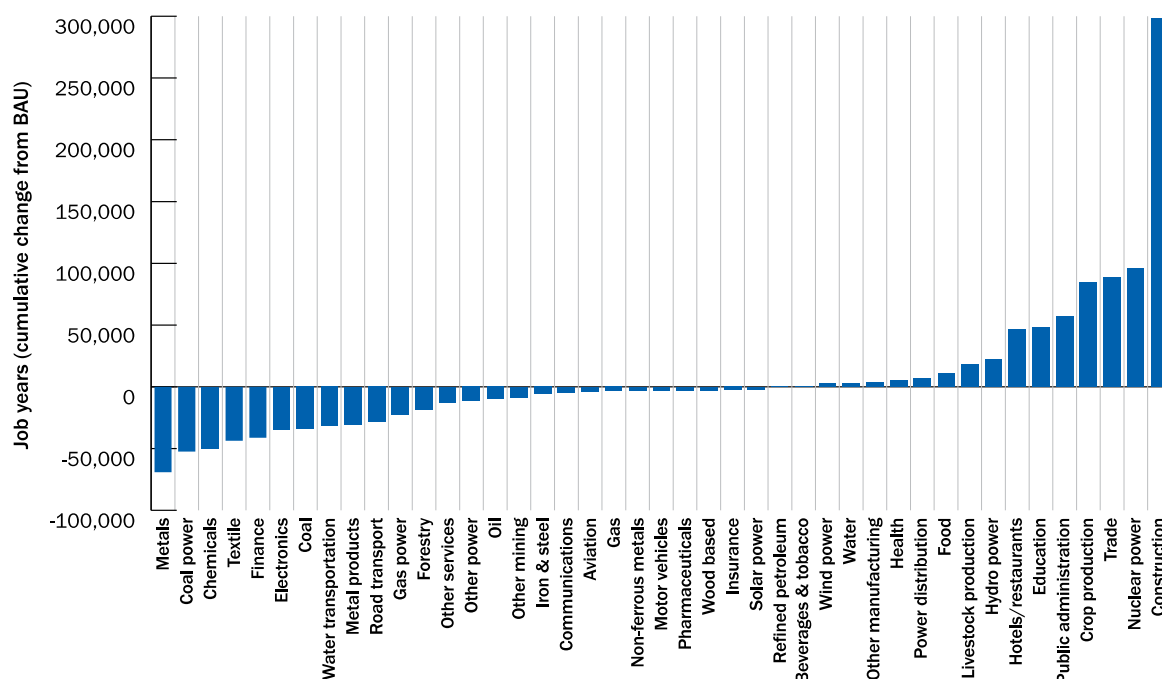
While the additional investments needed are significant, their overall impacts on the fiscal and external balances are relatively small. The analysis shows that additional investments raise capital and related imports, but savings in oil and gas imports offset these in the current account balance. Public debt levels in the RNZP rise by 1 to 3 percentage points of GDP compared with a baseline scenario, as government revenues from a carbon tax help offset borrowing for investment needs. This provides an indication of the fiscal space the government has should it choose to save less and instead take on a larger share of the total investment needed in capital and innovation to support the transition. Macroeconomic stability is essential to preserving this fiscal space and fostering private sector investments.

The impacts of decarbonization on consumption are positive. Policy makers need to pay careful attention to housing affordability, food security, electricity prices, mobility, and access to jobs and services. We expect the impact on inflation to be limited, with the effect on food and manufacturing prices under 1 percent in 2030 and below 2.5 percent in 2040. Additional carbon tax revenues can be used to compensate low-income households for adverse impacts, such as a rise in energy prices. With 13 percent of the carbon tax revenues recycled as cash transfers, all household income classes would benefit.

Decoupling emissions from growth involves economic restructuring and changes in labor demand, which poses challenges to a just and inclusive transition. Although Türkiye's green transition likely

will create new jobs in environmentally friendly production, it will also place other jobs at risk, particularly in sectors with fewer options for transitioning to more sustainable ways of production (figure S.7). And this transition will affect a country with already significant social challenges, including those linked to the recent rise in poverty (with over 10 million people now below the poverty line), the world’s largest refugee population, and low female labor force participation (the lowest among OECD countries). Türkiye’s lower share of green jobs and its higher share of jobs that require upskilling compared with its peers also make it a challenge to upgrade the skills of its workforce. Ensuring a just and inclusive transition will require careful management of economic and labor market adjustments, investments in human capital and education, strong and adaptive social protection systems, and targeted interventions for retraining and reskilling.

Figure S.7: Impact of the RNZP on labor demand by sector, 2022–30



Note: BAU = business as usual.

