GUIDE

NDC – LT-LEDS ALIGNMENT GUIDE

ALIGNING SHORT-TERM PLANS WITH LONG-TERM AMBITIONS

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Executive Summary

The next round of Nationally Determined Contributions (NDCs), due in 2025, is a critical milestone in global climate efforts. A key challenge will be ensuring that these short-term plans align with the long-term systemic transformations needed to meet the goals of the Paris Climate Agreement.

Alignment involves strategically designing short-term plans to support and contribute to the achievement of long-term objectives. Within the United Nations Framework Convention on Climate Change (UNFCCC) and beyond, there is broad and ongoing consensus that NDCs must align with the goals of the Paris Agreement. Working towards alignment can bring many benefits, including greater policy coherence, operational efficiency, credibility in climate commitments, and the ability to attract investment.

To help countries achieve this alignment, this guide provides a practical framework based on the premise that countries can fully understand how their NDCs align with the Paris Agreement only by viewing alignment through the lens of the elements provided by a Long-Term Low Emission Development Strategy (LT-LEDS). An LT-LEDS can highlight transformations and actions that might be overlooked in a short-term perspective, expanding the scope of the alignment process.

The guide acknowledges the difficulties involved in using LT-LEDS to align NDCs with the Paris Agreement, with a key challenge being that an LT-LEDS generally provides a normative vision that must be reconciled with current political and economic considerations. Additional challenges include the absence of LT-LEDS in many countries, misaligned timelines, and coordination gaps.

It underscores the essential elements that an LT-LEDS should include to support alignment: a clear pathway linking short and long-term actions; analysis of sector-specific drivers of transformation; and a consistent vision across sectors and the entire economy. It should also explore multiple future scenarios and account for varied impacts, while emphasizing the importance of international cooperation and building on an inclusive process to enhance ownership.

This guide consists of a set of questions for countries to consider, divided into two categories: content alignment, which examines how short-term plans correspond to long-term transformations; and process alignment, which focuses on organizational aspects such as coordination and planning. While countries may not be able to answer all questions in this NDC round, they should consider them as part of an ongoing, iterative process to progressively enhance alignment over time.

Regarding content, the framework is applied to assess how an LT-LEDS or net-zero target has been incorporated into an NDC. It also examines the short and medium-term targets needed to support long-term carbon neutrality, and which actions and policies should be implemented. The framework also highlights how countries could integrate relevant Global Stocktake (GST) outcomes, and identifies where cooperation would be crucial to achieving climate goals.

Process alignment is essential to achieve content alignment. It ensures that the various parts of government are engaged, that society is consulted, and that there is policy coherence with past regulations and reporting mechanisms. The framework includes questions on government coordination, societal inclusion, and policy coherence.

This guide includes four case studies that apply the framework and provide real-world examples of working towards alignment in Chile, the European Union, Morocco, and India.

Introduction

The preparation of the next round of Nationally Determined Contributions (NDCs) is a key milestone in international climate discussions for 2024-2025. The submission deadline is set for 10 February 2025,[1] and many countries have already started their preparations. The capacity of these national plans to integrate the lessons from previous processes, notably the Global Stocktake (GST) at an international level, and also other national and international benchmarks, will be a fundamental test for the ratcheting up of ambition from the Paris Agreement.

The key question is whether short-term plans,[2] such as those codified in NDCs, will demonstrate stronger alignment with the long-term systemic transformations[3] widely recognized – including in the recent GST – as essential to achieving the Paris Agreement objectives. In this guide, we define *alignment* as short-term plans that support the achievement of these long-term objectives.

This guide has a twofold purpose aimed at enhancing the quality and ambition of NDCs, with countries as a primary audience. Firstly, it provides guidance for the 2025 round of NDCs. Secondly, it anticipates future work on NDCs – either assessing the 2025 submissions or preparing for the next iterations in 2030. Furthermore, this guide aims to help make the 2025 NDCs a useful input for the GST2 process, thereby informing the climate community and the United Nations Framework Convention on Climate Change (UNFCCC) process.

To support countries with their approach to alignment, this guide provides a framework to align short-term plans with long-term objectives. It is essential to have a long-term perspective, such as that provided by Long-Term Low Emission Development Strategies (LT-LEDS)[4] or other Paris-aligned national long-term plans and visions. In Chapter 2, we outline the elements that an LT-LEDS provides that would help towards alignment. However, an LT-LEDS is not strictly required to start working towards alignment and we therefore encourage countries without one to use this guide as a reference nonetheless. Information can be drawn from other Paris-aligned plans, visions and documents. For example, a national development strategy can offer a long-term perspective if it takes climate change into account and aligns with the goals of the Paris Agreement. Finally, countries can also access support for development of the LT-LEDS with development partners.[5]

This guide focuses solely on the mitigation aspects of alignment, reflecting the expertise of its authors. This emphasis does not diminish the importance of adaptation and how it should be considered in NDCs and LT-LEDS, and also when working towards alignment. Other resources, such as the NDC Partnership's NDC 3.0 Navigator, offer valuable and specific guidance on adaptation,[6] and we encourage you to consider this tool when working towards alignment.

This guide is structured into four chapters. The first discusses the issue of alignment and the importance of aligning short-term plans with long-term ambitions. The second chapter presents a framework for alignment and explains how it functions. Next, four country case studies provide specific examples of how countries are practically approaching alignment by applying this framework. Finally, a conclusion links the country case studies with the framework.

1 https://unfccc.int/sites/default/files/resource/PAICC_11_meeting_report.pdf
2 In this guide, we use the term 'plans' to encompass a range of elements, including measures, targets, and policies. Our goal is to highlight not only our commitment to aligning these targets, but also the foundational strategies that support them.
3 In the IPCC Sixth Assessment Report (AR6), "system transformation" is defined as a profound change in the structures and functions of systems—such as energy, transport, and land use—that is necessary to achieve substantial reductions in greenhouse gas emissions and enhance resilience to climate impacts. These system transitions involve a significant upscaling of a broad portfolio of mitigation and adaptation options. (See Section 4.5, IPCC AR6, 2023)
4 For the purpose of this guide and to enhance readability, we use the term Long-Term Low Emission Development Strategy (LT-LEDS), understanding it to be interchangeable with the often-used Long-Term Strategy (LTS).
5 For example, through the MDBs Joint LTS support Programme or the 2050PP. In addition, a request can be made via de NDC Partnership Global Call.
6 https://ndcnavigator.org/routes/adaptation-goal/

Alignment: what and how

ALIGNMENT IN A PARIS AGREEMENT CONTEXT

Alignment is the process of ensuring that short-term plans (such as NDCs) are strategically designed to support and contribute to the achievement of long-term objectives.

Firstly, it is important to note that alignment is an iterative process rather than a fixed goal. Countries may not currently be aligned in terms of ambition, but having a long-term vision can help identify where to act now to increase the potential for greater ambition in the future. This can be achieved by removing barriers that currently limit ambition in the NDC cycle, thereby creating the foundation for future iterations with even more ambitious goals. This ongoing alignment process mirrors the cyclical structure of the Paris Agreement's five-year cycles, where setting a net-zero target (or emission reduction targets) and defining pathways to achieve that target serve both as a goal and as guidance for current and future NDCs.

The GST is a central component of this iterative alignment process, playing a crucial role in sharing lessons learned from national actions and progress in international cooperation, which in turn informs the revision of NDCs. Due to its iterative nature, the GST occurs every five years, two years before each NDC revision, giving countries time to integrate its insights. NDCs themselves are a key input to the GST process, and more robust NDC iterations can contribute to a successful GST by providing a clearer understanding of each country's progress and evolving needs.

There is broad and repeated consensus within the United Nations Framework Convention on Climate Change (UNFCCC) and beyond that NDCs must align with the goals of the Paris Agreement and be consistent with LT-LEDS. The specific details of the relevant UNFCCC decisions are outlined in **Box 1** below. As such, **alignment requires countries to determine how to practically integrate their NDCs with the global long-term goals of the Paris Agreement, with LT-LEDS serving as a critical tool to support this integration.**

HOW TO ALIGN: USING LT-LEDS AS A TOOL FOR ALIGNMENT WITH THE PARIS AGREEMENT GOALS

This guide presents a practical approach to alignment, aimed at helping countries effectively work toward meeting the Paris Agreement goals. Long-term system transformations are widely recognized as essential for achieving these objectives. LT-LEDS are uniquely positioned to explore system transformations within a country, as

Box 1. The international mandate for NDCs and LT-LEDS

NDCs and LT-LEDS are key plans guiding climate action within the UNFCCC and at a national level.

Both NDCs and LT-LEDS were established by the Paris Agreement in Article 4, with Article 4.1 setting them in the context of carbon neutrality. The two instruments have different time frames: NDCs must be submitted every five years (1/CP21 Article 4.9) and should represent a progression from the previous NDC, reflecting the country's highest possible ambition. LT-LEDS, established by Article 4.19, do not have a specified submission frequency, although there have been calls for periodic updates, as examined below. NDC targets generally cover a ten-year horizon, while LT-LEDS extend to the mid-century or beyond.

Over the years, the mandate for these two instruments has been ratified and strengthened. The Glasgow Pact at COP26 called on countries to revisit and strengthen the 2030 targets in their NDCs (1/CP26 Article 29) to increase their ambition and bring them closer to the Paris goals. It also urged countries that had not yet submitted an LT-LEDS to communicate one "towards just transitions to net-zero emissions by or around mid-century" by COP27 (Article 32) and highlighted the importance of aligning both instruments (Article 35).

More recently, COP28 provided another opportunity to ask countries to strengthen their NDCs by the end of 2024 (1/CP28, Article 37) to align with the Paris Agreement goals, particularly the 1.5°C temperature goal (Article 39). Countries were also encouraged to submit new NDCs by 2025 and to present them at a special United Nations Secretary-General event (Article 190). COP28 reiterated the Paris Agreement commitment to submit NDCs every five years, encouraged countries to use 2035 as an end date (Article 170) and urged them to start or intensify domestic arrangements for preparing and implementing such NDCs (Article 171).

COP28 also invited countries to communicate or revise LT-LEDS by COP29 (1/CP28 Article 42) and noted the importance of aligning NDCs with LT-LEDS (Article 40).

they provide detailed insights into the changes needed and align them in relation to a long-term carbon neutrality goal. In this way, they act as a direct translation of the Paris Agreement goals into a national net-zero goal and its required transformations.

This guide proposes that alignment with the Paris Agreement goals starts by developing a national perspective on the global long-term goal, with the elements of an LT-LEDS serving as the primary tool for this process. In other words, **countries can fully understand how their NDCs align with the Paris Agreement only by viewing alignment through the type of information found in an LT-LEDS.** For countries lacking an LT-LEDS, these elements can be sourced from other Paris-aligned plans.

LT-LEDS are generally designed to capture a country's national realities and aspirations, envisioning a pathway towards net-zero. Their open process makes the LT-LEDS a practical means of integrating the diversity of national planning processes that typically happen simultaneously in a country, such as those related to economic planning, development, adaptation/resilience and biodiversity. They are not, however, intended to address the detailed short-term obstacles, such as political and economic constraints; instead, they operate on the assumption that these challenges can be overcome.

In contrast, an NDC represents a snapshot assessment by the government of the relevant compromises achievable at a given moment on the path toward the LT-LEDS, integrating additional constraints that may not be present in the longer-term vision. These constraints could be political economy considerations – such as those emerging from existing sectoral or national goals, national policy objectives, ongoing cooperation agreements, and historical socio-economic trends.

