Planning for a Future with Zero Net Emissions: Costa Rica

Case Study 1. Developing and Implementing a Net Zero Development Pathway in a Middle-Income Country: Costa Rica's National Decarbonization Plan

Contributors: David Groves, Felipe DeLeon, and World Bank staff

Context

Building on its long tradition of sustainable development and strong focus on ecotourism, Costa Rica became an early champion of global decarbonization to limit global warming.[1] Its first national communication to the United Nations Framework Convention on Climate Change (UNFCCC) in 2000 highlights its early strategy for a low-carbon economy, beginning with developing a national GHG inventory in 1995 and implementing renewable hydropower and wind projects to expand access to electricity and eliminate fossil fuel power generation (Government of Costa Rica 2000). In 2007, the government expanded its commitment by announcing its goal to become carbon neutral. By 2011, Costa Rica had become one of the first countries to participate in the UN's Nationally Appropriate Mitigation Actions program, which provided financial support to reduce GHG emissions from its coffee supply chain.

In 2015, Costa Rica submitted its intended nationally determined contribution (NDC), which quantified near-term and intermediate targets and actions for reducing emissions in accordance with the Paris Agreement. This effort brought together a national team led by the Costa Rica Climate Change Directorate (Dirección de Cambio Climático de Costa Rica), known as the DCC team, with support from national and international sector experts, including the World Bank (PMR 2015). The NDC articulated an initial set of targets and approaches for reducing net GHG emissions, with a goal of reducing net emissions to 9.37 $MtCO_2e$, or 25 percent by 2030, compared with 2012 (World Bank 2016a). The NDC process also revealed a need for more comprehensive modeling of economic development and emissions pathways to formulate a complete long-term decarbonization strategy.

Costa Rica's government accelerated efforts to decarbonize in 2018. At this time, the president appointed the Climate Change Directorate within the Ministry of the Environment and Energy to lead the development of a new national decarbonization strategy. The Office of the President and First Lady became directly involved in designing, monitoring, and coordinating the plan (Calfucoy et al. 2022). This commitment to climate action helped bring not only the Ministry of the Environment but also the Ministry of Finance and other line ministries—such as energy, transport, and housing—into strategic decarbonization planning. This, in turn, attracted international support,

particularly from the multilateral development bank (MDB) community, for building in-country analytical capacity to drive the complex planning processes to come.

Policy

With international support, Costa Rica built internal technical capacity within its government and national universities. Through partnerships with the University of Costa Rica, the Inter-American Development Bank (IDB), the United Nations Development Programme, and others, Costa Rica was able to garner resources to develop technoeconomic models and capabilities for advanced policy analysis to support dialogues on plausible and beneficial decarbonization pathways (Bataille, Waisman, and Vogt-Schib 2021). By developing strong technical capabilities in the central DCC team, they successfully argued for ambitious climate action with diverse stakeholders, some of whom did not originally share that ambition.

Using this new capability and with international assistance, Costa Rica developed a whole-of-economy net zero national decarbonization plan (NDP), which it submitted as its long-term strategy (LTS) to the UNFCCC at the end of 2019. Importantly, this NDP set the ambitious goal of net zero GHG emissions by 2050—consistent with the more aggressive 1.5°C global warming limit. Taking advantage of its extensive renewable hydropower resources, Costa Rica's NDP called for the electrification of its transport sector, increases in energy efficiency and electrification of buildings and many industries, and investments to promote a more circular economy by collecting and recycling material and fully treating wastewater. Remaining emissions, particularly from agriculture and livestock, are to be completely offset through increased carbon sequestration from forests (Government of Costa Rica 2019). To achieve these outcomes, the NDP defined a framework with more than 70 targets and specific near-term actions for 35 agencies and line ministries, which served as the basis for several large policy-based loans (Jaramillo et al. 2023).

The LTS team formulated and evaluated development pathways that would lead to net zero emissions by mid-century while providing tangible benefits to the country. Costa Rica followed a "deliberation with analysis" approach in which models and quantitative analysis of emissions pathways, costs, and benefits under uncertainty support intense stakeholder engagements and discussions around the analytical results and revealed trade-offs (Groves and Lempert 2007). Developing whole-of-economy pathways and presenting targets and timelines to all emitting sectors enabled technical discussions with different sectors to explore the necessary changes and identify barriers and needed enabling conditions.

