

Executive Summary

# GETTING TO NET-ZERO EMISSIONS

Lessons from  
Latin America and  
the Caribbean

IDB and DDPLAC





Copyright ©2019 Inter-American Development Bank. This work is licensed under a Creative Commons IGO 3.0 Attribution-NonCommercial-NoDerivatives (CC-IGO BY-NC-ND 3.0 IGO) license (<https://creativecommons.org/licenses/by-nc-nd/3.0/igo/legalcode>) and may be reproduced with attribution to the IDB and for any non-commercial purpose. No derivative work is allowed.

Any dispute related to the use of the works of the IDB that cannot be settled amicably shall be submitted to arbitration pursuant to the UNCITRAL rules. The use of the IDB's name for any purpose other than for attribution, and the use of IDB's logo shall be subject to a separate written license agreement between the IDB and the user and is not authorized as part of this CC-IGO license.

Note that link provided above includes additional terms and conditions of the license.

The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.



Suggested citation: IDB and DDPLAC (2019). Getting to Net-Zero Emissions: Lessons from Latin America and the Caribbean. Inter-American Development Bank, Washington D.C







# Foreword

In 2019, the Inter-American Development Bank Group celebrates its 60th anniversary. Over the last six decades, it has played a transformative role in Latin America and the Caribbean to promote development. As we reflect upon many of these positive advances and look ahead, what will our contribution to the region be over the next decades?

This deliberation must consider that we face simultaneous and overlapping ecological and climate emergencies. The United Nations says that as many as 1 million species are now at risk of extinction due to human activity and that transformative action is required now, and sustained through 2050, to ensure that the world limits global heating to 1.5 degrees Celsius.

As the world's most biodiverse region and one of the most vulnerable to climate change impacts, the Region's future hinges on our ability to fundamentally transform its development pathway. A failure to do so could roll back years of progress and make it near impossible to achieve sustainable and inclusive growth. Our responses must put citizens first to ensure that we continue to simultaneously help solve development challenges while avoiding exacerbating existing ones or inadvertently creating new problems.

While climate change presents considerable risks, countries across our region are demonstrating that efforts

to confront it could help to launch new engines for sustainable development. Thinking about climate action as a development choice is paramount as thus far global efforts to arrest climate change have fallen short. To a large extent, we have been looking at the climate problem through the wrong lens by talking about the reduction of greenhouse gas emissions as a cost rather than an economic opportunity. This has resulted in incremental steps, which moves us forward some of the way, but not nearly far enough to where we need to get to.

In a bold and intellectually stimulating step, various Latin American and Caribbean countries are leading the way, with long-term decarbonization strategies that represent transformative tools to steer economic development towards a more sustainable, resilient, inclusive and competitive future.

These initiatives in the region show that climate action is not just about reducing emissions but choosing a new development path. The transition is about what jobs we want in the future, not just about how many jobs. It is about developing the green industries of the future. And it is about reducing air pollution and congestion in our cities and saving money – rather than imposing incremental costs. I am proud to say that the IDB is supporting countries with this innovative work to deliver on the objectives of the Paris Agreement and the Sustainable Development Goals.

Getting to Net-Zero Emissions chronicles the inspiring work underway by LAC governments to design and implement long-term decarbonization strategies and plans. There is no question that transforming our economies towards net-zero emissions will be tough. However, the evidence is growing that it is both technically possible and, with the right approach, can bring economic benefits to the region. Achieving net-zero emissions is essential to confront the climate crisis and implement the goals of the Paris Agreement.

As we conclude this decade and look ahead to the 2020s and beyond, I am confident that the design and careful implementation of these long-term strategies is not only necessary to achieve the Paris Agreement goals but can also harness technological advances needed to boost sustained and inclusive growth. Governments are the protagonists to facilitate this transition from today towards decarbonization by removing regulatory barriers, enabling and encouraging new business models and ensuring an inclusive transition.

The IDB will continue to support our LAC partners to implement their commitments under the Paris Agreement and achieve a more sustainable and inclusive development, which can improve the lives of all. A paradigm shift is required, and this publication shows the way forward: getting to net-zero emissions is necessary, it can positively contribute to development and it can be done.