The distinct nature of NDCs and LT-LEDS therefore highlights the need to revisit the assumptions underlying an LT-LEDS in light of a country's current realities. When working towards alignment, countries must ensure that the NDC effectively incorporates any additional constraints. This process will help countries understand their current situation and the optimal path to reach the long-term goal. Moreover, it will identify any tensions between the aspirational long-term goal and the current situation and, therefore, which steps are needed in the near future—and that should be included in the NDC—to enable these long-term transformations. This review requires the involvement of stakeholders with specific expertise in the country's political economy, its challenges, and potential solutions. This group should include those responsible for implementation, such as regional governments.

CHALLENGES AND BENEFITS OF ALIGNMENT THROUGH AN LT-LEDS

Aligning NDCs with LT-LEDS is not a straightforward task. For many countries, the need to align an NDC with longer-term perspectives presents significant challenges.

This guide acknowledges the difficulty of aligning short-term plans with long-term objectives. Firstly, some countries do not yet have an LT-LEDS. At the time of writing, 73 countries have submitted one to the UNFCCC.[7] For those without an LT-LEDS, it may be more difficult to develop a coherent vision of the future and investigate the possible options towards net-zero. Secondly, while some countries may have an LT-LEDS, the document may lack the clarity needed to directly inform an NDC. Later in this section we explain the essential elements of an LT-LEDS that support effective alignment. Thirdly, LT-LEDS and NDC processes are sometimes misaligned, not only in terms of content, but also regarding timing and coordination.

Alignment through an LT-LEDS can be a complex challenge, but it offers significant rewards. The NDC 3.0 Navigator,[8] developed by the NDC Partnership, highlights the key benefits of alignment, which we summarize and expand on in six key points below:

- **Consistency and coherence:** Aligning NDCs with an LT-LEDS fosters coherence in climate policies, helping to avoid short-term decisions by governments that may jeopardize long-term objectives.
- **Policy integration:** Given that LT-LEDS often cover multiple sectors of the economy, leveraging sectoral strategies in the NDC preparation can help facilitate coordination among different among government ministries, agencies, and stakeholders, enabling a more effective response to climate change. This enhances alignment and increases the effectiveness of climate initiatives by ensuring that sectoral strategies complement rather than conflict with each other. Alignment can also bring vertical integration. If the LT-LEDS process addresses sub-national level climate action, then the NDC should also address it consistently.
- **Enhanced ambition:** When a country establishes a net-zero emissions target through an LT-LEDS or similar framework, aligning the NDC with that target can reveal options that might be overlooked through a forecasting approach. This encourages greater ambition in NDC targets and enhances compatibility with a Paris Agreement-aligned emissions pathway.

7 https://unfccc.int/process/the-paris-agreement/long-term-strategies
8 https://ndcnavigator.org/routes/temperature-goal/align-to-LTS/

- **Investment certainty:** Aligning an NDC with an LT-LEDS communicates key priorities and investment strategies, providing assurance and stability for donors, investors, the private sector, and consumers making long-term decisions. This alignment reinforces a country's commitment to a low-emission, climate-resilient path, attracting investment that supports successful NDC implementation.
- **Process efficiency:** Aligning NDC and LT-LEDS processes can bring efficiency benefits, such as reducing the costs associated with documentation and updates, improving model and data efficiency, and minimizing stakeholder fatigue, etc.
- **Credibility:** An NDC that lacks alignment with an LT-LEDS, or exists without one, may raise questions about the credibility of a country's NDC and its climate commitments.

A "GOOD" LT-LEDS: FEATURES THAT SUPPORT ALIGNMENT

To effectively support the alignment of NDCs with the Paris Agreement goals, an LT-LEDS should include the features outlined in this section. These recommendations build on the experience of the Deep Decarbonization Pathways (DDP) initiative, which focuses on co-developing long-term pathways relevant for national decision-makingand are gathered in Waisman et al. (2021). Some of these insights are also close to those gathered by work supported by the 2050PP:

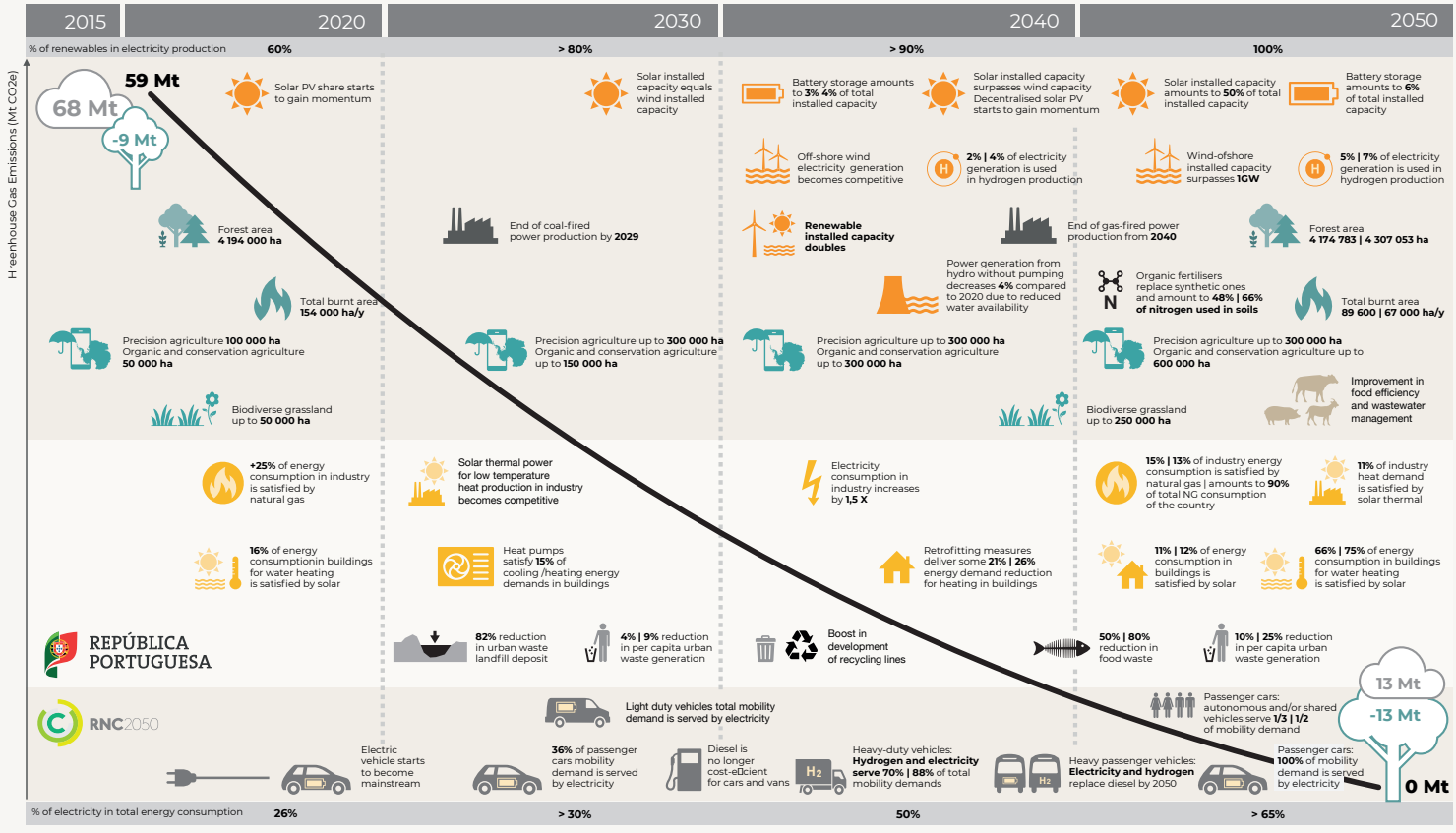
Analyse interplays between different time horizons: clearly identify short-term priorities essential for advancing the mid-century transition

A key role of an LT-LEDS is to link different time horizons together and to define a clear and transparent pathway that shows how short-term actions lead to long-term objectives. Specific short-term plans outlined in an NDC should be carefully considered against the LT-LEDS to ensure the country is on track to achieve long-term transformations. A backcasting approach is essential for this purpose. Backcasting is a planning method that starts by defining a desired future and then involves working backward to identify the policies and actions needed to move from the present to that future. This approach ensures that NDCs can account for path dependencies arising from potential inertia and the lock-in effects of short-term decisions, because actions in the short term fundamentally shape longer-term possibilities.

Figure 1 below provides a graphical example from the Portuguese "Roadmap to Carbon Neutrality",[9]

9 https://unfccc.int/sites/default/files/resource/RNC2050_EN_PT%20Long%20Term%20Strategy.pdf

Figure 1. Overall narrative of carbon neutrality by 2050 divided by sectors



Source: Portuguese LT-LEDS

showing how each sector specifically contributes to the long-term carbon neutrality goal, and the steps required each decade to achieve this goal. This example highlights the importance of aligning short-term measures with longer-term planning.

Make explicit the drivers of sectoral transformations: link transformations with practical actions

Turning sectoral emission trends into specific policies requires a thorough understanding of the fundamental changes driving these overall trends. An LT-LEDS should provide a detailed vision of the necessary changes, including in the short term, to link them with implementable policy actions. To achieve this, the approach to modelling is key. Here, we draw on elements from the DDP approach, based on Waisman et al. (2019).

When designing an LT-LEDS, developing a sufficiently detailed vision of the changes a country must undergo requires going beyond simple modelling approaches, as modelling tools cannot capture all sectors in adequate detail. To address this, it is essential to start by designing overarching narratives of the transformation needed for a country to reach net-zero. These narratives, which can be co-constructed with the various stakeholders through public participation, will describe the evolution of decarbonization drivers across economic, demographic, technical, organizational, and behavioural dimensions.

Once decarbonization narratives are developed, their effects can be calculated through detailed indicators. These calculations may involve various modelling tools, expert-based assessments, or other quantitative assessment methods. Integrating these different analyses is essential to present a coherent picture in the final LT-LEDS that combines the different results (for example, by integrating a sectoral model into an economy-wide one). The narratives and specific outcomes of the LT-LEDS will then help the NDC in proposing detailed policy measures that might otherwise be difficult to identify.

For example, to better understand the drivers of transformation in the passenger transport sector, it is essential to examine details specific to this sector. This includes analysing commuting patterns, the use of different modes of transport, and other relevant factors. This level of detail is essential because it provides the nuanced insights needed to inform effective policymaking.

Explore all economic systems and their interplays: provide a consistent economy-wide perspective with sector-specific detail

Achieving long-term carbon neutrality requires addressing every part of the economic system, as ambitious climate goals can only be met through significant changes across all sectors.

An LT-LEDS that supports alignment should therefore be developed by combining two key elements: first, a detailed analysis of each specific sector; and secondly, taking into account the timing and rhythm of the transition, i.e. considering how fast changes are happening in those sectors. This approach enables countries to examine the interactions between measures taken in different sectors, maximizing synergies and avoiding contradictory measures that could impact the transition. To achieve this, it is essential to develop economy-wide narratives of change that can then be translated into consistent sector-specific changes, as described above.