Costa Rica's climate policy development process strongly engaged technical and nontechnical stakeholders. The LTS explicitly served as the basis for developing Costa Rica's NDC update in 2020. It used an extensive stakeholder engagement process using a locally developed method called "Climate Conversations" to ensure that it properly considered climate justice and a just transition and that it accounted for the interests of a broad range

of Costa Ricans, including those from marginalized communities (Government of Costa Rica 2020). During the process of updating the NDC, the DCC team held nine decarbonization workshops with some 350 sectoral participants to explore the NDP's benefits and costs (Groves et al. 2020).

The Costa Rican government has taken the lead on institutionalizing measures into law and integrating low-carbon development into governmental processes. Presidential support was crucial in driving the Climate Change Law through congress. Several ministers, including the ministers of finance and planning, attended meetings convened by the president and first lady to agree on how they could support the LTS effort. This high-level engagement was also instrumental in developing and agreeing to the terms of the policy-based loans, which provided concessionary funding for NDP-aligned national development.

Costa Rica has taken important steps to operationalize its NDP, pursuing a wide range of activities to shift its economy toward carbon neutrality. According to its fourth national communication to the UNFCCC, it implemented 17 policy actions and 17 specific mitigation programs between 2015 and 2020. Its NDP lays out 23 projects and programs and 20 policies that would need to be implemented going forward.

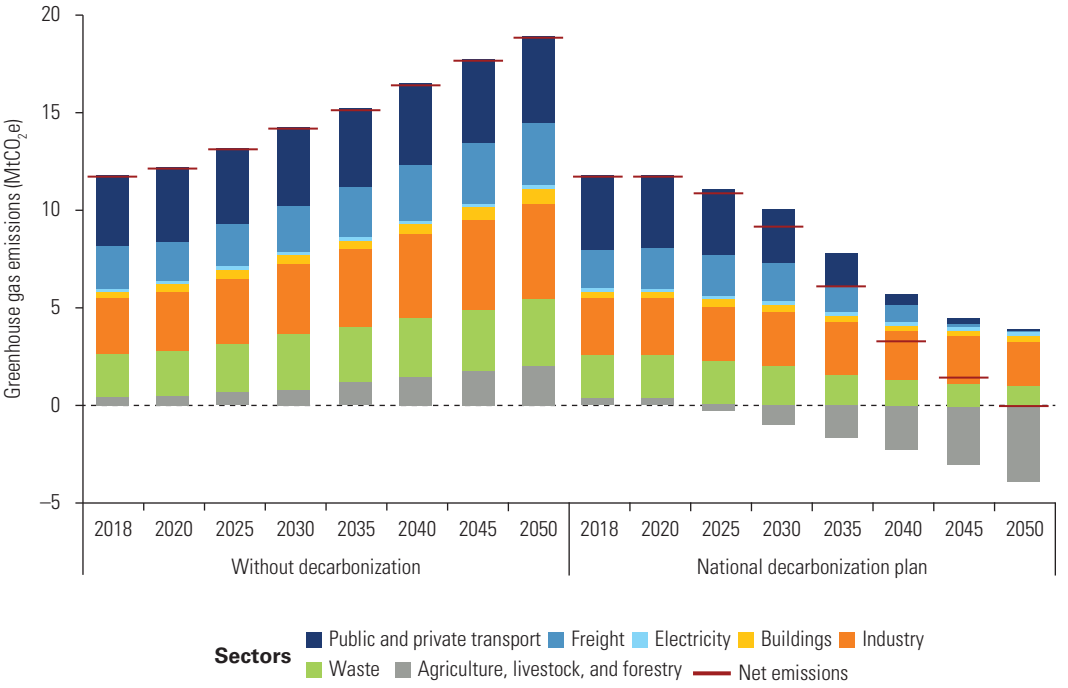
Results and Impacts

Costa Rica's NDP represents one of the most ambitious strategies for low-carbon development for a middle-income country. The NDP covers all major emissive sectors and would lead to net zero by 2050 under baseline assumptions. A follow-on study, supported by the IDB, evaluated the NDP under thousands of plausible futures, reflective of different assumptions, and found that the country would achieve close to zero emissions in most futures (figure 3.1) and that the net benefits of implementing the NDP would likely be highly positive, estimated at $41 billion through 2050 under baseline assumptions.

