EUROPE AND
CENTRAL ASIA

CROATIA

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

An Overview for Policy Makers

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Croatia Country Climate and Development Report: An Overview for Policy Makers[1]

The World Bank's Country Climate and Development Report (CCDR) for Croatia examines how climate change affects its economy and people and shows how investing in adaptation and decarbonization can help meet Croatia's development objectives, including by increasing its resilience, competitiveness, inclusion, and regional cohesion. The report provides evidence-based priorities and investment needs across key sectors to inform policy makers, the private sector, and development partners as they chart a path forward. This overview for policy makers outlines the imperative for accelerated decarbonization and then details critical adaptation needs, before presenting necessary enabling conditions, the economic case for investment, and high-priority actions.

Key messages

1. Accelerating decarbonization and strengthening adaptation is an opportunity for Croatia to restructure its economy, secure climate resilience, and achieve low-carbon growth that will allow the country to sustain income convergence with the rest of the European Union (EU).
2. Central to decarbonization is a transformation of the energy system—scaling renewables 14-fold and enhancing grid readiness and deep efficiency in buildings alongside shifts to cleaner, more efficient transport.
3. Place-based adaptation is critical to protect people, productivity, and infrastructure from climate hazards such as floods, droughts, and heat waves. Prioritizing heat resilience in the country with Europe's highest urban heat mortality rates, as well as water security, agricultural resilience, and disaster risk management (DRM) is essential.
4. Slightly more than half of the required investment for the climate transition could come from the private sector, but significant capital is being held up by regulatory and administrative bottlenecks.
5. Success hinges on stronger governance and institutions, removal of regulatory and administrative hurdles, strengthening of predictable policy signals, private sector participation, skills development, and social support for a just transition.

Croatia Needs to Ramp Up Decarbonization and Adaptation to Reap the Benefits of Low-Carbon, Resilient Growth

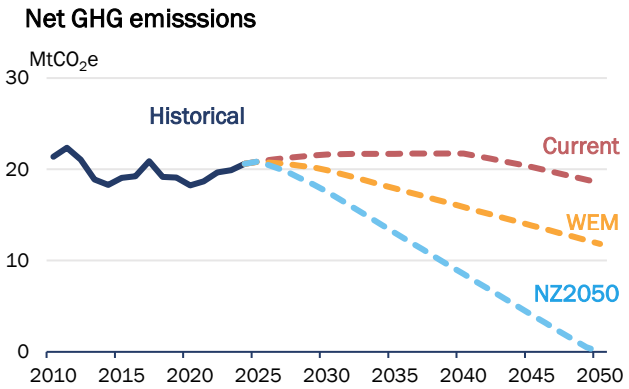
Croatia has grown rapidly and reduced poverty, nearing its goal of reaching 80 percent of the EU average per capita income by 2028. Sustaining convergence, however, will require addressing structural headwinds—an aging and shrinking population, labor and skills shortages, and comparatively low productivity—alongside persistent regional disparities, with rural areas often lagging.

As an EU member state with legally binding decarbonization targets for 2030 and a 2050 net-zero target, Croatia needs to combine its development goals with accelerated decarbonization. While the country has successfully decoupled greenhouse gas (GHG) emissions from economic growth, emission reductions have largely stagnated over the past decade, causing the country to fall behind on its targets. A step change is needed (Figure 1), and the most promising path to approaching its 2030 goals is to create the enabling conditions for sustained long-term decarbonization.

[1] This brief provides an overview of the Croatia Country and Development Report, published by the World Bank in 2025.

Croatia's success depends as much on removing existing barriers as on mobilizing incremental investments. Decarbonization is an economywide challenge requiring a policy mix that provides the enabling conditions for private and public investment as well as behavioral changes. The CCDR estimates the incremental investment required to reach net zero by 2050 as 1.1 percent of gross domestic product (GDP) (Table 1). While this is feasible, mobilizing investment requires removing barriers that impede the scaling of decarbonization solutions as well as supporting transitions where necessary. Croatia can draw on international experience to advance areas where progress has lagged.

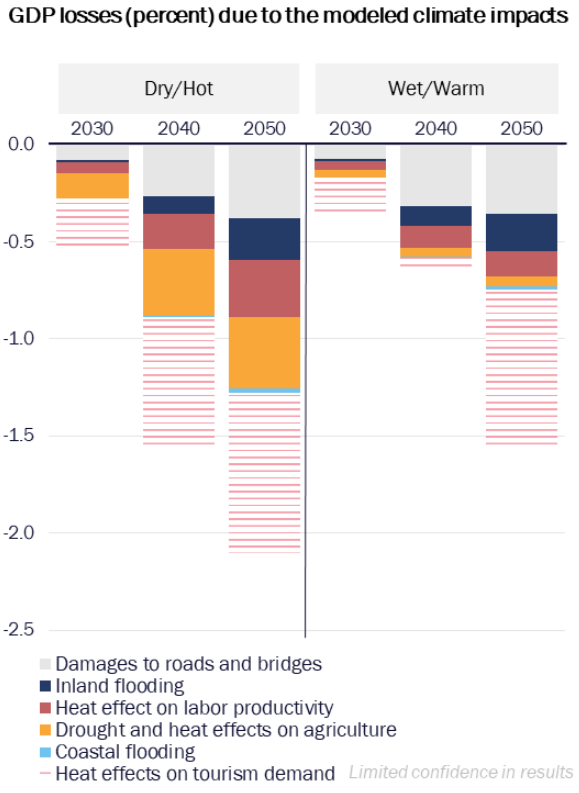
Figure 1: To reach climate neutrality by 2050, the pace of decarbonization would have to pick up significantly from recent trends



Source: Using data from the Croatia National GHG Inventory Report (2024) for historical emissions and own analysis for emissions projections.

Croatia's vulnerability to climate hazards such as droughts, floods, and heat waves could slow income convergence with the EU average without targeted adaptation. Average temperatures have risen nearly three times the global average and are projected to keep climbing, while floods, urban flash floods, forest fires, droughts, windstorms, and hail already cause significant damage and are intensifying. Based on the limited set of impacts this CCDR modeled, climate change could reduce GDP by 1.5–2.1 percent by 2050 relative to a scenario without additional climate change, with stronger effects on sectors such as agriculture and tourism (Figure 2). Strengthening protection for people and firms from climate hazards will help safeguard progress toward Croatia's development goals.

Figure 2: Climate change is expected to lead to GDP losses



Source: World Bank.

Investments in decarbonization and adaptation present an opportunity to advance Croatia's broader development agenda. For example, it can drive investment in lagging regions, improve population health and well-being through reduced air pollution, reduce high mortality and morbidity linked to extreme heat events, boost innovation, increase integration in international green value chains (especially in the electric vehicle and wind sectors), boost exports by tapping into Croatia's high solar and wind power potential, and increase productivity and competitiveness through energy efficiency. Protecting people and firms against climate impacts such as floods, droughts, and heat waves will bolster resilience and preserve competitiveness while often simultaneously contributing to decarbonization, for example, in the energy, water, and land use sectors.