To continue with the example of passenger transport, it is essential to consider how this sector interacts with others. For instance, factors like the carbon content in electricity production, the connections with the industrial system (e.g., how this affects the supply chain), and other related sectors all play a role. In terms of pace, we need to understand the rate at which electricity is decarbonized as this will affect electric vehicles by determining the carbon content of their fuel. For example, the French National Low Carbon Strategy[10] adopts a holistic approach when looking at the transport sector. It considers changes within the transport system itself (i.e., modal shifts, demand reduction, etc.), but also examines impacts on other systems, such as urban organization, infrastructure, and the organization of industry and supply chains.

Consider different options: explore the range of possible futures and their differentiated impacts

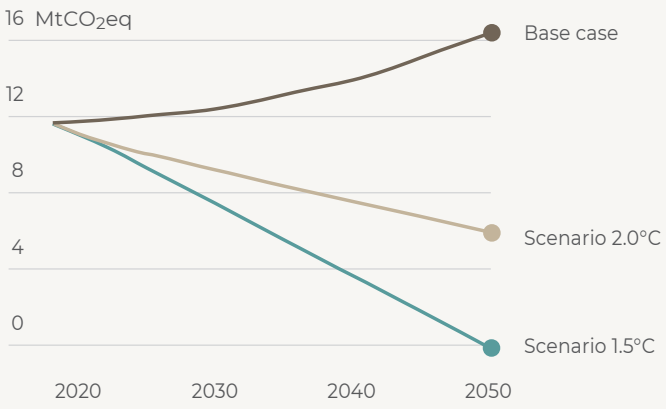
In any national context, there is no single trajectory to deliver ambitious climate goals. Instead, there are multiple options, each with different positive and negative impacts, as well as different enabling factors needed to unlock specific short-term actions. An LT-LEDS serves as an exploratory tool, helping to assess the consequences of alternative pathways towards neutrality, to reveal the challenges and opportunities created by the structural transformations required under each trajectory, and to highlight the differentiated impacts on various actors, including winners and losers. This approach allows countries to navigate the

10 https://www.ecologie.gouv.fr/sites/default/files/documents/en_SNBC-2_complete.pdf

uncertainties of long-term planning by understanding the short and long-term benefits of their choices.

For example, the scenario options considered in Costa Rica's "National Decarbonization Plan" illustrate this approach.[11] In their LT-LEDS, Costa shown in **Figure 2** Rica identified three possible scenarios, each with different consequences for the economy, society, and decarbonization rate.

Figure 2. Emissions trajectory for the different scenarios



Source: Costa Rica's LT-LEDS

Insert the national transition in the global picture: translate global benchmarks to the national context and identify requirements for international cooperation

National changes can only occur alongside a global shift towards net-zero, supported by strong and organized international cooperation to promote and accelerate the resources necessary for these transitions. An essential role of an LT-LEDS is to explicitly reveal the international cooperation requirements needed to enable ambitious national transitions.

This often involves clearly stating the assumptions made in designing the LT-LEDS. For example, a country may assume that trade agreements for certain zero-carbon products will be feasible, such as trading with the European Union (EU) under the Carbon Border Adjustment Mechanism (CBAM). Another example is Nigeria's recent LT-LEDS,[12] which highlights the need for international cooperation through climate finance, technology transfer, capacity-building, and partnerships. An additional example can be found in the Ethiopian LT-LEDS, which looks at the trade balance and balance of payments analysis of different pathways.[13]

An LT-LEDS can also help integrate relevant benchmarks, such as the GST and other international references, in a way that is tailored to national needs. An LT-LEDS can translate GST outcomes into a set of nationally-relevant goals, to appropriate and contextualize global benchmarks and outline what they would mean for the country. In subsequent sections, this guide provides examples of key signals from the GST that can be relevant for an LT-LEDS.

Conduct an inclusive and coordinated process: enable cross-ministerial exchanges and strengthen ownership among a diversity of stakeholders

Given its cross-sectoral, detailed and comprehensive nature, an LT-LEDS is well-suited to naturally integrating perspectives from various actors within the economic system. This makes it an ideal candidate for structuring exchanges involving a diversity of stakeholders and decision makers. As such, it serves as a valuable instrument for building domestic ownership of Paris-compatible transformations, providing a platform for exploring decarbonization options and organizing stakeholder consultations. Its long-term perspective enables consideration of a wider range of possible futures, supporting transformative rather than incremental changes away from current trends.

The development of an LT-LEDS should involve in-depth consultations with representatives of key sectors, including various government ministries, to guarantee that the outcome is relevant to the national context and to maximize buy-in from key stakeholders.

For example, Morocco's LT-LEDS development process[14] featured a robust governance and stakeholder engagement process that included:

- A Steering Committee, which oversaw the LT-LEDS development through a participatory process and included a broad array of stakeholders, including representatives of the National Commission on Climate Change and Biodiversity, the private sector, development partners, local authorities, and others.
- A technical committee of designated technical focal points, including members of the Climate Change Subcommittee of the National Climate Change Commission and Biological Diversity, and was extended to other relevant institutional and technical actors to address technical and operational matters related to the LT-LEDS development process.
- Seven sectoral decarbonization groups, each led by focal points from the respective departments or ministries.

11 https://unfccc.int/sites/default/files/resource/NationalDecarbonizationPlan.pdf
12 https://unfccc.int/sites/default/files/resource/Nigeria_LT-LEDS_01122023_240425_094617.pdf
13 https://unfccc.int/sites/default/files/resource/ETHIOPIA_%20LONG%20TERM%20LOW%20EMISSION%20AND%20CLIMATE%20RESILIENT%20DEVELOPMENT%20STRATEGY.pdf
14 https://2050pathways.org/success-story-morocco/

Alignment framework

This guide proposes a framework to help countries achieve alignment and evaluate the ambition of NDCs. It consists of a set of questions for a country's policymakers to consider as they work to align short-term plans with long-term ambitions. Although not all questions may be addressable in this NDC round, they can be kept in mind throughout the iterative alignment process and considered progressively to add new dimensions to future NDCs.

The questions are divided into two categories: content alignment, which looks at the substance of the long-term transformations that the country will undertake and how shorter-term plans are aligned with these goals; and process alignment, which addresses organizational aspects that enhance alignment through coordination, inclusion, and planning.

CONTENT ALIGNMENT

Under the UNFCCC, countries are asked to include a range of specific features in their NDCs, which are summarized in a recent paper by C2ES (see C2ES, 2024). Beyond these required elements, an NDC may also contain additional elements that are not covered in these guidelines, such as policies and actions, sectoral strategies, financial requirements, etc. Some of these elements will emerge naturally as countries work towards alignment.

Here we propose five questions to guide countries as they work towards content alignment, especially in the design of their next NDC.

To address each question on content alignment, countries must assess the current reality of the national context, examining what has advanced and evolved relative to the LT-LEDS to inform the NDC.

Has an existing LT-LEDS or net-zero target been reflected?

An LT-LEDS serves as a detailed roadmap outlining the specific actions and policies needed for a country to transition to a low-emission economy. In contrast, a net-zero commitment is a high-level target that sets the goal of balancing greenhouse gas emissions with removals by a specified date, without detailing the steps required to achieve that objective.

If a country has an LT-LEDS or elements of a long-term vision consistent with Paris Agreement trajectories, the NDC should align with the initial steps of the transformations as outlined in the LT-LEDS. This means both in terms of the sources of emission reductions, but also regarding the underlying transformations that should be implemented to reach net-zero. The recent DDP Annual Report "Making it Happen: national pathways to net-zero" provides practical examples of what this entails (DDP, 2024). As highlighted in the report, an excessive focus on immediate emission reductions risks overlooking mitigation actions that may not deliver immediate emission reductions, but are crucial for driving structural changes to achieve deeper reductions. The challenge of these structural changes is that they often encounter resistance, because decision-makers may not directly benefit from their emission reduction efforts. A specific example from the report is a case study of India, which looks at how transitioning the food and energy systems requires demand-side strategies aimed at changing lifestyles and behaviours. These changes can only develop progressively, as they depend on social norms and cultural practices.

Furthermore, the long-term vision of the LT-LEDS must align with current trends. The NDC should reflect the long-term transformations outlined in the LT-LEDS and be based on an assessment of whether these transformations are consistent with net neutrality or if they should be accelerated or even reversed. For example, an NDC should consider whether there are ongoing transformations in specific sectors or socio-economic trends within the country, as these factors will affect the assumptions about the speed and scope of the long-term transition. This approach can help identify the priorities that require attention in the NDC, therefore guiding the next steps needed in the near future. The DDP Annual Report (2024) provides some examples of such transformations, including the continuous decline in fossil fuel use.

Furthermore, it is important to consider whether the country has established a net-zero target, regardless if it has an LT-LEDS or not. If it has one, the NDC should be framed in relation to that net-zero goal, ensuring that the commitments made in the NDC align with the broader vision of reaching carbon neutrality.

What explicit short/medium-term targets have been included as milestones towards long-term transformations consistent with climate neutrality?

In preparing the NDC, national policymakers are likely to assess short-term emission reduction targets, such as those for 2035. As discussed in Chapter 2, it is beneficial to consider the long-term targets that the country may hold when designing an NDC. Following the cycles of the Paris Agreement, NDCs can serve as iterative steps towards achieving long-term national goals. For example, the EU case in page 17 illustrates how the EU is committed to climate neutrality by 2050, aims for a 55% reduction in greenhouse gas (GHG) emissions by 2030, and proposes a 90% reduction target compared to 1990 as a 2040 milestone. Similarly, Chile's case demonstrates how its LT-LEDS sets the country on a path to achieve carbon neutrality by 2050, and aligns with its 2020 NDC commitments.

Short-term targets will help activate the various actors in society (including government ministries) and signal the first steps needed towards achieving neutrality and resilience. To this end, a country may also consider developing sectoral targets alongside the greenhouse gas emissions reduction target. For example, Morocco's 2021 NDC includes sectoral targets focused on renewable energy, aiming to generate 52% of its electricity from renewable sources by 2030.[15]

For target setting, countries should undertake the exercise of gathering all existing goals and initiatives—whether in the LT-LEDS or beyond. For example, if a country has existing subnational targets, these can be incorporated into the NDC to promote greater coherence and cohesion across different government levels. Similarly, if a country has announced other targets, or joined initiatives or coalitions supporting a specific target, these can also be included in the NDC. Ideally, all existing targets and initiatives should be compared with the LT-LEDS, where applicable, to ensure they are Paris-aligned and consistent with the overall NDC target-setting approach.

What actions or policies should be implemented in the short to medium term to align with the longer-term neutrality objective?

Beyond simply setting targets, an NDC can signal which policies are being or will be developed across different sectors to achieve those targets. These policies could include energy efficiency standards, circular economy initiatives, land use and forestry initiatives, etc. For example, Chile's 2022 NDC references its Renewable Energy Law and Climate Change Framework Law, which outline policies to achieve its NDC targets.[16]

Furthermore, when proposing these concrete policies, the country must consider the socio-economic trade-offs and synergies involved. For example, they should assess impacts on households and purchasing power. In Latin America and the Caribbean, the transition to net zero can bring up to US$2.7 trillion in benefits to the region, many coming from enhanced completeness and health.[17] The DDP Annual Report (2024) provides examples of how transitioning the economy towards carbon neutrality can create opportunities for some countries to implement structural shifts in their domestic industrial structure. These changes can enhance local industrialization and promote decarbonization. A specific example can be found in South Africa, where the study highlights how localizing renewable energy value chains brings added value and job creation.