**Juan Pablo Bonilla**  
*Manager, Climate  
Change and Sustainable  
Development Sector,  
Inter-American  
Development Bank*





# Acknowledgements

---

The Getting to Net-Zero Emissions report, published by the Inter-American Development Bank, was prepared in the months leading up to COP25. It was led by Adrien Vogt-Schilb, under the direction of Amal-Lee Amin, Chief of the Climate Change Division at the IDB.

The report is signed by the IDB and the DDPLAC consortium. The DDPLAC consortium comprises the contributors to the coordination, financing and implementation of the IDB-led Deep Decarbonization Pathways for Latin America and the Caribbean (DDPLAC) project.

The DDPLAC project is financed by the IDB Sustainable Energy and Climate Change Initiative fund (RG-T3028), the IDB French Climate Fund (RG-T3193), the 2050 Pathways Platform, and the Agence Française de Développement (AFD). The

project execution is coordinated by the Institute for Sustainable Development and International Relations (IDDRI) under an IDB mandate.

The authors of the report are Adrien Vogt-Schilb, Hervé Breton, Guy Edwards, Marcela Jaramillo and Amal-Lee Amin from the IDB's Climate Change Division.

The authors of the report from the DDPLAC consortium include: Henri Waisman, Chris Bataille, Yann Briand, Pierre Marie Aubert and Johannes Svensson (IDDRI); Richard Baron and Bridgette Burkholder (2050 Pathways Platform); Damien Navizet, Slim Dali, Oskar Lecuyer and Nicolas Meisel (AFD); Francisco Lallana and Gonzalo Bravo (Fundación Bariloche); Gaëlle Le Treut and Julien Lefevre (CIRED); Angela Cadena and Ricardo Delgado (Universidad de los Andes); Ricardo Arguello (Universidad del





Rosario); German Romero (Departamento Nacional de Planeación de Colombia); Thomas Wild, Zarrar Khan and Leon Clarke (UMD); Jae Edmonds (PNNL); Guido Godinez, Luis Víctor-Gallardo and Jairo Quiros-Tortos (Universidad de Costa Rica), Eunice Ramos, Mark Howells and Will Usher (KTH), Felipe De León (Dirección de Cambio Climático, Ministerio de Ambiente y Energía de Costa Rica); Rafael Soria and Daniel Villamar (Escuela Politécnica Nacional), Pablo Carvajal (Escuela Politécnica Nacional and IRENA); Roberto Schaeffer, Alexandre Szklo, Pedro Rochedo, Mariana Imperio (Universidade Federal do Rio de Janeiro); Jordi Tovilla, Daniel Buira and Dennis Gastelum (Tempus Analítica), Jamil Farbes, Ben Haley and Ryan Jones (Evolved Energy Research); Jim Williams (University of San Francisco); Ximena Gomez, Willy Mak, Fernando Requejo, Mauricio Collado (Universidad del Pacífico) and Daniel De La Torre

Ugarte (Universidad del Pacífico and University of Tennessee).

Graham Watkins, Andrew Powell, Eduardo Cavallo, Bridget Hoffman, Tomas Serebrisky, Maria Eugenia Sanin, Juan Paredes, Michelle Carvalho Metanias and Marcelino Madrigal of the IDB, Alexander Rincon and Iván Darío Valencia (Ministerio de Ambiente y Desarrollo Sostenible de Colombia) each provided valuable input and feedback.

The comments and opinions expressed in this publication are those of the authors and do not reflect the views of the Inter-American Development Bank or its executive directors in any form, or in general those of the institutions the authors work with.

The report was designed by Eveliz Jurado with support from Andrea García.



# Key messages

---

**1** Limiting global warming to between 1.5°C and 2°C above pre-industrial levels requires achieving net-zero emissions of CO<sub>2</sub> by around midcentury and substantial reductions by 2030.

---

**2** The transition to net-zero emissions is technically possible by producing zero carbon electricity; electrifying industry, transport, heating, and cooking; increasing the provision of public and non-motorized transportation; managing and regenerating natural carbon sinks; and, by improving resource use efficiency, reducing waste, and minimizing carbon intensity in construction and diets.