Box 1: The CCDR's decarbonization and climate impact scenarios

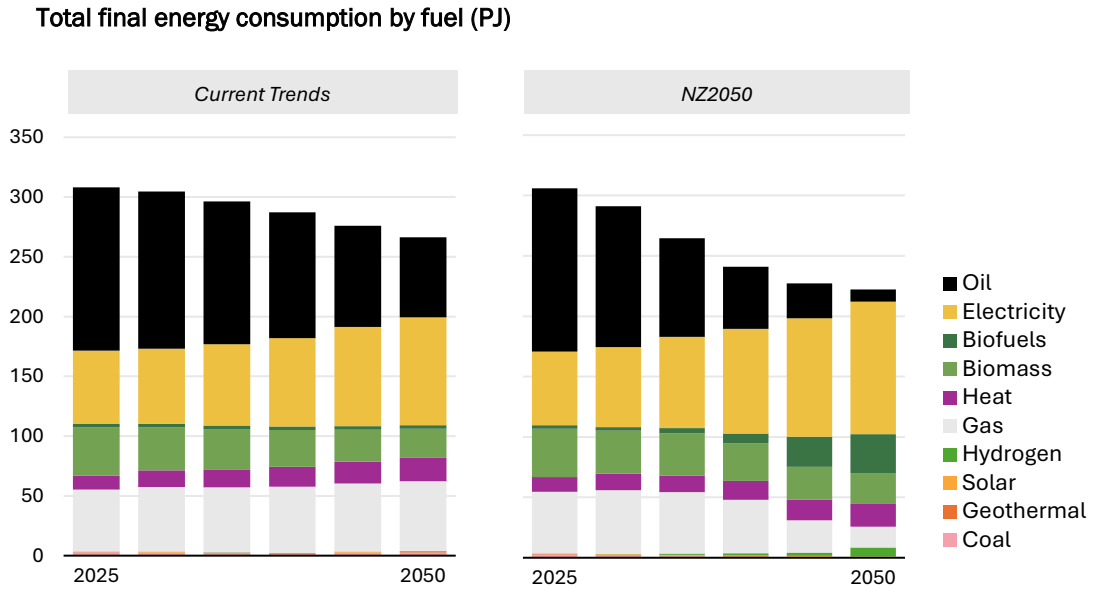
This CCDR generated three representative decarbonization pathways to illustrate the solutions and impacts of varying levels of ambition: a *Current Trends* scenario that projects into the future the largely stable GHG emissions level of the last 10 years, a *With Existing Measures* scenario that aligns with the ambition of the eponymous scenario in Croatia's National Energy and Climate Plan (NECP), and a *Net Zero 2050 (NZ2050)* scenario that aligns with the EU's legally binding target of climate neutrality in 2050 and is broadly consistent with the NECP's *With Additional Measures* scenario, projected to 2050. The pathways used a least-cost approach for the energy system. To model climate impacts, the CCDR compared two climate scenarios (one wet/warm and one dry/hot) to a 1995–2014 historical reference period to account for uncertainty in climate projections. Annex 1 of the CCDR details the scenario choices.

The Energy System Holds the Key to Meeting Decarbonization Commitments, but Policy Reforms Are Required to Unlock Investment

Transforming Energy Production for Decarbonization, Demanding Scaled Renewables Enabled by Simplified Permitting

Decarbonizing energy production by scaling renewable generation is pivotal for Croatia's NZ2050 pathway. Solar and wind remain underdeveloped despite favorable resource endowments and declining costs, requiring a roughly 14-fold expansion from a very low base, equivalent to adding 850 MW per year. Such growth rates have been achieved or exceeded in numerous European countries. Accelerated deployment, together with hydro refurbishment and life extension of the Krško Nuclear Power Plant, would enable a steady reduction in fossil fuel use. Harnessing Croatia's strong wind and solar resources would gradually cut energy import dependence, raise energy security, and position the country as a net exporter of electricity.

Figure 3: The displacement of most oil and gas by increasing the use of electricity in final energy consumption by 80 percent from 2025 to 2050 defines Croatia's net-zero future



Source: World Bank.

Unlocking the required investment at scale hinges more on removing administrative and system bottlenecks than on access to finance. Permitting processes in Croatia are among the slowest in Europe and add up to 35 percent to project costs. For banks to provide capital, this must be significantly simplified; the grid connection fee resolved; and transmission and distribution networks reinforced.

Croatia should also review the effectiveness of ancillary services products and markets and consumer participation, introduce tariff options to ensure cost recovery of grid investments, and streamline land administration. These reforms would lower project delivery risk, crowd in private investment, and enhance competitiveness by helping keep electricity prices low and limiting the need to purchase emissions allowances under the EU's climate architecture.

Deep Efficiency and Heat Electrification in Buildings to Cut Energy Use at Scale, Contingent on Targeted Incentives and Standards

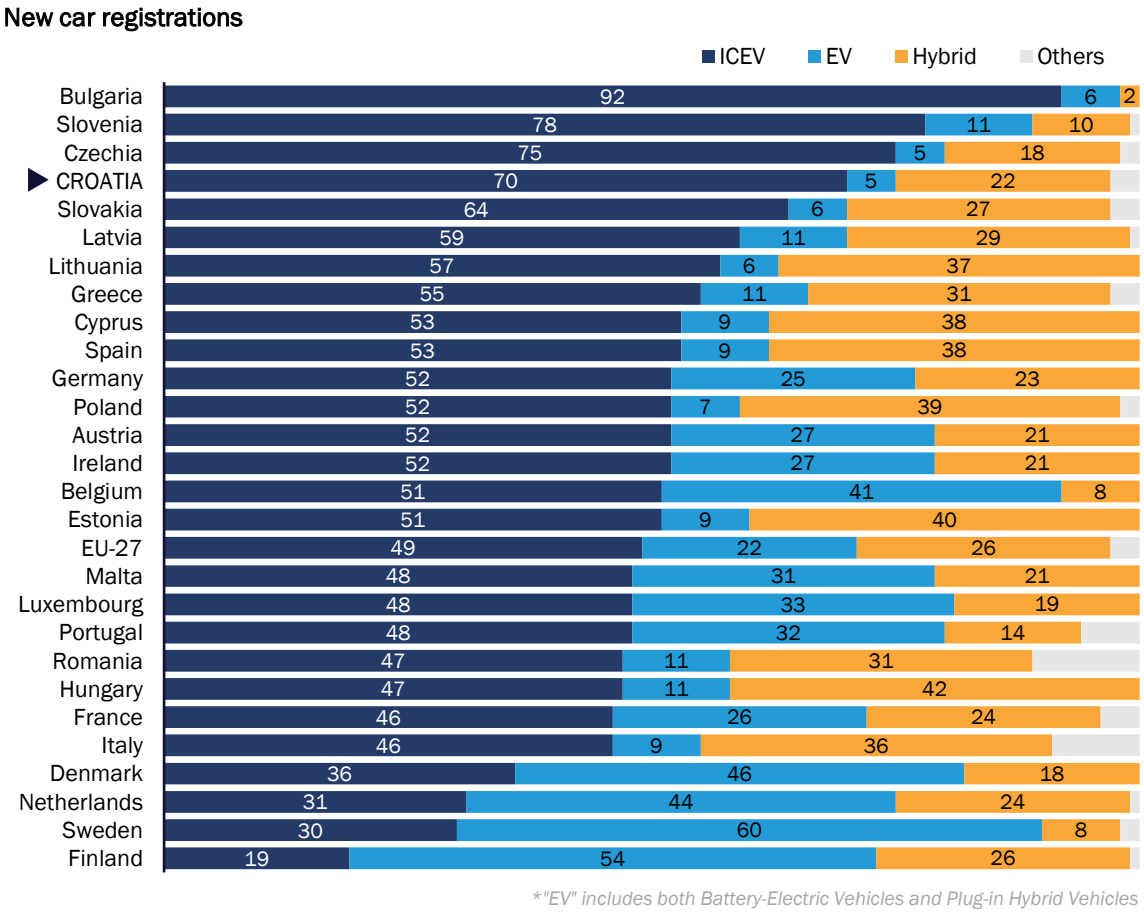
Buildings consume 42 percent of Croatia's energy and in most, low-carbon energy carriers need to displace fossil fuels—especially for heating—while efficiency needs to rise. Households and businesses will need to switch end-use applications to electricity or biofuels/modern biomass, with emissions from the few remaining hard-to-abate fossil fuel uses (some transport and industrial applications) either captured and stored or offset. Delivering this shift hinges on rapid scale-up of heat pumps and modern biomass as well as an increase in annual building retrofit rates from below 1 percent to at least 3–4 percent, driven by tighter standards and significant investments. This eases pressure on the power system while lowering consumer bills but requires targeted social support.