When designing such policies, it is important to consider any existing long-term flagship policy initiatives of the country, i.e., a long-term National Development Plan or an LT-LEDS. This is essential for identifying gaps and areas of misalignment between current policies and long-term objectives.

Which of the GST outcomes have been included and how?

According to Article 165 of 1/CP28, NDCs must be informed by the outcomes of the GST, as defined at COP28. However, specific guidance on how this should be done is currently lacking. For instance, the European Climate Law specifically mandates the first 2040 target proposal to consider "the outcomes of the GST" (see the European Union case study on page 17 for more details).

The GST has two distinct outcomes of very different natures. The first is the negotiated outcome, which all countries agreed to at COP28[18] (Decision 1/CMA.5 "Outcome of the first Global Stocktake"). This outcome is also the most well-known by the general public due to its strong signal for a transition away from fossil fuels. The second outcome comprises the results of the Technical Dialogue.

15 https://unfccc.int/sites/default/files/NDC/2022-06/Moroccan%20updated%20NDC%202021%20_Fr.pdf

16 https://cambioclimatico.mma.gob.cl/wp-content/uploads/2023/01/Chile-Fortalecimiento-NDC-nov22.pdf

17 https://publications.iadb.org/en/benefits-and-costs-reaching-net-zero-emissions-latin-america-and-caribbean

18 https://unfccc.int/documents/637073

Box 2. Mitigation signals to consider when incorporating the GST outcome into an NDC, based on C2ES (2024)

On mitigation, the outcome of the first GST at COP28 requests in paragraph 39 that countries prepare for the next round of NDCs with "ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors, and categories and aligned with limiting global warming to 1.5 °C, as informed by the latest science, in the light of different national circumstances". In Article 170 it also encourages the communication of these NDCs in 2025 with an end date of 2035.

In addition, paragraph 28 outlines some energy-related actions that countries could consider:

a. Tripling global renewable energy capacity and doubling the global average annual rate of energy efficiency improvements by 2030;
b. Accelerating efforts to phase down unabated coal power;
c. Accelerating efforts globally towards net-zero emission energy systems, utilizing zero and low-carbon fuels before the mid-century or ideally earlier;
d. Transitioning away from fossil fuels in energy systems in a just, orderly and equitable manner, accelerating action in this critical decade to achieve net zero by 2050, in line with scientific guidance;
e. Accelerating zero and low-emission technologies, including renewables, nuclear energy, abatement and removal technologies such as carbon capture, utilization and storage, particularly in hard-to-abate sectors, and expanding low-carbon hydrogen production;
f. Substantially reducing non-CO_2 emissions globally, with particular focus on cutting methane emissions by 2030;
g. Reducing emissions from road transport through various pathways, including infrastructure development and the rapid deployment of zero and low-emission vehicles;
h. Phasing out inefficient fossil fuel subsidies that do not address energy poverty or just transitions, as soon as possible;

Finally, it also highlights some non-energy-related mitigation outcomes. Paragraph 33 emphasizes the "importance of conserving, protecting and restoring nature and ecosystems towards achieving the Paris Agreement temperature goal". Paragraph 35 invites countries to "preserve and restore oceans and coastal ecosystems and scale up, as appropriate, ocean-based mitigation action".

In a recent paper, the Center for Climate and Energy Solutions (2024) identifies key signals from the COP28 GST outcome (detailed on pages 11 to 15 of their publication) that national policymakers can consider when designing their NDCs. The main mitigation signals are summarized in **Box 2**.

The final GST outcome was preceded and supported by a year-long discussion among various actors including countries, experts and civil society. This Technical Dialogue produced a set of recommendations that have been summarized in the Technical report by the co-facilitators.[19] Countries may find this document useful when designing their NDCs, as it includes some of the latest science on climate change, offers a more detailed look at system transformations, and provides greater detail in general.

Considering the GST outcomes when designing an NDC is inherently complex, as many GST signals indicate systemic transformations that cannot easily be captured within the short-term emissions targets of an NDC. Therefore, it is important that countries maintain a long-term perspective when addressing the GST outcomes.

An intermediate step is required to translate GST outcomes into a set of nationally-relevant policies and goals, allowing countries to appropriate and contextualize global benchmarks and outline their implications for the country. For example, the signal in Article 28 to triple renewable energy by 2030 does not imply that every country will triple its own capacity, but rather that all countries may need to intensify their efforts. A recent report by the International Energy Agency, reflecting on COP28 outcomes, also highlights that countries need to translate the COP28 goals into domestic energy policies.[20]

This process is more straightforward for quantified, time-bound signals, such as the tripling of renewable energy or the doubling of energy efficiency, but other signals that are not quantified or have no time horizon, such as ecosystem preservation, make it even more essential for each country to build evidence-based interpretations of these targets.

Once a country has translated these global benchmarks into its national context, these goals can be incorporated into a future LT-LEDS, either through modelling assumptions or overarching narratives. This step will also facilitate their integration into future NDCs. The India case study on page 28 shows how, according to its authors, India could incorporate specific GST signals into its NDC.

Where would cooperation be key to achieving climate priorities?

Achieving Paris-compatible transformations requires global cooperation, as no single country can accomplish the necessary deep decarbonization alone. International cooperation can support and accelerate progress on the essential aspects of national transitions.

As discussed in Chapter 2, a long-term perspective can identify the key areas where international coop-

19 https://unfccc.int/documents/631600

20 https://www.iea.org/reports/from-taking-stock-to-taking-action/executive-summary

eration is essential to enable ambitious national transitions. These requirements can take very different forms, e.g., including factors such as technology costs and availability, finance flows, capacity building, trade regulations, etc. For example, in the Morocco case study in page 22, the government accounted for various drivers of socio-economic development when designing its LT-LEDS, including major reductions in the carbon content of electricity to align with the CBAM mechanism.

Countries may decide to signal their assumptions and needs for international cooperation in their NDCs. Some countries have already done so in previous NDCs. For instance, India's 2022 NDC emphasizes the importance of technology transfer and financial support from developed nations to achieve its climate goals.[21] The more clearly these needs are described, the easier it will be for the global community to respond and to structure collaborations accordingly.

If countries express their international cooperation needs, they should consider whether cooperation agendas already exist in the country or are currently under discussion. For example, if a country has signed a Just Energy Transition Partnership, the new targets can incorporate this additional support to enhance ambition.

PROCESS ALIGNMENT

Alignment also requires process-oriented considerations to ensure that the various parts of government are involved, that society is consulted, and that there is policy coherence with past regulations and reporting mechanisms. Process alignment is essential for achieving the content alignment discussed above. It fosters more inclusive and effective climate policies, which lead to increased ownership, both within and outside government, as well as enhanced ambition.

The following questions should be considered when addressing process alignment:

- Coordination – whole of government
  - Are the same line ministries responsible for both the NDC and LT-LEDS? If not, how can good communication and coordination among ministries be ensured?
  - Is it possible to align the timelines for the LT-LEDS and NDC formulation processes, so that the LT-LEDS is developed first and informs the NDC?
  - Have similar narratives and assumptions (e.g. BAU, GDP growth, energy demand, etc.) been used in the analytical processes of both the NDC and LT-LEDS?, if not, is it possible to compile those possible differences as a key background consideration for future work or country discussion?
  - Has the analytical work been tested and discussed with all relevant stakeholder within the government and independent local experts? If not, seek spaces to enable these discussions with a view to familiarize the whole of government with the NDC and LT-LEDS roles and gather relevant considerations to enhance alignment.
- Inclusion – whole of society
  - Have the same stakeholder groups – such as the private sector, research institutions, and local communities, among others – been consulted in both the NDC and LT-LEDS processes and asked to input into how to align them?
  - Are the stakeholder groups involved in the planning phase also responsible for the implementation of the NDC and LT-LEDS within their respective capacities?
- Planning and policy coherence
  - Are there regulatory and legal frameworks in place to ensure alignment, such as climate laws or policies that provide guidance on the roles and processes for the LT-LEDS and NDC? If not, these could be propelled by the NDC update process, thus leaving a policy framework set up for future updates tailored to the country experience. You can see practical examples of policy framework in the case studies in the following chapter.
  - Are responsibilities for implementing short-term actions clearly assigned across government entities?
  - Have in-country reporting mechanisms been harmonized to track progress on short, medium, and long-term targets?

21 https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf

Figure 3. Towards a fully aligned NDC: Aligning short-term plans with long-term objectives

CURRENT NDC

ALIGNMENT ON CONTENT

- Has an existing LT-LEDS or net-zero target been reflected?
- What explicit short/medium-term targets have been included as milestones towards long-term transformations consistent with climate neutrality?
- What actions or policies should be implemented in the short- to medium-term to align with the longer term neutrality objective?
- Which of the GST outcomes have been included and how?
- Where would cooperation be key to achieving climate priorities?

ALIGNMENT ON PROCESS

COORDINATION

- Are the same line ministries responsible for both the NDC and LT-LEDS? If not, how can good communication and coordination among ministries be ensured?
- Is it possible to align the timelines for the LT-LEDS and NDC formulation processes, so that the LT-LEDS is developed first and informs the NDC?
- Have similar narratives and assumptions (e.g. BAU, GDP growth, energy demand, etc.) been used in the analytical processes of both the NDC and LT-LEDS?, if not, is it possible to compile those possible differences as a key background consideration for future work or country discussion?
- Has the analytical work been tested and discussed with all relevant stakeholder within the government and independent local experts? If not, seek spaces to enable these discussions with a view to familiarize the whole of government with the NDC and LT-LEDS roles and gather relevant considerations to enhance alignment.

INCLUSION

- Have the same stakeholder groups – such as the private sector, research institutions, and local communities, among others – been consulted in both the NDC and LT-LEDS processes and asked to input into how to align them?
- Are the stakeholder groups involved in the planning phase also responsible for the implementation of the NDC and LT-LEDS within their respective capacities?

PLANNING AND POLICY COHERENCE

- Are there regulatory and legal frameworks in place to ensure alignment, such as climate laws or policies that provide guidance on the roles and processes for the LT-LEDS and NDC? If not, these could be propelled by the NDC update process, thus leaving a policy framework set up for future updates tailored to the country experience.
- Are responsibilities for implementing short-term actions clearly assigned across government entities?
- Have in-country reporting mechanisms been harmonized to track progress on short, medium, and long-term targets?

PA goals GST LTS

UPDATED NDC

Country case studies: presenting real examples of alignment

This chapter contains four case studies that illustrate how countries have applied the alignment framework, offering practical examples of national efforts towards alignment. These studies have been developed by independent in-country experts, based on their own experiences and knowledge, and therefore do not necessarily represent the views of the respective governments. The countries featured are: Chile, the European Union, Morocco, and India.

CHILE

Author: Cristián Eduardo Retamal González

In the context of the UNFCCC process and the Paris Agreement regime, Chile has progressively developed its institutional capacities and enabling environment towards a new climate-compatible paradigm. While there may be ongoing discussions about the effectiveness, efficiency, transparency and legitimacy of certain climate policy efforts, it is unquestionable that Chile has initiated a paradigm shift towards a low-emission and climate-resilient development pathway.

Content alignment

Alignment with the Paris Agreement

Chile has a series of climate commitments and policies, both in place and under development, to meet the requirements of the UNFCCC, including the development of concrete sectoral policies to implement these commitments, as described below.