---

**3** The transition to net-zero emissions brings substantial economic and development opportunities for Latin America and the Caribbean (LAC). The cost of renewable electricity and electric mobility is dropping fast. Solar and wind are already the cheapest options in many LAC countries. Done right, the transition can bring one million net jobs in the region by 2030 and generate benefits worth several percentage points of GDP through avoiding the current loss of productivity in congestion and health impacts from pollution.

---

**4** The implementation of current Nationally Determined Contributions (NDCs) is insufficient to meet the temperature goal envisaged in the Paris Agreement and may lock in high-emission pathways by creating technical and economic barriers to decarbonization, including future asset stranding. Updated NDCs could save the region \$90bn in avoided stranded assets and \$100bn in reduced investments costs just in the power sector.

---

**5** Long-term strategies can guide the design of more ambitious NDCs, help governments to anticipate costs, manage trade-offs, and ensure a just transition to net-zero emissions, while identifying the immediate policy reforms and investment priorities necessary to unlock the transformation.

---

**6** Latin America and the Caribbean is producing compelling evidence on how to work with stakeholders from government, civil society, academia and the private sector to design long-term strategies that integrate economic, social and decarbonization goals.







# Overview

## // Achieving net-zero emissions by around 2050 is necessary, possible and beneficial to development

The Inter-governmental Panel on Climate Change (IPCC) indicates that meeting the Paris Agreement's goal of limiting the global temperature rise from pre-industrial levels to between 1.5 and 2 degrees Celsius requires **reaching net-zero emissions of carbon dioxide (CO<sub>2</sub>) between 2050 and 2070, as well as deep reductions in the emissions of other greenhouse gases (GHGs).**

**Getting to net-zero emissions of CO<sub>2</sub> is technically possible.** Governments, academics, think tanks, and international agencies agree that it can be done through actions around four central pillars: (i) producing zero carbon electricity (e.g. through a large-scale rollout of energy from renewable sources); (ii) undertaking massive electrification (e.g. deployment of electric vehicles and electric cooking stoves) and switching to other carbon-free fuels; (iii) increasing the share of public and non-motorized transportation; (iv) halting deforestation and protecting and regenerating natural carbon-rich ecosystems. In addition, countries will need to improve efficiency and reduce waste across all sectors, particularly from energy and food consumption, and switch to less carbon-intensive industrial processes, building materials and diets.

**The costs of zero carbon technologies are dropping rapidly whereas business as usual is becoming more expensive and exposed to transition risks including asset stranding.** Renewable energy is now the cheapest form of electricity in many countries, following a fivefold reduction in costs over the last decade. The cost of batteries for electric vehicles has also seen a six-fold reduction in just eight years, which is expected to continue.

**The transformation to net-zero emissions can bring economic opportunities and contribute to delivering on the Sustainable Development Goals.** The OECD suggests that decisive action taken now towards decarbonization, if accompanied by structural policies, could increase GDP in 2050 by up to 2.8% on average across G20 countries. The ILO also says that one million net jobs could be created in Latin America and the Caribbean (LAC) by 2030 in the process. Actions to decarbonize can also help overcome development gaps. For example, transport systems relying more on public transport and electric vehicles can improve the quality of life for citizens of LAC countries and bring several percentage points of GDP worth of benefits through reducing time lost in congested roads and minimizing the health impacts of air pollution.

## // Several challenges need to be carefully addressed

**The current round of emissions reduction pledges outlined in the Nationally Determined Contributions (NDCs) are insufficiently ambitious to achieve the Paris Agreement goals.** IPCC scenarios compatible with the global temperature objectives imply substantial reductions of CO<sub>2</sub> emissions by 2030, which go far beyond existing collective targets put forward by countries in the context of the UN Climate Change Conference in Paris in 2015. Furthermore, policies, laws, and



investments for implementing existing NDCs could lock in high-emission pathways and create new technical and economic barriers to decarbonization. A significant risk is that long-lived assets, such as energy and transport systems, built in compliance with NDCs could become “stranded” (i.e. abandoned with consequent significant economic losses), when climate ambition is eventually increased. If the goals of the Paris Agreement are to be met, it is crucial that the updated NDCs, to be submitted in 2020, are consistent with country-specific pathways towards net-zero emissions.