Achieving the switch to low-carbon energy carriers and sustained efficiency improvements requires an unprecedented policy and investment push. Priorities include aligning end-user energy prices with economic costs by phasing down energy subsidies and allowing the pass-through of the EU Emissions Trading System (ETS2) price signals, making reliable information on costs and savings readily accessible. Additional priorities include providing targeted support to overcome financing barriers, investing in a qualified workforce for installation and maintenance, setting standards and obligations for energy retail suppliers and financial institutions, and establishing long-term policy objectives to guide household and firm investment decisions. In industry, wider deployment of energy management systems can prevent energy consumption from rising while supporting continued economic growth.

Transport Decarbonization with a Push toward Electric Vehicles (EVs) and Public Transport to Reverse Emissions Growth

Transport consumes the second-largest share of Croatia's energy after buildings, and Croatia lags in transport decarbonization. Representing 35 percent of the country's total final energy consumption, transport is the single-largest source of recent emissions growth and accounts for around 30 percent of gross GHG emissions. It is the most important reason for Croatia's Effort Sharing Regulation (ESR) sectors, being about 14 percent above the annual emissions allocation and for Croatia being offtrack for its 2030 goals. With the lowest electric vehicle share in the EU (Figure 4), catching up will require a step change: to reach NZ2050, around two-thirds of new passenger car registrations would need to be electric by 2030 and 100 percent by 2035.

Figure 4: New vehicle registrations in Croatia have the lowest share of EVs in the EU and one of the highest remaining shares of internal combustion engine vehicles



Source: Based on ACEA (2024).

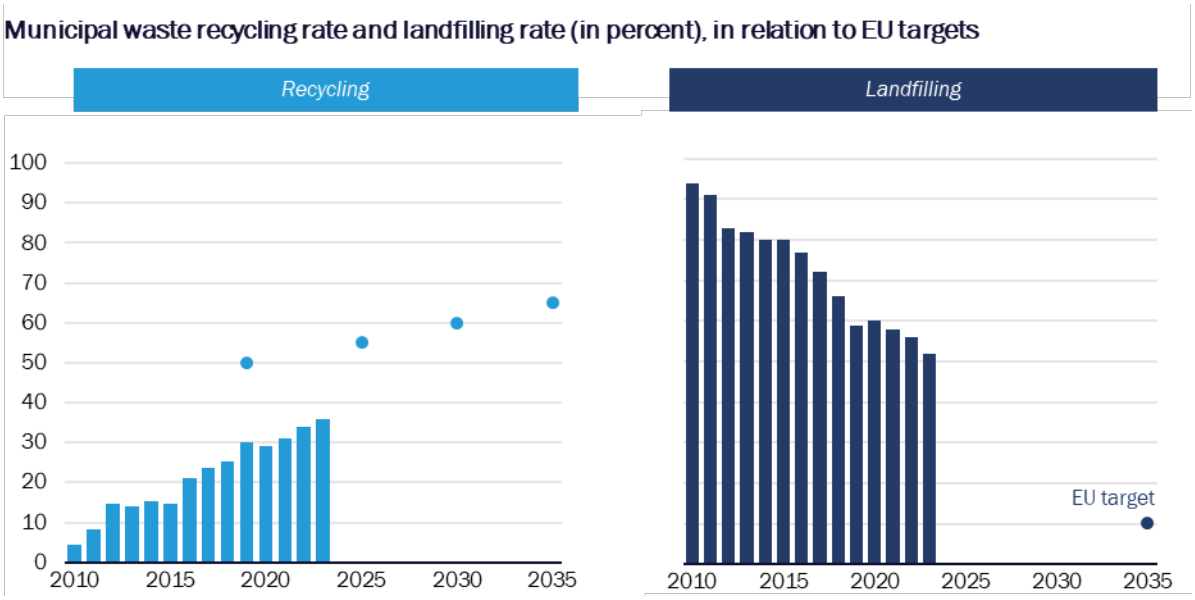
To get on track, near-term priorities include accelerated vehicle electrification and infrastructure while reducing reliance on private car use in urban areas. The former includes reforming vehicle taxation into a feebate scheme for individuals, introducing enhanced financing mechanisms for light commercial vehicles, and running well-designed concession tenders for public charging. The latter can be supported through demand management such as dynamic parking pricing and congestion charging. In addition, public transport must become cleaner and more attractive, with all new municipal bus registrations being electric by 2030. Innovations in procurement and public-private partnerships (PPPs) can help overcome financing constraints. Decarbonization of heavy goods vehicles can ramp up more slowly—decarbonization accelerates after 2035, reaching about 80 percent of new truck registrations as zero emission by 2050, primarily through electrification. Increasing the share of rail freight to 30 percent and restoring passenger rail to 2010 levels would round out the policy agenda, which would also improve air quality and population health. Equity measures need to accompany these reforms to manage distributional impacts.

Completing Decarbonization by Improving Waste Management, Addressing Livestock Emissions, and Sustaining Croatia's Forest Carbon Sink

Croatia can build on its recent success in waste sector GHG emissions to simultaneously meet decarbonization and waste-related targets. Municipal waste is the largest contributor to the waste sector's GHG emissions, and in 2022, 56 percent of this stream was landfilled. In addition, for Croatia to meet its 2030 EU targets, the annual growth rate of recycling would need to increase from 2.5 to 3.4

percentage points per year (Figure 5). Finally, Croatia's Circular Material Use Rate (CMUR)[2] has risen from 1.6 percent in 2010 to 6.2 percent in 2023 but remains behind the EU average of 11.8 percent and the EU target of 22.4 percent for 2030. Adequate contribution of the waste sector to NZ2050 requires accelerated development of reuse centers, separate waste collection systems, sorting facilities, advanced recycling facilities, and waste management centers. Financial incentives to reduce landfilling and enhance recycling rates should complement landfill taxes, which took effect in 2025. Croatia should also focus on increasing its CMUR by promoting high-value recycling, reuse models, and waste-to-resource innovations, particularly in the food, construction, plastics, and textiles sectors. These measures could unlock economic value, create jobs, and reduce the cost of waste management.