During its UNFCCC COP 25 Presidency, Chile updated its first NDC in 2020 with an ambitious and clear mitigation commitment, setting an emissions budget of 1,100 $MtCO_2eq$ for the 2020-2030 period as part of a long-term vision to achieve carbon neutrality by 2050. This mitigation indicator is a climate ambition and environmental integrity exercise in itself, as it avoids uncertainties around interpreting and estimating the country's GHG emissions reduction pathway.

At the same time, Chile's 2020 updated NDC includes: i) an integration component, which includes commitments related to the circular economy, land use, land-use change and forestry (LULUCF), ecosystem restoration and oceans; and ii) an implementation component with commitments on capacity building, technology transfer and climate finance. In addition, it includes a social pillar aimed at aligning overall NDC commitments with the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs), while integrating the concept of a just transition as an enabling condition for the implementation of the NDC as a whole.

In January 2020 the country began discussions on a Climate Change Framework Law introduced to Congress by the Ministry of Environment. This law was enacted in June 2022, establishing the 2050 carbon neutrality and climate resilient targets within the country's legal framework, and creating a need for developing new regulatory instruments at both sectoral and sub-national levels.

In 2021, Chile submitted its first version of the LT-LEDS to the UNFCCC, setting the first elements of a key transformational roadmap for climate-compatible development towards carbon neutrality and climate resilience by 2050. The LT-LEDS aligns with the commitments outlined in the 2020 NDC, assigning indicative GHG emissions budgets per key sector and identifying key dimensions and indicators for adaptation. This alignment also extends to the 2020 NDC and the Climate Change Framework Law, which was still under discussion in Congress when the LT-LEDS was submitted to the Convention.

In recent years, Chile has initiated the development of sectorial and territorial climate plans, aimed at transposing national climate targets into key sectors and sub-national levels. However, recent joint studies by national academic and civil society sectors[22] indicate a significant delay in creating the instruments required by the Climate Change Framework Law. These delays are in clear conflict with the principle of climate urgency identified in Article 2 of the same law.

22 Observatorio Ley Cambio Climático: https://leycambioclimatico.cl/estudio-revelo-que-35-de-los-reglamentos-en-la-ley-marco-de-cambio-climatico-estan-pendientes-de-implementacion-cnn-chile/

Thus, Chile's leading national policies for achieving the envisioned climate targets are:

- The 2022 Climate Change Framework Law[23] and all the related legal instruments it mandates. This law establishes a legal framework to address the challenges posed by climate change, with the aim of achieving and maintaining greenhouse gas emissions neutrality and climate resilience by 2050. In addition, it creates a National System for Access to Information and Citizen Participation on Climate Change managed and coordinated by the Ministry of Environment. The law also establishes guidelines and financial mechanisms to address the climate challenge.
- The 2019 Coal Phase Out Plan[24] and other complementary policies for decarbonizing the national power grid, led by the Ministry of Energy, aim to progressively close the country's 28 coal-fired power plants, which have historically been a major source of electricity but also a significant contributor to Chile's carbon emissions. In addition, the coal phase-out plan is coupled with a significant shift towards renewable energy sources, particularly solar, wind, and hydropower. The strategy also acknowledges the need to avoid negative impacts on workers and communities dependent on the coal industry, and hence incorporates guidance on retraining programmes and economic diversification plans to mitigate potential disruptions.
- The 2021 Sustainable Mobility National Strategy,[25] led by the Ministry of Transport and Telecommunications, focuses on reducing the transportation sector's carbon footprint, which is responsible for more than 20% of Chile's GHG emissions, while improving air quality and enhancing the accessibility of public and private transportation systems. The strategy establishes key efforts towards a sustainable mobility system in the areas of transport electrification, public transport modernization, decarbonization of transport services, urban planning, education and behavioural change, as well as policy and regulation.
- The 2022 updated Climate Finance Strategy,[26] led by the Ministry of Finance, aims to ensure that the country has the financial resources and mechanisms necessary to meet its ambitious climate goals. The strategy considers three main pillars: i) generating information, data and analysis under a coherent institutional framework, ii) promoting green financing among private actors, and iii) strengthening green finance in the financial sector.

In addition, Chile has launched a series of complementary transformational initiatives - and related targets - that contribute to achieving national and international climate objectives, including but not limited to:

- The 2022 National Strategy for Electromobility,[27] originally introduced in 2017, which aims to transition the country's transportation sector toward electric vehicles (EVs) to reduce carbon emissions and fossil fuel dependence. Its key components include public transport electrification, private electric vehicles, charging infrastructure, regulatory and policy framework, environmental and economic benefits, and global leadership in electromobility.
- The 2023 National Sovereignty Strategy for Food Security[28] focuses on strengthening the country's food system to make it more sustainable, resilient, and inclusive. The strategy is part of Chile's efforts to enhance food security by promoting local agriculture, ensuring access to nutritious food, and mitigating the impacts of climate change on agricultural production. Its key priorities include sustainable agriculture, climate adaptation, food sovereignty and public-private collaboration.
- The 2024 Green Hydrogen Action Plan 2023-2030[29] outlines a roadmap for Chile to become a global leader in green hydrogen production. The plan includes a first phase (2023-2026) that focuses on establishing the industry's foundation by defining environmental, social, and labour standards, streamlining permitting processes, advancing research, and promoting financial incentives; and a second phase (2026-2030) that emphasizes scaling up production, enhancing local development, and establishing human capital and territorial planning instruments. An important goal is for green hydrogen to contribute significantly to Chile's energy mix, potentially accounting for about 15% of national energy consumption by 2050. The strategy also aims to reduce fossil fuel dependency and promote electrification.

23 Ley Marco de Cambio Climático: https://www.bcn.cl/leychile/navegar?idNorma=1177286
24 Plan de Retiro y/o Reconversión de Unidades a Carbón: https://energia.gob.cl/sites/default/files/plan_de_retiro_y_o_reconversion_centrales_carbon.pdf
25 Estrategia Nacional de Movilidad Sostenible: https://www.subtrans.gob.cl/wp-content/uploads/2022/11/Documento-oficial-ENMS-2023-SECTRA.pdf
26 Estrategia Financiera frente al Cambio Climático: https://www.hacienda.cl/noticias-y-eventos/noticias/ministerio-de-hacienda-actualiza-estrategia-financiera-frente-al-cambio
27 Estrategia Nacional de Electromovilidad: https://energia.gob.cl/sites/default/files/estrategia-nacional-electromovilidad_ministerio-de-energia.pdf
28 Estrategia Nacional de Soberanía para la Seguridad Alimentaria: https://soberaniaalimentaria.odepa.gob.cl/
29 Plan de Acción 2023-2030 de Hidrogeno Verde: https://www.planhidrogenoverde.cl/

- The 2024 Lithium National Strategy[30] aims to secure State control over lithium resources while promoting collaboration with the private sector. The strategy includes several key goals such as State participation in lithium exploitation, establishing public-private partnerships (PPPs), ensuring environmental sustainability, involving local communities and fostering technological development (i.e., electric vehicle batteries in line with the national goal of global leadership in electromobility).

Finally, in the context of Chile's alignment with its climate targets it is important to highlight the existence of certain non-state initiatives that monitor the effective and timely implementation of these national climate targets. Notable among these initiatives are:

- The Climate Change Law Observatory[31] is an academic initiative that initially monitored the discussion of the law in Congress and has since tracked its implementation once the law was enacted. In recent months this Observatory has identified significant weaknesses in various sectoral instruments mandated by the law, as well as delays in their development, as previously mentioned.
- The Carbon Neutrality Observatory[32] is an academic initiative primarily focused on monitoring Chile's compliance with the carbon neutrality goal set in its 2020 NDC and mandated by the Climate Change Framework Law. Researchers from the Observatory have recently indicated that, while certain show a reduction in emissions, their estimates suggest that Chile's NDC targets are unlikely to be met, with emissions projections for 2030 exceeding the target by around 7%.[33]

Both initiatives led by units within Universidad de Chile–the country's main public university–conduct periodic assessments of current trends in their respective dimensions.

Development alignment

Chile has considered the socio-economic impacts that the transformations required to achieve climate neutrality would bring to the country, as described below.

In the context of the first 2020 NDC, the Government of Chile considered economic impact assessments for the main measures aimed at achieving the NDC's climate targets, which are currently being revisited as part of the NDC 3.0 preparations. The assessments developed for the 2020 NDC used a general equilibrium macroeconomic model[34] to analyse the impacts of climate mitigation measures. The model evaluated how different sectors of the economy (i.e., energy, transportation, industry) interact and respond to climate policies, specifically examining the long-term economic implications of decarbonization, estimating costs, trade-offs, and potential benefits, including GHG emission reductions.

In addition, certain government-led initiatives have assessed policy interventions that could be implemented in the short and medium term to align Chile's trajectory with its envisioned climate-compatible path. These interventions include, but are not limited to: a specific tax on transport fuels, the broadening of the carbon tax policy, and emission trading schemes. In this context, it is possible to highlight the work with the World Bank on recommendations of economic instruments for the energy transition[35] and the assessment led by the Inter-American Development Bank on options to achieve carbon neutrality.[36] These exploratory efforts help identify policy trade-offs and synergies; however, the policy recommendations still require significant consensus building at the political level before they can be enacted as new regulations.

Finally, Chile emphasizes in its 2020 NDC and LT-LEDS that international cooperation is essential for achieving its climate goals and advancing global efforts to address the climate challenge. This cooperation is particularly crucial in the context of climate finance, carbon markets and Article 6 of the Paris Agreement.

Process alignment

Chile has created a governance scheme that aims to coordinate climate action across relevant ministries, and that adopts a participatory approach with stakeholders and civil society.

Climate policy in Chile is led and coordinated by the Ministry of Environment, the authority that is in

30 Estrategia Nacional del Litio: https://www.gob.cl/chileavanzaconlitio/#:~:text=Chile%20tiene%20litio.,econom%C3%ADa%20verde%20a%20nivel%20global.
31 Observatorio Ley de Cambio Climático para Chile: https://leycambioclimatico.cl/
32 Observatorio de Carbono Neutralidad para Chile: https://observatoriocarbononeutral.cl/#/
33 La Tercera 13/05/2024, '¿Cómo va Chile con el cumplimiento de sus compromisos para bajar emisiones?: https://www.latercera.com/que-pasa/noticia/como-va-chile-con-el-cumplimiento-de-sus-compromisos-para-bajar-emisiones/CLI-5VM6D5JADHAJCGF2PE2IG5I/
34 A general equilibrium macroeconomic model analyzes how different sectors of an economy interact to determine prices, output, and key variables, assuming all markets are in balance.
35 'Recomendaciones y pasos necesarios para desplegar un esquema de instrumentos económicos que catalice la transición energética necesaria para cumplir con la NDC de Chile y el objetivo de cero emisiones de GEI', (WB, 2023): https://energia.gob.cl/sites/default/files/recomendaciones_y_pasos_necesarios_para_desplegar_un_esquema_de_instrume.pdf
36 'Opciones para lograr la carbono-neutralidad en Chile: una evaluación bajo incertidumbre' (IDB, 2021): https://publications.iadb.org/es/opciones-para-lograr-la-carbono-neutralidad-en-chile-una-evaluacion-bajo-incertidumbre

charge of linking the implementation of the Climate Change Framework Law with different sectoral authorities. At the same time, new NDCs and LT-LEDS are formulated with the leadership of the Ministry of Environment, in collaboration with other sectoral authorities, before being submitted to the Council of Ministers for Sustainability and Climate Change for approval. This council, created jointly with the Ministry of Environment in 2010 and chaired by the same ministry, consists of the Ministries of Agriculture, Finance, Health, Economy, Development and Reconstruction, Energy, Public Works, Housing and Urban Planning, Transport and Telecommunications, Mining and Planning.