In LAC, implementing current NDCs and correcting course in 2030 to reach carbon neutrality by 2050, would create USD 90 billion worth of stranded assets in the power sector. Doing so would also require USD 100 billion more in power plant investments than a transition starting from more ambitious NDC targets.

**The transition towards net-zero emissions potentially creates winners and losers, with negative social impacts if not carefully addressed.** The potential negative impacts on consumers, workers, communities and businesses include those related to phasing out or downsizing economic activities that are inconsistent with net-zero emissions, e.g. the production of fossil fuels or cattle. The short-term impact of removing energy subsidies or introducing environmental taxes that increase the cost of food and basic services are also important issues. These impacts need to be anticipated, minimized, and compensated by targeted policies and complementary measures. Furthermore, international evidence suggests that the social acceptability of reforms requires the consultation of stakeholders and communication campaigns before implementing reforms.

**Deep decarbonization will also affect sectors that contribute towards a country's fiscal revenues.** Fiscal sustainability is essential to the political feasibility of the reforms needed for transformational

approaches. For instance, the adoption of electric vehicles would typically reduce revenues from gasoline and diesel taxes, which can represent more than 10% of fiscal revenues in countries such as Costa Rica or Uruguay. It is necessary to anticipate these changes to allow for alternative fiscal measures to be planned and implemented. At the same time, the revenues that governments in LAC derive from oil production and exports, a key source of government funding in countries such as Ecuador and Venezuela, could be reduced by USD 4 trillion over the 2020–2035 period because of the global transition towards net-zero emissions. Ministries of Finance of oil-exporting LAC countries need to be aware of this transition risk and take measures to mitigate it.

**Current regulations can undermine the implementation of low-carbon options by the private sector.** The prevailing market organization of entire sectors may be intrinsically linked to incumbent technologies, practices, and business models. For instance, the LAC public transport sector tends to rely on small-scale operators that may struggle to bear the higher upfront cost of electric buses, even if these vehicles make greater financial sense over their lifetime. Governments will need to change the rules of the game and let new business models emerge.

**Current prices may send the wrong signal.** The IMF estimates that, at the global level, varied forms of energy subsidies stood at USD 5.2 trillion (6.5% of GDP) in 2017, with LAC accounting for 5% of global energy subsidies. On the other hand, the abrupt increase of prices, due to subsidy removal or environmental taxation, could hurt poor and vulnerable consumers, disrupt business models, create stranded assets, and lead to business closures and jobs losses. Any significant price change needs to be phased-in and accompanied by measures to help the most affected groups manage the transition.





**// Long-term strategies can help governments plan for net-zero emissions, anticipate and manage trade-offs, update NDCs, and design policy and investment roadmaps needed to enable the transition**

As part of the Paris Agreement (Art 4.19), by 2020 Parties are expected to formulate and communicate long-term development strategies to reduce greenhouse gas emissions. **Long-term strategies (LTSS) should establish a country's vision of specific development outcomes associated with deep decarbonization**

by mid-century, and identify the sectoral pathways to get there, so as to guide the design of more ambitious NDCs.

**Many countries in LAC have established processes for developing national decarbonization plans.** Costa Rica published its national decarbonization plan in February 2019. This plan is one of the first to map out a comprehensive transition to net-zero emissions by 2050, including setting out a sequenced policy package. In 2019, twenty-one countries in LAC have announced that they are working towards achieving net-zero emissions by 2050.

**Several key principles have emerged in recent years to guide the elaboration of long-term strategies.** These include the integration of all development goals, beyond decarbonization, as well as the participation of multiple stakeholders from civil society, the private sector and



government from inception through to implementation. Back-casting from a 2050 vision to the present day helps identify the public policy, planning and investment choices needed to achieve this vision, particularly for long-lived infrastructure, as well as an appropriate sequence of policy actions for a just and inclusive transition.