Figure 5: Croatia's municipal waste recycling and landfilling rates are not yet meeting EU targets, but there is room for catch-up



Source: Based on Republic of Croatia (2023).

Reducing agricultural GHG emissions—a longer-term agenda—hinges on the ability to reduce livestock emissions, which represent nearly two-thirds of the sector's GHG emissions. Abatement of livestock emissions is costly, so the net-zero scenario only programs a reduction of 12 percent by 2050. Achieving this will depend on enhancing productivity and adopting climate-smart techniques, particularly in livestock management. Key measures include improving livestock management practices (for example, feed management, genetics, animal health), using feed additives to reduce enteric fermentation, improving manure management, increasing soil carbon stocks through better grazing management, and promoting dietary shifts to less emission-intensive products. The fragmented nature of Croatia's agricultural sector, however, requires the resolution of underlying structural constraints through farmland consolidation, productive partnerships, support for new farm entrepreneurs, and the targeted use of existing subsidies.

Croatia's forests are a crucial carbon sink and their carbon sequestration capacity must at least be maintained amidst increasing climate pressures. As a heavily forested country with a strong sustainable forest management culture, Croatia enjoys a favorable starting position, and forestry generated US$405 million and 18,000 jobs in 2022, primarily in rural areas. Forests have sequestered an average of 22 percent of Croatia's gross GHG emissions between 2015 and 2022. However, since 2005, forest

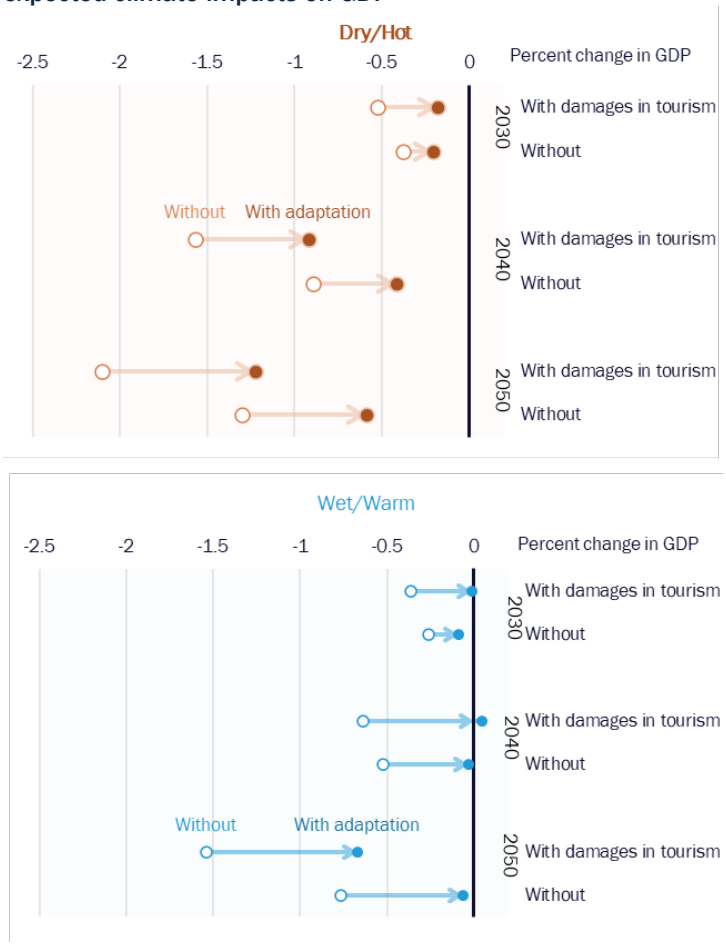
[2] The CMUR measures the circularity of materials in the economy and refers to the share of the total amount of material used in the economy that is accounted for by recycled waste. Increasing the CMUR (by increasing the amount of recycled waste or decreasing the amount of material used) would reduce the amount of primary material extracted for production and the associated negative impacts on the environment and climate.

carbon sinks have been on a declining trend, as all causes of forest disturbances—including insect infestations, diseases, and severe weather events—have been increasing with rising temperatures, with trend increases of areas affected between 2007 and 2017 ranging from +60 percent to +250 percent. Maintaining current sequestration levels in the face of increasing climate pressures will therefore not be straightforward. Achieving this will require, in the short term, updating the national forest strategy to reflect climate adaptation and carbon storage needs, establishing an advisory commission to guide strategic transitions, and integrating carbon value into financial analyses of timber allocation. Modernizing forest management methods, increasing transparency in harvest and distribution decisions, and addressing labor shortages are crucial. Additionally, revitalizing the payment for environmental services fund and reviewing the allocation of Common Agricultural Policy resources could support forestry operations and maintenance. Investments in scientific research on climate impacts on Croatian forests should inform ongoing reforms.

Protecting People, Productivity, and Physical Capital through Place-Based Adaptation

While climate change is expected to create economic losses, relatively affordable adaptation measures can largely mitigate most of the modeled non-tourism-related damages, protecting Croatia's convergence with EU-27 income levels. The modeled annual losses due to climate change could conservatively reach 1.5 to 2.1 percent of GDP by 2050 (see Box 2 for limitations). Roughly half of this loss could be from declining tourism revenues due to higher temperatures, followed by damages to roads, bridges, and agriculture. Adaptation is essential in both urban and rural settings, but takes different forms depending on exposure, assets at risk, and institutional capacities. Investments of around 0.04 percent of GDP could more than halve or even fully offset non-tourism-related economic losses modeled in this CCDR, making the economy more resilient (Figure 6). Additional investments in water security, urban heat management, health systems, and DRM would further boost resilience but could not be modeled in this CCDR. When also factoring in tourism losses, the expected reduction is more limited. Many adaptation investments generate additional co-benefits such as livability, reduced health costs, or increased productivity.

Figure 6: Targeted adaptation measures can largely offset expected climate impacts on GDP



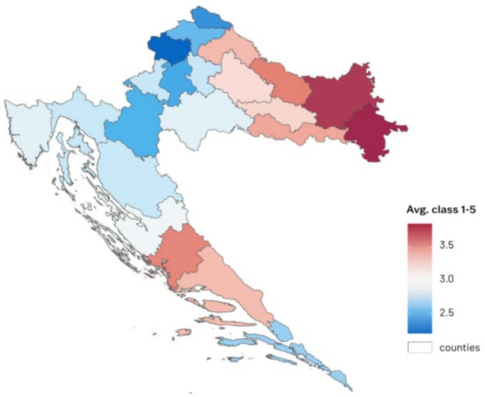
Source: Using CC-MFMod and based on data from Industrial Economics.

Box 2: Can models do full justice to climate shocks and adaptation efforts?