Similarly, in 2019 the Government of Chile formalized the Inter-ministerial Climate Change Technical Team (*Equipo Técnico Interministerial de Cambio Climático,* ETICC), comprising delegates of key ministries and led by the Ministry of Environment. The ETICC was later endorsed in 2022 by the Climate Change Framework Law to support the Ministry of Environment in developing, implementing and monitoring climate change instruments, included the NDC and the LT-LEDS. It serves as the main governmental coordination space for technical-level climate action among sectoral ministries.

Similarly, the Climate Change Framework Law considers the institutionalization of the Scientific Advisory Committee, which advises the Ministry of Environment on the scientific aspects required for the development, design, implementation and updating of climate change management instruments established in the law. This scientific body is therefore responsible for conducting assessments (such as modelling, assumptions, etc.) that support the formulation of NDCs and long-term plans.

Since 2014, Chile has included participatory elements in the formulation of its commitments under the Paris Agreement, beginning with the first I-NDC, which incorporated a first ever public consultation and citizen participation process for an environmental multilateral commitment. Since then, the 2020 updated NDC, as well as the 2021 LT-LEDS, have considered analogous approaches. In addition, the Climate Change Framework Law includes citizen participation as a principle of the law, and hence the current process for NDC 3.0, to be submitted to the UNFCCC in 2025, has also considered a consultation and participation process in 2024.

The Climate Change Framework Law clearly identifies the authorities in sectors that represent the highest emissions or that have the greatest vulnerability to climate change, assigning responsibilities for the formulation and implementation of mitigation and adaptation plans. The law specifies that the Ministries of Energy, Transport and Telecommunications, Mining, Health, Agriculture, Public Works, and Housing and Urban Planning should develop climate mitigation plans. Similarly, the law identifies that climate adaptation plans should be formulated for the following sectors: biodiversity, water resources, infrastructure, health, mining, energy, agriculture and forestry, fishing and aquaculture, cities, tourism, coastal zones and transport; assigning this responsibility to the relevant ministries with competence in each sector.

In addition, the Climate Change Framework Law establishes the National Report on Climate Action (*Reporte Nacional de Acción Climática,* RANCC). This report is to be developed by the Ministry of Environment in coordination with the ETICC every two years, in line with the reporting regime of the Enhanced Transparency Framework of the Paris Agreement. According to the law, the RANCC must seek the endorsement of the Council of Ministers for Sustainability and Climate Change, and it should also be presented to the National Congress by the Ministry of Environment before submission to the UNFCCC. This allows the National Congress to call on sectoral ministerial authorities to explain any delays in the formulation or implementation of sectoral climate change plans.

Chile has thus initiated the transition towards a climate-compatible pathway, establishing institutional and regulatory frameworks and procedures that enable both oversight and accountability through administrative channels. Similarly, climate science has been institutionalized as a basis for decision-making, while societal engagement has been recognized as an essential condition for achieving climate goals. At the same time, the private sector has been encouraged to take a key role in mobilizing climate investments. However, it remains to be seen how authorities will be able to trigger the necessary large-scale mobilization of funds, considering the public acceptance of critical private investment decisions.

EUROPEAN UNION

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Background: Climate governance in the EU

Over the last thirty years, climate action in the EU has been increasingly integrated and mainstreamed across various policy areas (Meyer-Ohlendorf et al., 2017; Oberthür & Von Homeyer, 2023). The European Green Deal represents the culmination of these processes, marking a shift from incremental steps to transformational, concrete policies aimed at mid-century goals (Duwe & Bodle, 2020; Kulovesi & Oberthür, 2020). Proposed by the European Commission in 2019, the European Green Deal placed the transition to climate neutrality at the centre of EU economic development. Two years later, the European Climate Law was adopted, making the goal of achieving climate neutrality by 2050 – "and negative emissions thereafter" – legally binding, establishing procedures for monitoring progress and ensuring policy alignment with this objective.

As a supranational union, the EU is unique among the case studies in this guide. While EU-level institutions play a central role in climate policy, national governments remain responsible for reducing domestic emissions not covered by the EU Emissions Trading System (ETS). Since 2018, the Governance Regulation has required Member States to engage in common reporting and to fulfil short and long-term policy planning obligations, with the latter serving as their national LT-LEDS submission to the UNFCCC. As national reduction targets through 2030 are set at the EU level under the Effort Sharing Regulation (ESR), *Member States do not submit their own NDCs.* Instead, under Art. 4.16 of the Paris Agreement, the EU submits a joint NDC for the region. Nevertheless, the national perspective remains crucial, as planning and reporting by Member States help align domestic policies with the EU-wide climate neutrality goal. As such, weak national implementation risks undermining the entire EU net-zero project (ECNO, 2024c; EU Advisory Board, 2024).

At the Union level, the EU lacks a formal short-term planning cycle, although recent target revisions have included a dedicated policy package – and, as mentioned above, a process exists for the regular planning and review of Member State actions. However, key EU climate policies follow a review schedule aligned and integrated with the five-year cycle of the GST, allowing GST outcomes to inform potential adjustments. This includes the EU Climate Law and Governance Regulation as well as substantive measures mentioned in the EU NDC, like the ESR, the LULUCF Regulation, and the EU ETS – all of which include a review clause that calls on the European Commission to produce a report on the effectiveness of the policy 'within six months of each global stocktake agreed under Article 14 of the Paris Agreement' (see, e.g., European Commission 2024c). These aspects of EU climate governance, along with the precedent of raising targets and legally binding procedures for monitoring progress at both EU and national levels, underscores the bloc's commitment to the Paris Agreement. Even with a strong framework, as discussed in the following sections, many provisions for long-term alignment are underutilized in practice. Additionally, weaknesses in both content and process are evident, especially when considering the EU as the sum of its national parts.

Content alignment

Long-term targets

The EU is legally committed to achieving climate neutrality by 2050 and aims for negative emissions thereafter. In the short term, it has set the goal of a 55% net reduction in GHG emissions by 2030 compared to 1990 levels. A proposed milestone for 2040, aiming for a 90% net reduction from 1990 levels, is currently awaiting legislative approval. Once adopted, this 2040 milestone is expected to form the basis of the EU's 2025 submission ahead of COP30, which will include an indicative target for 2035 (European Commission, 2024b, p. 6).

According to EU estimates, the 2030 target and proposed 2040 milestone put the EU on track to reach climate neutrality by 2050 (see European Commission, 2020a, 2024b). However, independent analyses have been critical, highlighting that these targets are not in line with the EU's fair share under the Paris Agreement. The widely-cited Climate Action Tracker (CAT) rated the EU's 2050 net-zero ambition as "acceptable", but considered the bloc's 2030 NDC to be "insufficient" compared with both domestic and 1.5-degree pathways.[37]

The EU climate targets have been revisited in response to domestic and international developments. The European Commission was legally required to propose a 2040 target within six months of the first GST and *may* revise the target after the second GST. The European

37 The CAT assessed the EU's 2050 target as fulfilling 7 out of 10 good practice criteria, including full GHG coverage, legally binding status, and a dedicated review process. However, the EU target lacks a separate objective for removals, only covers international aviation, and "makes no reference to fairness or equity". Moreover, the 2040 target proposal was poorly evaluated for falling at the low end of the 90-95% range suggested by the European Scientific Advisory Board on Climate Change (EU Advisory Board). See: https://climateactiontracker.org/countries/eu/, accessed 22 Aug 2024.

Climate Law specifically mandates that the first 2040 target proposal must consider "the outcomes of the GST". While this is not explicitly stated for revisions after the second GST, the intent to extend this principle appears evident. The law also requires that intermediate EU targets be "kept under review in light of international developments" and aligned with efforts towards the Paris Agreement's long-term objectives, including discussions on NDC time frames. As such, EU law firmly links the EU's target setting process to the Paris Agreement's cycles, signifying an effort to ensure that changes in ambition reflect the GST. The 2040 proposal incorporates GST conclusions, including the phase out of fossil fuels as well as EU contributions to international climate finance (European Commission, 2024b, pp. 4–5). The proposal outlines three GHG reduction target options for a 2040 milestone – (1) up to 80%, (2) 85-90%, and (3) 90-95% – and claims that the third "sets a clear transition path away from fossil fuels as called for by COP28" (European Commission, 2024b, p. 7).

EU law sets differentiated national reduction targets through 2030 for sectors not covered by the EU ETS, but is silent on long-term targets for Member States. Nonetheless, at present, 21 of 27 EU countries have adopted a net-zero target, with 14 of these legally binding under national climate law, signalling strong political resolve against backsliding (Averchenkova et al., 2024; Evans et al., 2024). In short, most European countries are progressing along the trajectory set by the EU and, previously, by the Paris Agreement.

Long-term strategy

The Governance Regulation implemented Art. 4.19 of the Paris Agreement by requiring the European Commission to prepare an LT-LEDS, focused on greenhouse gas reductions.[38] The EU LT-LEDS document, titled "A Clean Planet for All: A European Strategic Long-Term Vision for a Prosperous, Modern, Competitive and Climate Neutral Economy", was published by the European Commission in November 2018. It outlines two pathways for net-zero emissions by 2050: (1) a 1.5 TECH scenario focusing on zero-carbon energy carriers, energy efficiency, and negative emissions from carbon capture and storage (CCS); and (2) a 1.5 LIFE scenario emphasizing the circular economy and consumer choice, thus reducing reliance on carbon removals. The strategy identifies seven key areas to guide policymaking: energy efficiency in buildings, expanding renewables and electrification, decarbonizing mobility, promoting a circular economy, developing smart infrastructure, enhancing natural carbon sinks, and using CCS for residual emissions. Notably, the EU LT-LEDS omits indicative sectoral targets and economy-wide milestones, instead detailing scenario outcomes. With the publication of Clean Planet for All the European Commission proposed to adopt climate neutrality by 2050 "at the latest" as the EU's new long-term climate objective. It took another year to reach political agreement on this target between EU Member States – and then another two to make it legally binding.

Despite its significant impact on the EU's long-term climate ambition, the EU LT-LEDS is not referenced in the latest EU NDC update from 2023. This may be because the EU LT-LEDS was already over five years old at the time and reflected a partially outdated vision for climate neutrality, given the significant changes to short-term climate ambition and policy under the European Green Deal, not to mention the impacts of the COVID pandemic, the Russian invasion of Ukraine, and the ensuing energy crisis (Duwe, 2022). Although the international regime emphasizes long-term planning as an iterative process, the EU does not require the European Commission to produce a revised strategy, and it has yet to do so. However, the underlying modelling has been updated twice (at least in part): in 2020, for the latest upgrade to the EU's 2030 target (European Commission, 2020b), and more recently for the 2040 target proposal (European Commission, 2024a). While these updates are important EU-wide benchmarks for national planning, they may lack the political weight of an official strategy document.