The advantages of pursuing the RNZP are greater if we account for global decarbonization trends and the benefits of retaining access to global markets and participating in global value chains. Climate action in other countries will affect Türkiye through changes in global demand, technologies in global value chains, and trade rules. The impacts of the EU’s CBAM will be significant on a few emission-intensive industries that have high trade exposure to the EU market. Some of these industries will face lower output and employment, requiring action to facilitate structural adjustments both within and between sectors. But the aggregate macroeconomic impacts of an EU CBAM will be limited.

Türkiye’s firms have a relatively high degree of sophistication, as reflected in their integration in global value chains and growing value-added from exports, and the country has large potential in green global value chains. The CBAM creates an opportunity for Türkiye to benefit in markets where competitors are more carbon-intensive, especially if the country makes increasing efforts on energy efficiency in industries and on the performance of the logistics system. Türkiye is already well integrated in electric mobility value chains and has significant opportunities to participate in the global solar and wind energy value chains, a topic that will be explored in the forthcoming CPSD.

This CCDR also looks at how natural risks may affect the economy, though it does not account for all threats. Analysis of floods and earthquakes¹ shows that, while there are large short-term welfare costs after big events, they are manageable in the long run, with total GDP losses in 2100 below 1.6 percent of GDP in 95 percent of the simulated scenarios. However, impacts on poor and vulnerable populations can be substantial, with the risk of a significant increase in transient poverty after large shocks. While floods and earthquake risks are widely distributed across the country’s population, wildfire and food security risks mostly affect the poorest.

Climate change threatens agricultural productivity, rural incomes and employment, and food security, especially through its impact on water scarcity. The Global Food Security Index ranks Türkiye 47th for overall food security. Climate change patterns are expected to significantly impact yields, especially through increased water scarcity, and to pose challenges to the sustainability of Türkiye’s fisheries and aquaculture. A 10 percent reduction in water supply could cost Türkiye 6 percent of GDP, about \$50 billion. This would exacerbate food price pressures and overall food security concerns. Lower-income populations would be most affected, since the share of income they spend on food is three times larger than the richest households. Impacts on the tourism industry are also likely to affect incomes and growth. Assessment of these impacts, as well as adaptation priorities, is a priority for future work.

Short-term priorities include “no regret” options that contribute to growth and climate objectives, but also difficult changes in a few key sectors

Delaying some interventions could reduce short-term transition costs, allowing Türkiye to benefit from the decline in green technology costs and adjust its strategy as more information becomes available (table S.2). For example, while electrifying residential heat and other energy use is needed to achieve net zero emissions, doing so immediately magnifies the challenge of decarbonizing the power system. In contrast, the cost of electrifying existing buildings is manageable, so delaying this action until 2030 would allow Türkiye to benefit from cheaper technologies (heat pumps, induction cooking) and less carbon-intensive electricity. Similarly, completely decarbonizing Türkiye’s carbon-intensive industry will require new technologies, such as hydrogen-based steel making and carbon capture and storage, but widespread implementation of these technologies is more realistic after 2030.

Table S.2: Illustrative list of policies, classified according to urgency and synergies with short-term growth

	More urgent	Less urgent
Growth policies	<ul style="list-style-type: none"> • Macroeconomic stability, human capital and social protection, institution strengthening 	
Synergies	<ul style="list-style-type: none"> • Investing in energy storage and renewable energy (including transmission, distribution, and integration); removal of fossil fuel subsidies • Modal shift and efficiency gains in passenger transport and freight • Energy efficiency in industries, especially carbon- or energy-intensive ones • Improving decision making for more resilient infrastructure • Improving water management (efficiency, irrigation, drainage, diversification) • Improving waste management (for resilience and carbon emissions) • Shifting toward climate-smart agriculture (and fisheries) and repurposing support in the sector • Green finance and disaster risk financial protection 	
Trade-offs	<ul style="list-style-type: none"> • Exit from coal and just transition • Energy efficiency and resilience in buildings • Sustainable forestry practices • Pilot projects for carbon capture and storage and low-carbon technologies in industries (e.g., hydrogen) 	<ul style="list-style-type: none"> • Electrification of buildings • Low-carbon technologies to reduce industrial processes and product use

¹ While earthquakes are not a climate hazard, most policies and measures to manage risks—from construction standards to disaster risk finance instruments—have to consider the full range of threats in their design, especially in a country that is as exposed to earthquake risks as Türkiye.