Modeling the effects of climate change on the economy and the impact of adaptation is complex because of data limitations and because modeling of biophysical climate impacts and economic modeling is evolving. The effects of a changing climate are nonlinear, and aggregate measures mask the full extent of impacts from single events. In addition, the complexity of the climate system inserts uncertainty into model projections. Physical responses to climate events and impact channels are often not well understood or can only be partially analyzed. Further, climate hazards compound and interact, causing events that may not have been observed historically. Conversely, adaptation can take many shapes, full modeling of which quickly becomes prohibitively costly. For example, since potential adaptation measures in tourism are difficult to define and their results are highly uncertain, they could not be modeled. Finally, all modeling conducted depends on uncertain projections of future growth and population levels. Despite these caveats, modeling remains an important tool to guide policy making. Current efforts to bridge the gaps between climate science and economic modeling are yielding insights that no single sectoral perspective can provide on its own. For more details on the modeling carried out, see Annex 1 of the CCDR.

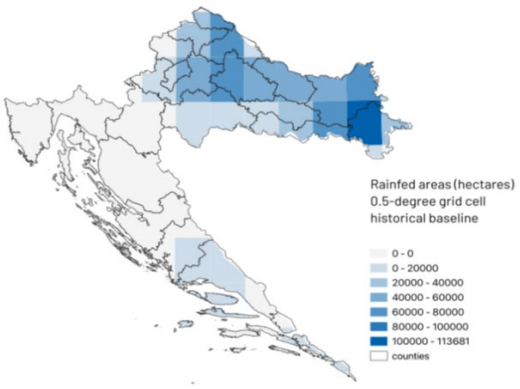
Croatia faces significant drought risks, particularly in Slavonia and coastal regions like Split-Dalmatia and Šibenik-Knin counties, where drought threatens tourism, agriculture, and regional development (Figures 7 and 8). Slavonia, already grappling with deep-seated poverty and high social exclusion rates, is especially vulnerable. Effective drought management can protect the local economy and support farmers. Additionally, Croatia's non-revenue water rates, nearly double the EU average, reduce water supply reliability, especially during peak summer demand in coastal tourist areas. To address these challenges in drought-sensitive regions, mitigate risks, and ensure sustained economic growth, enhanced drought management and climate-resilient planning are crucial. Water infrastructure investments can also increase efficiency and security.

Figure 7: Drought risk is highest in eastern Croatia and in Central Dalmatia …



Source: Based on Hofste et al. (2019).

Figure 8: … which overlaps significantly with the greatest extent of rain-fed crops.

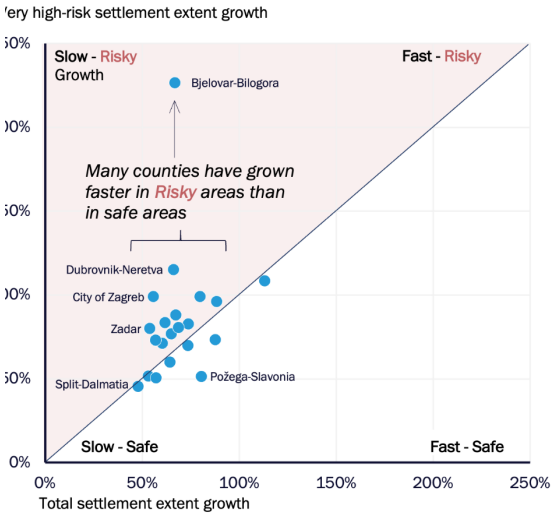


Source: Based on IFPRI (2019).

Robust DRM strategies are needed to help Croatia face climate-related hazards, including floods and wildfires, which can be compounded by earthquakes. For example, urban settlements in very high flood-risk areas expanded by more than 98 percent between 1985 and 2015. Urbanization has been advancing faster in flood zones than in safe areas, locking in future costs and challenges (Figure 9). By 2020, roughly 24 percent of all settlement areas were in zones with moderate flood risks or higher. Modeling suggests that flooding could increase by up to 6 percent annually by 2050 compared to the 1995–2020 average. To enhance resilience, Croatia should strengthen legal and financial frameworks for DRM, improve data and information management systems for better risk assessment, enhance the

resilience of public facilities and critical infrastructure (integrating energy efficiency and nature-based solutions), advance local capacity building and community engagement, and improve spatial planning. Containing urban expansion to areas outside the 20-year flood zone would decrease expected capital damages by between 70 and 80 percent while not requiring any new investments. In addition, the social assistance system will need to become more adaptive to climate-induced shocks. Investing in DRM yields substantial economic benefits, reducing losses and providing multiple social and environmental co-benefits.

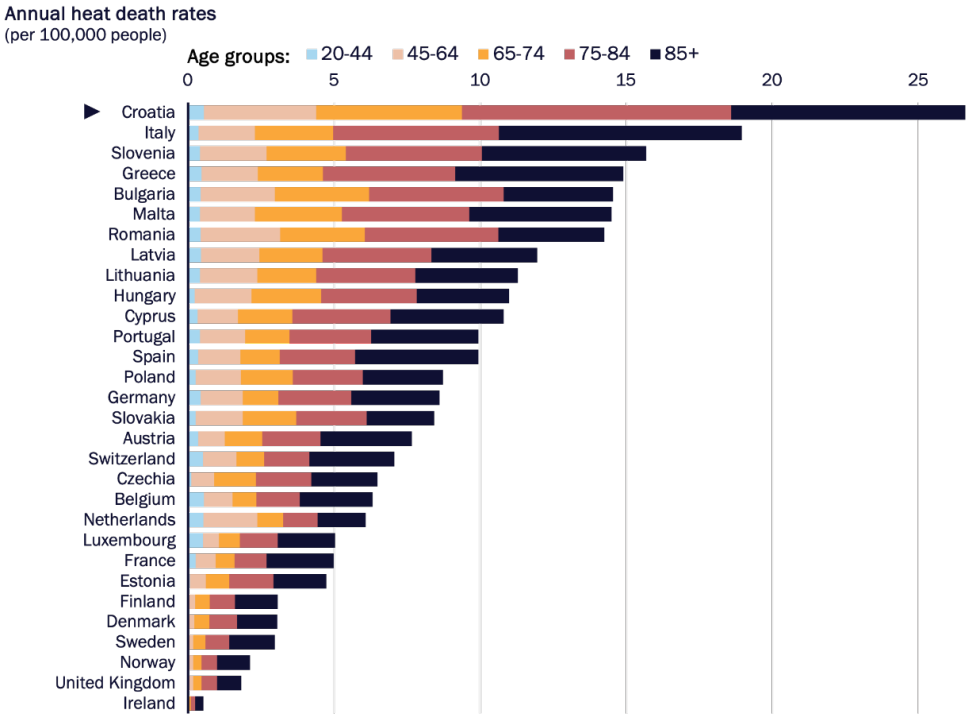
Figure 9: Settlements in many counties have grown faster in flood hazard areas than in safe areas



Source: World Bank.

Croatia already faces the highest heat-related mortality rate in Europe (Figure 10) and, without adaptation, this rate could double by the 2050s. Nearly 300 people have died of heat in Croatia every year between 2000 and 2019—more than of traffic crashes. Cities are particularly exposed due to the urban heat island effect, and 7 of the 10 European cities with the highest heat-induced death rates are in Croatia. To mitigate these impacts, Croatia can build on its existing policy framework, including by integrating adaptation measures into urban spatial planning; upgrading residential buildings and public facilities; establishing heat-health action plans and labor protection policies; improving the delivery and quality of health care, especially for vulnerable groups such as the elderly; and enhancing education and early warning systems. These investments yield substantial economic, well-being, and health returns.