At a national level, the Governance Regulation transcribes Article 4.19 of the Paris Agreement to national level obliging EU Member States to produce LT-LEDS with a 30-year time horizon every ten years (with five-year updates "where necessary"). However, implementation by national governments has been inconsistent. Studies highlight deficiencies in the detail of planning documents and the robustness of underlying scenario development (Velten et al., 2022), as well as their misalignment with short-term National Energy and Climate Plans (Evans et al., 2024). Moreover, many countries were late with their submissions, and nearly five years after the deadline, Poland has yet to produce an LT-LEDS.[39] Conversely, other strategies from, e.g., Czechia and Germany are now well over five years old, while the French strategy has already undergone several revisions.

38 A separate EU Adaptation Strategy was adopted in 2021, as mandated by the European Climate Law.

39 See National long-term strategies (europa.eu), accessed 07 Sep 2024.

Short-term action planning

The EU's 2023 NDC update states that the 2030 climate target will primarily be achieved through three revised measures under the Fit-for-55 policy package: (1) the EU ETS, which aims for a 62% reduction in emissions by 2030 compared to 2005 levels in large industry and energy sectors; (2) the ESR, setting differentiated national targets for non-ETS sectors to achieve a 40% reduction by 2030 compared to 2005 levels; and (3) the Land Use, Land-Use Change, and Forestry (LULUCF) regulation, which establishes national targets for natural carbon sinks, aiming for a net removal of 310 million tons of CO_2 across the EU.

According to the EU NDC, these three policies, together with CO_2 emissions targets for new cars and vans as well as binding EU targets for energy efficiency and renewable energy, put Europe on track to achieve the EU's 2030 goal. Several other policies have longer-term implications, such as the extension of the EU ETS to include road transport and buildings and the Alternative Fuels Infrastructure Regulation, which national targets for deploying publicly available EV charging and hydrogen refuelling stations. The EU NDC also highlights the requirement that 30% of the EU budget and economic recovery funding contribute to climate neutrality, which along with the EU Sustainable Finance Framework, aim at implementing Article 2.1c of the Paris Agreement and making financial flows consistent with a low-GHG development pathway. However, a 2024 independent analysis showed that insufficient public and private investment for the transition threatens the EU's long-term ambition, especially on innovation funding targeting industrial emissions (Calipel et al., 2024). The analysis also noted that fossil fuel subsidies in the EU continue to increase, despite the 2023 GST's call for a phase-out. These climate finance inconsistencies undermine long-term policy alignment.

While the EU LT-LEDS underscores that the EU "will use its external action, trade policy and international cooperation to support global transformation" – particularly by using high environmental standards to leverage its role as the largest single market – the NDC does not address this in much detail (European Commission, 2018a, p. 22). The EU's 2023 NDC *does* mention the CBAM and its goal of preventing carbon leakage, as well as encouraging regional participation (i.e., Norway, Iceland, Liechtenstein) in the EU ETS. It further emphasizes that the 2030 target is to be achieved with domestic reductions and removals without relying on international flexibilities. At the time of writing, CBAM has been in a transitional phase since October 2023. As such, it is likely that this policy will play a larger role for the EU's 2025 NDC update and thereafter. Notably, the current NDC lacks information on planned EU contributions to international finance.

At the national level, the Governance Regulation requires Member States to produce short-term National Energy and Climate Plans (NECPs), including specific goals and policies on a five-year cycle in line with the Paris Agreement. These plans and their updates serve as important inputs for EU reporting and help to harmonize policies across countries. Although the level of detail is generally higher than found in the LT-LEDS, an independent analysis highlighted internal inconsistencies on issues such as bioenergy and residual emissions (ECNO, 2024b). Moreover, in 2023, several EU countries were late in producing draft NECP updates, and the EU's assessment noted a shortfall in aggregate national ambition and insufficient information on socio-economic impacts (European Commission, 2023).

Socio-economic considerations

The EU LT-LEDS models the economic impact of the climate neutrality transition on GDP and provides a qualitative assessment of related indicators, such as employment. Just transition concerns are primarily addressed in terms of regional disparities in fossil fuel-related jobs and the need for re-skilling. More recently, however, the European Green Deal has placed greater emphasis on social considerations aiming to maximize the socio-economic co-benefits of mitigation actions and to ensure a just, inclusive transition that "leaves no one behind" (European Commission, 2019, p. 1).

The EU's 2023 NDC outlines several new policies, including the creation of a Social Climate Fund to protect vulnerable households from potential price increases resulting from the new ETS2 for transport and buildings. A separate Just Transition Mechanism and an enhanced Modernization Fund aim to mitigate the transition's disproportionate regional effects. While these policies provide a strong framework for a just transition, national implementation will be crucial; countries must submit Social Climate Plans that align with their national climate strategies. As these instruments are new, their ability to fulfil the European Green Deal's promise of a fair transition remains to be seen. Nonetheless, cooperation among Member States and efforts for citizen engagement in affected areas will be key to ensure support is distributed effectively as well as to maintain public backing for the transition and prevent political backlash (Kögel, 2024).

Process alignment

Coordination

The Directorate-General for Climate Action (DG CLIMA) is primarily responsible for climate planning in the EU, working closely with the Directorate-General for Energy (DG ENER) on policy formulation.[40] It is part of the European Commission, the EU's executive branch. In 2019, European Commission President Ursula von der Leyen created the office of Executive Vice-President for the European Green Deal, tasked with an overarching coordination role to oversee progress towards climate neutrality, align the EU's 2030 targets with the new net-zero ambition, and strengthen the EU's position in UNFCCC negotiations. At present, much of the European Commission is in flux. The structure and mission for the next legislative period are expected to shift based on policy priorities, following the European Parliament elections in June 2024. For instance, the political guidelines issued by von der Leyen in July 2024 focus heavily on competitiveness and industrial transformation and high-level coordination for the net zero transition will fall to the office of the Executive Vice-President for Clean, Just and Competitive Transition (currently Commissioner-designate Teresa Ribera).[41]

All EU Member States designate responsibility for climate action within their governments, and more than half have a permanent inter-ministerial coordinating body (Evans et al., 2024). Notably, many countries divide responsibilities between ministries, separating short and long-term planning. Typically, the LT-LEDS is handled by an environment or climate ministry, while short-term planning falls under an energy or economic ministry. This division is a likely side effect of the Governance Regulation's goal to integrate energy and climate planning. However, without effective communication and coordination, competing priorities among ministries could also hinder long-term alignment (Velten et al., 2022).

Planning cycles

As noted above, there is no requirement to update the EU LT-LEDS or to establish a dedicated short-term planning cycle at the EU level akin to the NECP process at national level. However, key EU policies, such as the European Climate Law and the Governance Regulation, are on a five-year revision cycle, i.e. reviews must take place 'within six months' of each GST.[42] These reviews could lead to revised legislation and targets, which in turn could result in a new policy package.

EU Member States are required to update their NECPs every five years, but this is not the case for LT-LEDS, which must be submitted every ten years, with interim five-year updates being largely voluntary. Fewer than half of EU countries have signalled that they intend to follow the optional five-year cycle to ensure that short-term actions are guided by an *up-to-date* LT-LEDS (Evans et al., 2024). As such, policy reforms are needed to better integrate national planning horizons extending through 2050 and beyond (Duwe et al., 2023; Oberthür, 2024).

Stakeholder engagement

It is difficult to determine whether the same stakeholders participated in developing both the EU LT-LEDS and the policies that make up the EU NDC. Each followed similar processes but were several years apart. A description of the public consultations on the EU LT-LEDS, which can be found in the accompanying technical assessment (European Commission, 2018b, p. 292), included a 12-week online survey, position paper submissions, and a two-day high-level conference held in Brussels in July 2018. The EU received over 2,000 responses from "private individuals" and approximately 700 from specific stakeholder groups. Of these 700, 57% came from the business community; 22% from NGO and related networks; 9% from national, local, or regional authorities; 8% other; and 4% from academia. Among the 173 position papers submitted, 63 were from business associations and private enterprises. These figures indicate a response bias towards the private sector. No details are provided on the breakdown of participants at the July 2018 event. A similar approach was implemented for the impact assessments of each European Commission policy proposals under the Fit-for-55 package and Climate Target Plan, which form the basis of the EU's current NDC. The breakdown of stakeholder consultations on the Climate Target Plan had a higher level of private sector engagement, with 52% from business, 25% from NGOs, 8% from public authorities; 8% other; and 7% from academia (European Commission, 2020b, p. 7).

Recently, the European Climate Pact and the Conference on the Future of Europe,[43] which concluded in 2022, have provided additional channels for stakehold-

40 For instance, impact assessment for the 2040 target proposal lists DG CLIMA as the lead institution (specifically Unit A2, Foresight, Economic Analysis, and Modelling) with DG ENER as a co-lead (European Commission, 2024a, p. 87).

41 See Europe's Choice: Political guidelines for the next European Commission 2024-2029, accessed 07 Sep 2024.

42 The report on the functioning of the European Climate Law, ESR, and EU ETS was published in May 2024 (see European Commission, 2024c).

43 See Conference on the Future of Europe - European Commission (europa.eu), accessed 06 Sep 2024.

er participation (European Commission, 2020a, p. 24). According to the European Commission, the European Climate Pact has engaged with a broad range of individuals, communities, businesses, and organizations across Europe, aiming to raise awareness and encourage sustainable actions towards climate neutrality.[44] In summary, the EU pursues stakeholder engagement for short and long-term climate actions, but these often take the form of passive consultations, making their impact difficult to assess. Furthermore, the disproportionate participation of the private sector suggests that a more proactive approach may increase representation. Nevertheless, dedicated forums under the European Green Deal have provided an opportunity for more continuous engagement.

Stakeholder participation at the national level is dictated by the Governance Regulation in the form of "multi-level climate and energy dialogues". National implementation varies in both form and substance; some countries have permanent stakeholder bodies, while others rely on ad hoc working groups, such as those convened for NECP development or one-off citizen assemblies (Faber et al., 2024). Studies highlight substantial room for improvement on the effectiveness of participatory processes among EU Member States, especially for fostering commitment to a long-term vision for the net-zero transition (Didi et al., 2023; EEB, 2023; Velten et al., 2022).

Policy framework and coherence

The European Climate Law establishes an overarching framework for long-term climate action in the EU. Articles 6 and 7 of the law require the European Commission to assess both EU-wide progress and the consistency of EU and national policies with the 2050 climate neutrality target every five years. In theory, these assessments could function to ensure the alignment of short-term measures with net-zero and identify any inconsistencies in EU and national policy. However, the law does not require these consistency assessments to be made public. The EU indicated that such an assessment was conducted and presented in the 2023 Climate Action Progress Report (European Commission, 2024c, p. 2), but external observers noted a lack of transparency and detail in reporting (ECNO, 2024a).

The European Climate Law also requires all new EU policies to be evaluated for their consistency with climate neutrality. This requirement could serve as a powerful lever for aligning short-term actions (across all policy fields) with long-term ambition, but its effectiveness rests on robust implementation in the context of policy impact assessments. Finally, the European Scientific Advisory Board on Climate Change, established in 2021 by the European Climate Law, can also play an important role in supporting long-term policy alignment by regularly reviewing EU actions and promoting evidence-based policy.[45] An example of this in practice is the European Commission's decision to adopt the lower end of the Advisory Board's 90-95% proposal for the 2040 milestone (EU Advisory Board, 2023).

The Governance Regulation establishes a mirror framework for EU Member States, over half of which also have their own national climate framework laws (Ecologic Institute, 2024). The regulation further stipulates that national-level NECPs and LT-LEDS *must* be aligned with each other and consistent with EU-wide climate neutrality. However, no official mechanism exists to verify this alignment, and studies highlight evidence of structural, timing, and methodological misalignment (Velten et al., 2022).