These principles have guided the design of the **Deep Decarbonization Pathways in Latin America and the Caribbean (DDPLAC)** project led by the IDB, in partnership with the 2050 Pathways Platform and the Agence Française de Développement (AFD), and drawing on the experience of the Institute for Sustainable Development and International Relations (IDDRI). Under this project, domestic universities and think tanks from six LAC countries (Argentina, Colombia, Costa Rica, Ecuador, Mexico, and Peru) are investigating national decarbonization pathways. The teams are using models describing the energy, agriculture and land-use systems built in partnership with international experts, creating a regional peer-to-peer exchange platform, and discussing decarbonization scenarios with policymakers, civil society, and other stakeholders in their countries.

**The pathways confirm that decarbonization can be achieved alongside economic growth.** In all six countries analyzed in the DDPLAC project modelling teams have developed scenarios where GDP per capita increases steadily by 2050 while emissions are reduced by 55-100%. In the case of Costa Rica, decarbonizing the transport sector will bring total net benefits of nearly USD 20 billion by 2050 as a result of the reduced negative impacts of air pollution on health, time saved from reduced congestion, fewer accidents, and lower operating costs. These benefits more than compensate for the initially higher upfront costs of switching to electric vehicles.

**Long-term strategies can help inform the re-orientation of infrastructure choices and the design of investment plans**

**to deliver the transition.** Examples of investments in the transport sector planned for 2019-2022 in Costa Rica's National Decarbonization Plan include dedicated bus lanes, intermodal stations, a network of fast charging stations, and an electric passenger train project. With priorities on investments defined, governments can identify financing gaps and possible approaches to catalyze investments.

**Long-term strategies can help build policy roadmaps to address regulatory barriers to decarbonization.** Starting from a clear vision of what they are trying to achieve, governments can focus reforms on enabling the transition to net-zero emissions. For instance, Chile has created new business models in the public transport sector to enable the introduction of electric buses, and Costa Rica is thinking about the design of a new payment for ecosystem services to incentivize reforestation and the preservation of biodiversity by private farmers.

**A long-term vision can help manage fiscal impacts.** Countries that tax gasoline consumption can progressively adjust the rate of taxes on gasoline, electricity and vehicle ownership and operation based on the targets in their decarbonization plan. For oil exporting countries, a long-term view gives time to plan the diversification of their economy and the targeting of government funding to reduce their vulnerability to changes in global fossil fuel demand.

**Long-term strategies can also help governments manage the social impacts of decarbonization and ensure a just and inclusive transition.** Chile is transforming its power sector through the progressive retirement of coal powered generation. This is being supported by a dialogue between the government and coal power plant owners, workers' unions, affected municipalities, academia, and civil society. This process has allowed for consideration of the timing of coal phase out and the potential use of compensatory policies to support the most affected communities.



All the countries in Latin America and the Caribbean have ratified the Paris Agreement, which aims to limit global warming to between 1.5°C and 2°C above pre-industrial levels. Those goals require reaching net-zero carbon dioxide emissions by around 2050.

*Getting to Net-Zero Emissions* takes stock of the lessons learnt from IDB analysis and experience in Latin America and the Caribbean and proposes approaches to developing and delivering long-term pathways to net-zero emissions by 2050. By reading this report, we hope that decision makers and technicians will gain insights into how to deliver decarbonization successfully.

The report shows the essential role played by long-term strategies in terms of identifying and planning the deployment of the infrastructure and policy packages necessary to ensure a just transition towards a net-zero emission economy. Long-term strategies will help governments anticipate fiscal and financial costs, manage trade-offs, minimize social impacts, and define the sequence of policy reforms and investment priorities required to deliver a carbon-neutral future.

The design of long-term strategies by 2020 – in line with the timeline envisaged in the context of the Paris Agreement – can guide the establishment of more ambitious Nationally Determined Contributions (NDCs) and minimize stranded assets and associated costs.

Long-term strategies are an essential instrument, both to contribute to the redirection of public and private investments, and to guide the dialogue with development institutions seeking to support sustainable and inclusive development.