Figure 10: Croatian cities have the highest raw excess death rates due to heat in Europe



Source: Based on Masselot et al. (2023).

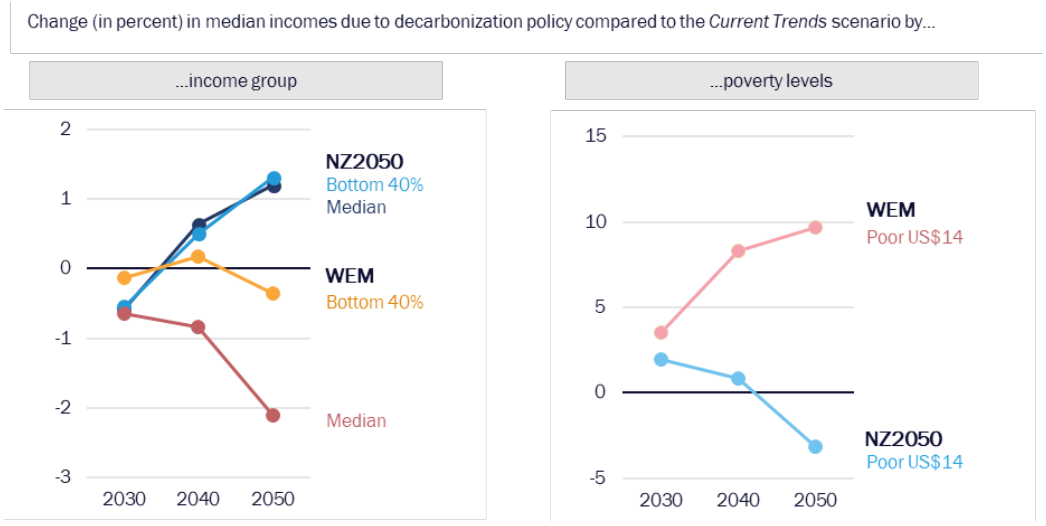
Average agricultural yield losses of up to 14 percent are expected for some crops in the 2040s, but no-regret adaptation investments exist. These impacts compound agricultural productivity that is 3–4 times below the EU average, which limits competitiveness and constrains affordable, climate-resilient food production. Expanding irrigation rates from 1 percent of agricultural land to about 5 percent and adopting climate-smart agriculture practices such as soil conservation and heat-tolerant crop varieties in 50 percent of production could significantly boost productivity. Potential gains range from 10 percent higher outputs in a wet/warm scenario to limiting losses to 5 percent in a dry/hot scenario. These no-regret adaptation strategies can improve agri-food competitiveness and reduce trade imbalances. To implement adaptation at scale, however, the sector would also need to overcome low capital investment and small average farm sizes. In addition, water availability assessments under extreme dry scenarios would need to inform irrigation investments.

Tourism contributes nearly one-fifth of GDP but is vulnerable to climate impacts, calling for a diversification strategy. Croatia's 17.4 million foreign tourists in 2024 generated 35 percent of its exports, and accommodation and food services provide 7 percent of jobs. The sector has driven infrastructure development and supports local economies, in particular along the Adriatic coast. However, rising temperatures alone risk a reduction in tourism revenues of up to 11 percent by the 2050s in a worst-case scenario, with knock-on effects for employment. Water scarcity and extreme weather events add additional risks. By promoting more balanced seasonal and regional development as an adaptation strategy, Croatia could address regional imbalances, use its infrastructure more efficiently, and preserve tourism revenues.

Softening the Impacts of Climate Change and Equipping Workers to Manage the Decarbonization Transition

Policies are required to limit the poverty impacts of climate change and the distributional impacts of decarbonization. While climate impacts are not projected to significantly alter the at-risk-of-poverty rate, they are projected to increase the proportion of vulnerable people (living below US$14 per day) by 10 percent by 2050. Adaptation policies explored in this CCDR can reduce income losses. However, they would not fully offset these losses. While ambitious decarbonization is expected to boost equity overall (Figure 11), to assist people through the transition, Croatia will need to efficiently implement its Social Climate Plan and assess complementary needs and delivery mechanisms. In addition, a stronger and more adaptive social protection system could mitigate energy poverty and boost resilience to climate impacts.

Figure 11: Decarbonization can support poverty reduction, driven by stronger economic growth



Source: World Bank.

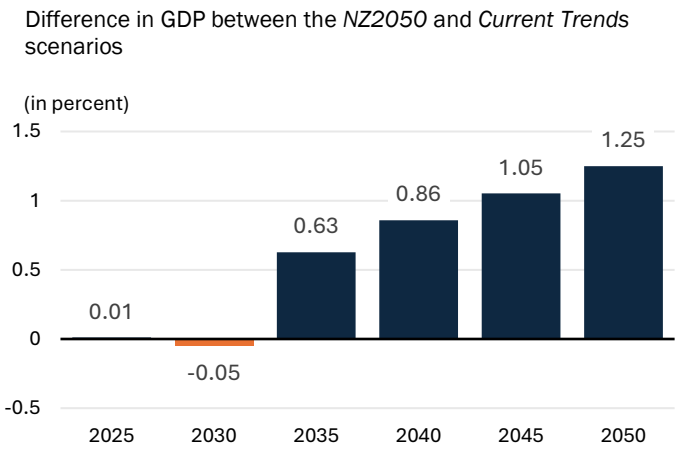
To succeed at decarbonization, Croatia will need to boost its workforce in terms of numbers and skills. The transition will amplify labor market challenges, particularly the pre-existing severe labor and skills shortages and mismatches that result in part from a shrinking and aging population trend that is not expected to abate soon. The share of green jobs has increased, but approximately 17 percent of jobs—especially in polluting industries—face significant transformation. Lower-educated workers and women are more negatively affected due to larger skill gaps and lower representation in green jobs. In addition, the transition requires the right workforce and skills. Croatia needs to increase labor force participation, invest in the quality and efficiency of education and training, and develop a more systematic labor mobility strategy.

Workers will also need to be equipped to face new demands. To navigate the climate transition and equip the workforce with the necessary skills, substantial investments in education and training systems are essential. To provide retraining opportunities for workers, programs like the Green and Digital Voucher Scheme should reach more people. In addition, information systems should be strengthened to better anticipate changes in the demand for skills needed to succeed at the climate transition. In parallel, social protection systems must be strengthened to support labor transitions and prevent structural unemployment. Social assistance may be required for older workers with significant skill gaps, to avoid leaving vulnerable groups behind. Finally, the facilitation of mobility schemes to support the geographical reallocation of workers where jobs are growing should be considered.

The Economic Case for Climate Action in Croatia: Benefits and Feasibility

Spending to reach climate neutrality by 2050 will have modest positive effects for the Croatian economy, and under the EU climate architecture, decarbonizing is more advantageous than delaying action. GDP in the *NZ2050* scenario is projected to be 1.3 percent higher in 2050 than in the *Current Trends* scenario (Figure 12). Reaching climate neutrality by 2050 will be more economically advantageous than not doing so, as not meeting EU decarbonization commitments would imply having to purchase emissions allowances from abroad when ample lower-cost domestic decarbonization opportunities exist.