Some changes are urgent, because current trends are creating lock-ins into carbon-intensive patterns that will increase costs and create financial risks, such as stranded assets. Particularly urgent is the need to realign current energy policies. This includes ending the costly support to domestic production and consumption of indigenous coal and stopping the construction of new coal power plants, which would be at high risk of becoming stranded assets before the end of their lifetimes.² It would also require significant upscaling of renewable energy with a diversified power mix—including wind, solar, hydropower, geothermal, gas generation with carbon capture and storage, and nuclear—as well as investments in energy storage, particularly battery energy storage, which the country has yet to start investing in. This clean energy transition is necessary to achieve the government’s net zero target, and it would contribute to reducing dependency on imported energy without compromising energy security. It would also reduce exposure to geopolitical risks and energy price volatility on global and regional markets.

Other changes are urgent in sectors with long-lifetime assets, technological inertia, or declining natural capital. This includes action to improve energy efficiency in new residential buildings, which would reduce energy costs and retrofitting needs, be synergetic with increasing resilience to earthquakes and high temperatures, and facilitate the decarbonization of the power system. Similar interventions to support energy efficiency in carbon- or energy-intensive sectors would improve external competitiveness and productivity and help Türkiye’s economy prepare for future climate-related trade policies implemented by its main trade partners. For technologies to decarbonize heavy industries to be available and cost-competitive by 2030, investments in research and development and in pilot projects—including identifying sequestration opportunities—should start immediately. Supporting a modal shift toward rail, public transit, and soft modes (such as cycling and walking) requires early action on transport infrastructure and supportive, risk-informed urban planning with transit-oriented development. Finally, growing climate and disaster risks make adaptation and resilience interventions equally urgent, such as improved water management and agriculture practices to preserve water resources and productive soils.

Table S.3. Summary of sample 2030 sectoral milestones for the illustrative RNZP

SECTOR	2030 MILESTONES
Power 27% of total gross emissions in 2020	<ul style="list-style-type: none"> 75% share of RE in power generation (42% in 2020) 37% share of variable RE in power generation (12% in 2020) 9% share of coal in power generation (32% in 2020) 10 GW battery storage capacity (0 GW in 2020)
Transport 15% of total gross emissions in 2020	<ul style="list-style-type: none"> Share of rail in total freight transport: 8% (4% in 2020) Public transit (buses and rail) modal share for surface transport: 49% (47% in 2020) Electrification of cars and buses: 12% and 19%, respectively (both 0% in 2020) New investments screened for risks; critical assets identified and strengthened
Buildings 12% of total gross emissions in 2020	<ul style="list-style-type: none"> New and retrofitted buildings to achieve Class A energy rating (Class C in 2021) From 2030, electrification of new and retrofitted residential buildings Combined seismic and energy retrofit of 2.5 million residential buildings 100% of urban plans updated to account for future climate risks
Forest landscapes Carbon sequestration offsetting 11% of gross emissions in 2020	<ul style="list-style-type: none"> Harvest rate 24.3 million m³ (26.0 million m³ in 2020) Zero deforestation after 2022 Average burnt area per wildfire reduced to below 2 hectares (6.2 in 2020) 102 MtCO₂e/year emissions removals (57 MtCO₂e/year in 2020)
Rest of economy 46% of gross emissions in 2020	<ul style="list-style-type: none"> Agriculture: emissions reduced by 19% to 55 MtCO₂e Fugitive emissions reduced by 18% to 17 MtCO₂e Manufacturing/construction (except IPPU) reduced by 19% to 44 MtCO₂e Solid waste reduced by 19% to 14 MtCO₂e

Notes: GW = gigawatts; MtCO₂e = million tonnes of carbon dioxide equivalent; IPPU = industrial processes and product use.

² Türkiye’s planned investments in new coal-fired power generation are the world’s 5th largest and Türkiye alone accounts for 73 percent of the OECD and EU pre-construction pipeline.

Türkiye can use the RNZP and its priorities to define intermediate milestones, which it can use more directly to design policies, identify investments, and inform its revised nationally determined contribution (NDC). Table S.3 presents the 2030 milestones for the RNZP, which the government can use as medium-term targets for its next NDC, as a basis for sectoral ministry and agency proposals and investment plans, or to allocate budgets, track progress, and report to Parliament and the population.

Six short-term priorities to trigger the transition

Some interventions that tackle underlying structural obstacles to Türkiye's growth and development can also help achieve the country's climate objectives. Those include measures to promote:

- **Macroeconomic stability:** Reducing macroeconomic volatility, stabilizing inflation, building external reserves, and maintaining a prudent level of public debt, all of which are essential to enable the required public and private investments.
- **Human capital and social protection:** Investing in people through health and education, ensuring higher labor force participation (especially for women), and building stronger and more comprehensive safety nets to reduce macroeconomic transition costs and minimize social costs.
- **Institutional strengthening:** Better integrated policy documents, improved economic decision-making and budgetary processes, and more efficient public spending through procurement and public investment management.