Analysis of the NDP suggests that its implementation would have highly positive macroeconomic benefits. Evaluations show positive effects on economic growth, employment, and poverty. One study finds that decarbonization and digitization investments could result in 135,000 net new jobs by 2050. Another shows that implementing the NDP could offset longer-term gross domestic product (GDP) and job losses from COVID-19 (Groves et al. 2022). A macroeconomic study, focused on the agriculture, forestry, and other land use sectors, finds cumulative positive wealth impacts in these sectors of about US$9 billion by 2050, and estimates that investments could lift over 4,500 people out of poverty by 2050 (Banerjee et al. 2022).

Articulating a strong decarbonization plan has helped Costa Rica mobilize at least $2.4 billion in international concessional finance. According to a review of the effects of the NDP on financial resource mobilization, Costa Rica has received funds

FIGURE 3.1 Costa Rican GHG Emissions over Time, without Decarbonization and with the NDP



Source: Groves et al. 2020.

Note: Emissions from the electricity sector are negligible in Costa Rica under baseline assumptions. GHG = greenhouse gas; $MtCO_2e$ = metric megatons of CO_2 equivalent (million tons); NDP = national decarbonization plan.

from 13 different sources, including several MDBs and other development partners, in the form of grants, policy-based loans, and dedicated external funding (Jaramillo et al. 2023).

Through governmental leadership, Costa Rica was able to drive agreement on aggressive climate action. The multiprong approach to stakeholder engagement, with workshops across different sectors and groups as well as meetings with larger emitting businesses and state-owned enterprises, was essential. The close links between the central technical and stakeholder engagement teams strengthened their ability to encourage diverse interest groups to consider options of far more ambitious emissions reductions than they had initially thought viable. The high-level political backing also played an important role in reaching an agreement from the state-owned petroleum importer and refiner to the LTS plans for transport electrification.

Key Takeaways

The Costa Rican experience developing and starting to implement its NDP provides several key takeaways on how a middle-income country can build the necessary

technical capacity and political and public support to move toward net zero. It further highlights some key challenges to the full implementation and achievement of a net zero.

- Successful LTS implementation must be guided by a clear transformation pathway that identifies and enables the many targets and changes required to achieve its goals. The concept of a whole-of-economy low-emissions development pathway must be the technical core of an LTS, and its elaboration should be a central aspect of its development process.
- There must be widespread stakeholder buy-in of targets, processes, and narratives of change over the short, medium, and long terms. Stakeholders must understand and agree on the importance of their roles, as this helps ensure that most of their decisions are aligned with the Paris goals. Costa Rica used international expertise and resources to empower and strengthen the national team and help it develop and run a series of sectoral workshops, with the Ministry of Environment and Energy maintaining control and full visibility of the work. This approach allowed the national team to use and defend the analysis throughout the iterative stakeholder engagement process, which would not have been possible with purely outsourced analysis.
- Full political sponsorship at the head-of-government level can ensure the appropriate buy-in and governance to enable LTS implementation. The unprecedented changes implied by the LTS will be disruptive for important sectors, resulting in shifts of activity and investment away from old modalities and into new ones. This can lead key groups to challenge the feasibility of such rapid change and not align with the minister or agency charged with coordinating LTS work. Only clear and constant support from the highest political figures can counter this.
- LTS implementation requires adequate institutional arrangements for financing, monitoring, and ensuring accountability. The mechanisms and institutions responsible for ongoing independent auditing and advice on LTS progress should be made clear and codified in law. Findings and recommendations should be reported at the highest level of government and widely publicized to encourage country leaders to take full responsibility for successful implementation. The challenge of financing decarbonization actions is also an important obstacle. While the central government successfully secured policy-based loans from development banks to support climate action, much more funding will be needed, particularly from the private sector. Finally, local and household actions will drive much of the country's shift to low-carbon development, but municipal authorities often have limited technical and planning capabilities, which can make it difficult to identify and scope specific projects that are in line with LTS requirements and can enhance local conditions. New partnerships between local universities, technical groups, and local governments can help overcome this challenge.