Figure 12: The macroeconomic effects of bringing the Croatian economy to net zero by 2050 are expected to be mildly positive



Source: Using the Climate Change Macro Fiscal Model (MfMod)

Relatively affordable adaptation investments can protect development gains. Adaptation investments amounting to 0.04 percent of GDP could more than halve or even fully offset related economic losses outside the tourism sector, making the economy more resilient. They can reduce expected GDP losses from 0.8–1.3 percent by 2050 to 0.1–0.6 percent (Figure 6).

Moreover, raising the financing for Croatia's net-zero and resilient investment needs is feasible. Reaching *NZ2050* requires investments of 1.1 percent of GDP or about 12 percent (or US$14.3 billion, discounted and at constant prices) above the baseline investments required to sustain the economy under the *Current Trends* scenario. By 2050, this would cumulatively amount to US$132.2 billion, compared to US$117.8 billion (discounted values). The cumulative adaptation investments in the period 2025–2050 modeled in this CCDR are estimated to cost 0.04 percent of GDP (Table 1). The

contained incremental investment needs and Croatia's relatively solid fiscal position—despite some deterioration in 2024 and 2025—suggest that the country should be able to finance the transition. The public sector will need to bear close to half of the incremental investments but will also need to support households that will otherwise struggle to renovate their homes or buy electric vehicles. This could affect public debt by 2050; however, debt would remain well below the EU limit. Given uncertain future EU funding due to shifting priorities, it is imperative to facilitate private climate investment in the short term, and to efficiently assign public funds.

Table 1: Decarbonization and climate resilience impose net costs on the economy, but these are limited

2025–2050 cumulative (billions, 2020 US$, 6% discount rate)	CAPEX current trends (A)	CAPEX net zero and resilience (B)	OPEX current trends (C)	OPEX net zero and resilience (D)	Net increase in CAPEX (B – A)	Net increase in OPEX (D – C)	Net costs (B – A + D – C)	Net investment as a share of GDP (B – A) / GDP (%)	Financing of incremental investment (in %)	
									Public	Private
Decarbonization										
Electricity[a]	4.3	11.4	7.5	6.4	7.1	−1.1	6.0	0.6	60	40
Transport[b]	85.1	89.1	46.0	45.3	4.0	−0.7	3.3	0.3	42	58
Residential	10.5	11.6	23.6	25.3	1.1	1.7	2.9	0.1	0	100
Commercial	3.9	4.2	13.7	15.1	0.4	1.4	1.7	0.0	50	50
Industry and other[c]	14.1	15.7	14.7	15.4	1.5	0.8	2.3	0.1	37	63
Forestry[d]	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	100	0
Agriculture	0.0	0.1	2.2	2.4	0.1	0.2	0.3	0.0	0	100
Total	**117.9**	**132.2**	**107.7**	**110.0**	**14.3**	**2.3**	**16.6**	**1.1**	**47**	**53**
Adaptation[e]										
Agriculture	–	0.1	–	0.01	–	–	0.07	0.0	–	–
Inland and coastal flooding protection	–	0.1	–	–	–	–	0.1	0.0	–	–
Transport infrastructure resilience	–	0.4	–	–	–	–	0.4	0.0	–	–
Total	–	**0.5**	–	**0.01**	–	–	**0.5**	**0.0**	–	–

Source: Using TIMES, SImulation of SEctoral Pathways and Uncertainty Exploration for DEcarbonization (SiSePuede), and Climate Change Macro Fiscal Model (CC-MFMod).

Note: Parts may not sum to totals due to rounding.

a. CAPEX and OPEX for electricity include energy production and grid.

b. Transport includes the purchase of vehicles, investments in electric charging infrastructure, and investments in rail infrastructure but not rolling stock or ships.

c. 'Other' includes the waste sector.

d. Forestry OPEX and CAPEX do not include costs related to harvesting, replanting, and other production forestry.

e. The costs of adaptation for water security, urban heat, and DRM are not included as modeling their costs and benefits to 2050 was beyond the scope of this CCDR.

Capturing the Gains of the Climate Transition Hinges on Improved Enabling Conditions

Improved Governance and Institutions

Achieving the implementation pace commensurate with Croatia's climate targets requires addressing governance barriers. Croatia's challenges in achieving its climate goals are partially due to fragmented policy development, limited coordination, and deficient implementation capacity. Priority actions include elevating whole-of-government coordination to the center of decision-making; establishing a clear vertical interface with counties and municipalities; operationalizing existing strategies such as the National Energy and Climate Plan and the National Adaptation Strategy with clear quantified,

implementation guidance, robust monitoring and evaluation, and integration into sector plans; building technical capacity across implementing ministries and local governments; aligning public finance and procurement with climate objectives; and creating structured, continuous engagement with the private sector, civil society, and vulnerable groups.

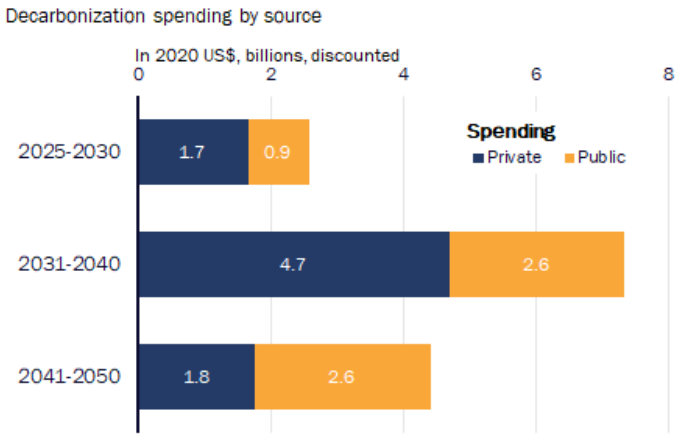
Adjustments in Fiscal Policy and Increased Decarbonization Investments by State-Owned Enterprises (SOEs)

Fiscal policy can be a powerful tool for supporting the climate transition, but some shifts would help. With a relatively solid fiscal position and contained incremental investment needs, the Croatian public sector should be able to finance its share of the green transition without major difficulties. Croatia's total carbon price is below that of peer countries and should more effectively support decarbonization goals. Increasing the stringency of such market-based instruments (for example, excise taxes), while ensuring revenue neutrality and balancing them with instruments such as standards, could more effectively direct investment and spending. Additionally, the current horizontal energy price support will need to be limited to the most vulnerable to ensure effective price signals and improve fiscal sustainability. Finally, decarbonization and adaptation investments by the government and SOEs can strongly support the climate transition and the resilience of the economy. However, for this to materialize, budget rigidity will need to be reduced, and the SOE governance framework improved to enhance oversight and align mandates with national climate goals.

A Private Sector Empowered to Play a More Active Role

Slightly more than half of the required investment for the climate transition could come from the private sector (Figure 13), but mobilizing the funds will require re-prioritization. Private capital is readily available to finance renewable energy projects, provided administrative inefficiencies are removed. Similarly, policy and tax incentives and competitive procurement can accelerate private investment in electric vehicles and charging stations. And higher standards, information campaigns, and targeted incentives can catalyze investment in energy efficiency by firms and households. Mobilizing this capital depends more on appropriate targeting and removing policy barriers to private investment than on raising additional financing.