Making improvements in these three domains creates clear synergies: in addition to accelerating growth, they would make the economy better able to manage the transition toward climate resilience and net zero emissions. But these interventions also need to be complemented with a set of targeted sectoral approaches.

Priority 1. Realign energy policies to exit from coal and decarbonize the power sector: Make parallel efforts, through a new energy security compact, to commit a just and inclusive transition from coal, by (i) not building new coal plants; (ii) retiring most existing coal power plants and mines by 2040 and compensating for lost future revenues; (iii) supporting laid-off workers and affected communities; (iv) facilitating environmental remediation; (v) scaling up renewable energy; (vi) deploying grid integration measures, particularly battery and pumped storage, remunerating storage services, and expanding and digitalizing transmission networks; and (vii) ensuring well-designed power markets, with careful consideration of implications for reliability and electricity prices.

Priority 2. Maximize the economic benefits of the transition with a supportive macroeconomic and financial environment: Implement macro-stabilizing and structural interventions to raise economic productivity by (i) alleviating factor market rigidities; (ii) removing or repurposing fossil fuel and agricultural subsidies, and deploying de-risking instruments; (iii) enabling public investments and mobilizing private investments through a tax reform that combines subsidy reform with a carbon tax (or an equivalent emissions trading system) in all sectors except agriculture and landfills; (iv) mainstreaming climate objectives in macro-fiscal and monetary policy; and (v) reforming the financial sector to extend tenor and taxonomy, developing green and blue bonds, and improving transparency and disclosure of climate-related risks in the financial system. The latter will be further explored in the forthcoming Financial Sector Assessment Program.

Priority 3. Make the economy more energy efficient: Establish a more ambitious National Energy Efficiency Action Plan to 2030 for transport, buildings, urban industry, and waste sectors, with (i) more stringent and well-enforced building standards and codes; (ii) strategies and investments to support modal shifts in transport and transit-oriented urban development; (iii) a national program for

building renovations; (iv) national schemes to support energy efficiency in factories, including energy audits and efficiency reporting, and improved recycling programs for metals, e-waste, and other waste; and (v) a progressive and coordinated shift toward electrification in industries, as well as space and water heating, coupled with rooftop solar schemes to offset impacts on the grid.

Priority 4. Maximize negative emissions from forests and landscapes: Mainstream sustainable forest management to enhance carbon sinks and manage climate risks (especially wildfires), with investment in landscape restoration through reforestation, forest and grassland rehabilitation, cropland management, and wetland conservation.

Priority 5. Make growth more resilient and sustainable: Adopt an economy-wide approach that mainstreams (i) resilience and future climate change impacts in public and private sector decisions, by including climate risks in budgeting procedures; (ii) infrastructure and building construction standards; (iii) procurement and public investment management; (iv) urban and infrastructure planning; (v) water management plans and regulations, complemented by modernized irrigation and drainage and diversified freshwater resources; (vi) agriculture policies and support, including subsidy repurposing; and (vii) social protection systems.

Priority 6. Minimize social disruptions and ensure a just and inclusive transition: Build a strategy that (i) identifies at-risk sectors and workers; (ii) anticipates and prepares for retraining and reskilling needs; and (iii) strengthens social protection systems to make them more reactive, flexible, and better able to absorb expected and unexpected shocks. Repurposing retired coal power plants and closed coal mines can not only lead to economic and energy transition, but also mitigate the social impacts and disruption of these closures.

The way ahead

This CCDR explores important issues and opportunities created by climate change for Türkiye but does not provide definitive answers. There are two priorities for future analytical work:

- First, the government needs to design a long-term strategy that is integrated into its development and economic plans and policies and prepare a revision of its NDC that is consistent with Türkiye's long-term commitments and objectives.
- Second, broad policy recommendations need to be translated into much more detailed policy advice and investment plans. For example, detailed policy recommendations on the design of a just and inclusive transition from coal will be the focus of follow-up analytical products.

Türkiye's development and climate objectives are ambitious, and the policies and interventions that are needed to achieve them involve risks and uncertainty, making it important to follow an iterative approach. Careful monitoring and evaluation are needed to detect and manage expected and unexpected negative effects and to adjust policies over time. Türkiye does not need to set its strategy in stone for the next 30 years. Climate policy takes place in a context of incomplete knowledge and large uncertainties, which will only be resolved as countries implement climate policies, carefully monitor their impacts and results, and learn from their successes and failures. Contexts of deep uncertainty require flexible and regularly adjusted policies. This CCDR identifies a short-term strategy for 2022–30 that minimizes short-term trade-offs and maximizes synergies. It is important to consider the longer-term pathway over 2022–40 or even to 2053, keeping in mind that the strategy can and will be adjusted between now and 2030, based on what is learned in the meantime.