Figure 13: Decarbonization spending needs to be front-loaded, and slightly more than half can be borne by the private sector



Source: Using TIMES, SiSePuede, and CC-MFMod.

Croatian businesses lag in climate adaptation and decarbonization, but the country can take steps to enhance private sector engagement. While many firms monitor GHG emissions, green technology adoption is weaker and only 5 percent have strategies to adapt to physical climate risks. The financial sector is gradually integrating climate and disaster risks into business processes, but transparency and consistency in climate risk reporting need improvement, particularly among domestically owned firms. Several priorities emerge: first, diversifying support instruments beyond financial incentives is essential. This includes supporting energy audits, energy management plans, and energy efficiency certification for small and medium enterprises (SMEs), coupled with advisory support to facilitate regulatory compliance and expanded access to credit. Enhancing coordination between the government and the private sector and awareness and education campaigns can facilitate compliance and promote

sustainable investment practices. Additionally, incentivizing the adoption of certified management systems can improve resource efficiency and green technology adoption. Finally, the financial sector should continue to integrate climate and disaster risks into business processes, especially among domestically owned firms.

Mobilizing PPPs could help complement scarce public resources. To finance large capital projects, particularly at the local government level, adequate access to finance needs to be assured, including by developing capital markets and sustainability-linked financial products. PPPs can be an important additional source of financing and improve asset management efficiency. Croatia's mature PPP framework and experience in the energy sector can be leveraged to attract private investment in other climate-relevant sectors, such as energy efficiency, public infrastructure, battery storage, grid infrastructure, and green hydrogen production. Performance-based PPPs can incentivize private investment in adaptation-relevant areas such as transport and water infrastructure. Croatia can combine EU funds or those from international financial institutions with private investment to generate more affordable hybrid PPPs, especially at the subnational level.

Croatia will need to rely on its financial sector to support its climate transition, which offers the sector a growth opportunity. Banks should reconnect with corporate clients by offering tailored green financial products such as green loans, sustainability-linked bonds, and advisory services, positioning themselves as strategic allies in clients' long-term growth. The Croatian Bank for Reconstruction and Development (*Hrvatska banka za obnovu i razvitak,* HBOR) should continue funding renewable energy and energy efficiency projects, leveraging partnerships with international financial institutions. To expand Croatia's underdeveloped corporate bond and equity markets, stronger policy support, capacity building, and public sector participation, including sovereign green bond issuance, are essential. Pension funds should integrate environmental, social, and governance (ESG) and climate risk management criteria into their investment decisions and adopt active shareholder engagement practices. Additionally, developing climate-related insurance products and catastrophe bonds can provide new revenue streams while building resilience against physical risks. Green fintech offers opportunities to make sustainable investments more accessible, transparent, and efficient. Joint efforts from fintech startups, banks, and policy makers are necessary to scale climate finance tools and drive sustainable growth in Croatia.

Continued Resolution of Structural Challenges

To seize the opportunities that decarbonization and adaptation present while pursuing the development goal of raising incomes to average EU levels, Croatia will need to address some of its long-standing structural challenges. Boosting productivity, including through institutional reforms, would yield the highest growth dividend and generate positive spillovers that would facilitate mobilizing overall investment, including for decarbonization and adaptation. The positive impact of reforms that raise total factor productivity would encourage additional and more productive investment. Additionally, increasing labor force participation, including among youth, women, and older workers; investing in the quality and efficiency of education and training; and more systematically leveraging labor mobility would have significant benefits given demographic headwinds and a shrinking working-age population. Packaging reforms with strengthened governance and state capacity to coordinate policies and with accelerated private sector investment could maximize the overall effect of such reforms.

High-Priority Recommendations

Croatia can achieve a low-carbon, climate-resilient development pathway at manageable cost with net economic gains if action is sequenced and financed well. Front-loading no-regret decarbonization and targeting adaptation will reduce losses, strengthen competitiveness, and protect households and firms. But timelines are tight: meeting 2030 and 2050 decarbonization obligations requires a step change in

pace this decade to close the current gap. Delivery must be led from the center, with clear, stable policy signals, efficient permitting, empowered line ministries, and counties and cities supported with mandates, data, and finance while mobilizing private capital and EU funds.

The following 12 high-priority recommendations should be addressed in the short term to maximize Croatia's chances of meeting its climate targets while protecting its development goals. While this list sets out priorities for the next 1–3 years, the CCDR provides more details as well as medium-term recommendations.

To decarbonize the economy, the priority should be on

1. Unlocking private investment in renewable energy to roll out 850 MW of additional generation capacity per year, primarily by simplifying administrative procedures;
2. More than tripling the current rate of building energy efficiency renovations and heating system upgrades by strengthening institutional and workforce capacity, diversifying support instruments, streamlining financing, and addressing market barriers while ensuring equitable transitions for vulnerable households;
3. Rapidly scaling up zero-emission transport by reforming vehicle taxation, expanding public charging, supporting fleet electrification, and promoting integrated transport systems; and
4. Ensuring Croatia's Total Carbon Price effectively supports the decarbonization agenda.

To protect people and firms from climate change impacts, the priority should be on

5. Investing in water infrastructure and management to enhance drought resilience, requiring an improved enabling environment for utility investments, strengthened implementation capacity, implementation of the National Loss Reduction Action Plan, and enhanced resilience in coastal areas through demand management and efficiency gains. Strengthening water monitoring and transboundary cooperation will improve planning for increased climate variability;
6. Improving DRM through enhanced legal, financial, and data systems; integrating resilience into infrastructure; and empowering local actors; and
7. Reducing urban heat risks by integrating green infrastructure, adaptive planning, and heat-health measures, with a focus on vulnerable populations and local preparedness.

To protect the vulnerable during the transition and seize opportunities for growth and jobs, the priority should be on

8. Implementing an efficient Social Climate Plan, supporting job transitions, and strengthening social protection systems;
9. Expanding climate finance by mobilizing banks, capital markets, and institutional investors while promoting insurance innovation and PPPs in climate-relevant sectors; and
10. Strengthening SOE governance by clarifying ownership policies, enhancing board independence and performance metrics, and aligning strategies with national climate goals.

To achieve such an ambitious program, key enabling conditions need to improve, with a priority on

11. Enhancing climate governance through stronger coordination, strategic planning, institutional capacity, and inclusive public engagement, and
12. Strengthening public-private coordination and helping firms access funding, meet sustainability standards, and invest in climate-aligned projects.

Decarbonization and adaptation can deliver strong development dividends for Croatia: faster, more-resilient growth; greater competitiveness and energy security; new jobs; increased productivity; new export opportunities; and cleaner air. Delay can be costly and can manifest in higher disaster losses, lock-in and stranded assets, missed EU targets, and rising fiscal and competitiveness risks, including payment outflows for emission allowances. With credible, coordinated implementation this decade, Croatia can safeguard recent gains, accelerate income convergence with the EU, and set a regionally recognized example of sustainable, inclusive prosperity. The Croatia CCDR sets out pathways for seizing opportunities and limiting risks.