Concluding remarks

The European Green Deal placed the transition to climate neutrality at the centre of the EU's economic strategy. In this context, the EU has refined its policy framework for aligning its own climate actions with international cycles and a long-term transition, introducing a binding long-term net-zero target, intermediate milestones, and formal mechanisms for monitoring progress and policy consistency. Since 2018, EU Member States have been required to produce regular short and long-term climate plans that are consistent and report on progress towards their implementation. The European Climate Law also requires that national planning be consistent with EU-wide climate neutrality.

Nevertheless, as discussed above, while these and other provisions appear promising on paper for enhancing alignment between NDCs and LT-LEDS, several factors threaten their effectiveness in practice, including the lack of an updated EU LT-LEDS and insufficiently detailed long-term planning at the national level. Several new EU policies underscore the importance of socio-economic considerations and aim to mitigate the transition's impacts on the most affected regions, but it remains to be seen whether these these policies can foster greater appropriation by private and public actors of the EU's vision for climate neutrality.

44 See European Climate Pact - European Union (europa.eu), accessed 06 Sep 2024.

45 See European Scientific Advisory Board on Climate Change (europa.eu), accessed 06 Sep 2024.

MOROCCO

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Content alignment: Aligning Morocco's climate action and development dynamics with the Paris Agreement

Although responsible for an insignificant fraction of global GHG emissions–only 0.21% in 2022 according to the European Commission for Global Atmospheric Research[46]–Morocco is emerging as a global leader on climate issues. This is due to the Moroccan government's early recognition of the country's high exposure to severe climate change impacts, with rising temperatures and changing precipitation patterns leading to severe water shortages, declining agricultural yields, desertification and other national-scale damage. At the same time, there has been a significant increase in the country's population, urbanization and demand for water resources for irrigated agriculture.

Driven by a high-level political will to set an example on the international stage, Morocco's strong commitment to reducing its GHG emissions–and particularly to decarbonizing its economy–resulted in a revised ambition for its Nationally Determined Contribution (NDC) in 2021, setting a target of a 45.5% reduction in GHG emissions by 2030 compared to a business-as-usual scenario. This ambitious target aligns Morocco's NDC with the conclusions of the GST and Intergovernmental Panel on Climate Change (IPCC)'s recommendations for limiting global warming to 1.5 °C. As such, Morocco ranks ninth internationally in the Climate Change Performance Index (CCPI), published in August 2024 by the NewClimate Institute in collaboration with Germanwatch and Climate Action Network.

In 2021, the Government of Morocco submitted its first qualitative LT-LEDS, titled "Vision Morocco 2050", to the UNFCCC, outlining a pathway for low-carbon economic development in the medium and long term. This initial "qualitative" LT-LEDS enabled the co-construction of sectoral visions for decarbonization by 2050 with all stakeholders, and helped identify actionable levers and challenges in terms of low-carbon development. As a result of this participatory exercise, a shared national ambition was established to reach the overall objective of net zero national emissions by 2050. This national ambition is based on four strategic orientations: accelerate the development of renewable energies to achieve a 96% decarbonized electricity mix by 2050, and encourage the development of green hydrogen to decarbonize heavy industry and road freight; generalize efficiency related to energy and natural resources in all sectors, particularly in industry, construction and transport, and stimulate the new circular economy and waste recovery sectors; develop sustainable, climate-smart and resilient agriculture and forest ecosystems as well as carbon sinks; and promote a new generation of low-impact, "smart" regions and cities equipped with zero-emission transport plans and logistics promoting multimodality and integrating new digital technologies.

In 2023, the government finalized the formulation and modelling of its integrated and quantitative LT-LEDS, establishing a clear pathway for Morocco's carbon-neutral and climate-resilient development. The LT-LEDS is aligned with both the international objectives of the Paris Agreement and the results of the GST, as well as with the goals set by the national sustainable development strategy (NSDS), the orientations of the New Development Model (NDM) Morocco 2035, the National Strategic Adaptation Plan (NSAP), Morocco's new green hydrogen initiative and new sectoral policies. It defines the technical measures, timeline, national and sectoral decarbonization trajectories and key medium and long-term milestones in an operational and scientifically-based format.

It is important to note that the design of Morocco's national Net Zero Emissions trajectory was guided by key drivers of the country's economic and social development, and its societal and industrial transformation. These drivers include: ensuring energy sovereignty and reducing the national energy bill to mitigate exposure to external shocks due to international price volatility and geopolitical crises, by making optimal and flexible use of Morocco's abundant and competitively priced renewable energy resources; developing a diversified, competitive and affordable renewable energy and electricity supply for all industrial and economic operators in the country; drastically reducing the carbon footprint of electricity produced in Morocco to address new carbon adjustment tariff barriers, particularly that of the EU's CBAM, which came into force in October 2023; unlocking the potential for energy efficiency and the development of green hydrogen and its derivatives for economic and social uses; using the low-carbon transition as a strategic lever for adaptation and climate resilience to address water stress, land degradation and biodiversity loss, by strengthening the Decarbonation-Water-Nature-based Solutions-Green Hydrogen Nexus; ensuring a just

46 https://edgar.jrc.ec.europa.eu/report_2023#emissions_table

low-carbon transition by selecting effective technical decarbonization measures that are acceptable in both economic and social terms by public and private sectors and disadvantaged social groups. In addition, related effects such as the impact of these measures on the environment and health should also be taken into account.

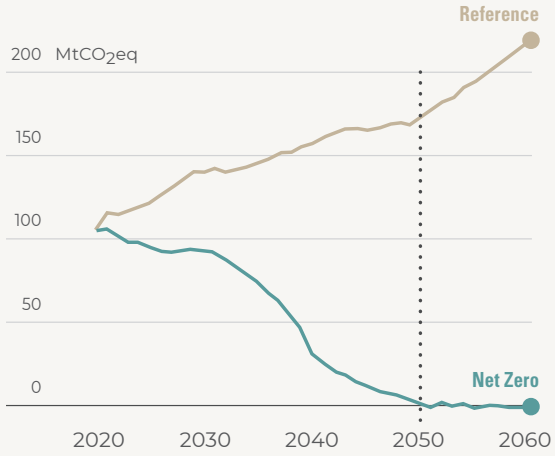
This new long-term national strategy has enabled both the creation of a clear vision of the profound economic, social and industrial transformations necessary to achieve the net-zero emissions objective between 2020 and 2050, and also a strong commitment among key stakeholders to the new national long-term low-carbon development trajectory and its implementation roadmap. This innovative strategic process aims to support the development and integration of new green industrial value chains to drive the decarbonization of the national economy, promote a proactive and strategic export positioning, and to enhance Morocco's competitive standing as a decarbonized economy, particularly with a view to benefit from the EU's Green Deal and CBAM, the Inflation Reduction Act (IRA) of the United States, and the African Union's new continental free trade area (AfCFTA).

Morocco now has a net-zero emissions trajectory and a concrete, robust, holistic and realistic roadmap, based on around 100 operational measures to achieve deep decarbonization of its national economy and territories. This roadmap covers seven key sectors: Energy, Industry, Transport, Building, Agriculture, Waste/Circular Economy, and Forestry/Biomass. Morocco's LT-LEDS was drawn up in a participatory manner using the Low Emissions Analysis Platform (LEAP).[47] It provides an optimal and in-depth assessment of the direct costs of reducing emissions and associated savings, and proposes a scorecard of GHG reduction objectives and target indicators for reducing emissions from energy and non-energy sources by sector for each strategic axis of the Net Zero Scenario by 2030, 2040 and 2050. Morocco's LT-LEDS was presented by the Minister for Energy Transition and Sustainable Development at COP28 in Dubai on 6 December 2023, during a dedicated side-event.

47 https://www.sei.org/tools/leap-long-range-energy-alternatives-planning-system/

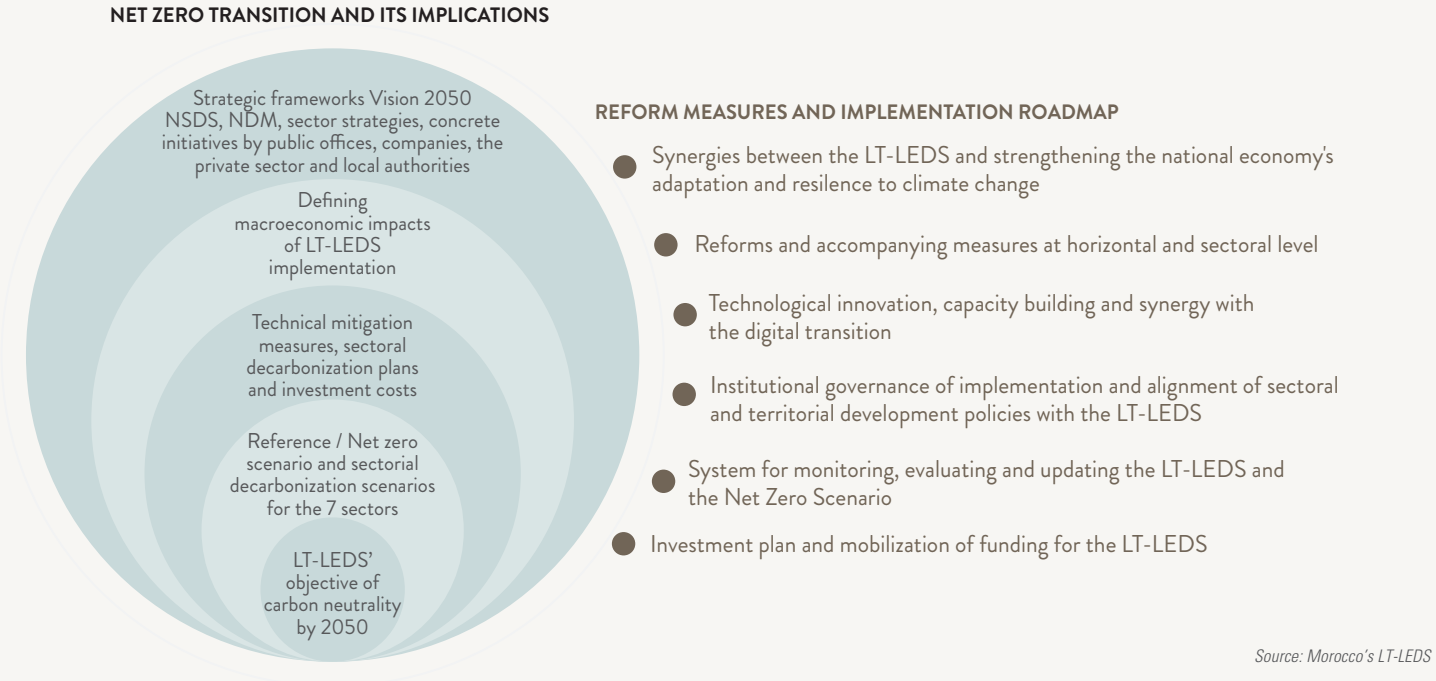
Figure 5. Reference and Net Zero emissions

Trajectories for Morocco's LT-LEDS



Source: Morocco's LT-LEDS

Figure 4. Structure and components of Morocco's LT-LEDS



Source: Morocco's LT-LEDS

By the end of 2023, the Ministry for Energy Transition and Sustainable Development (MTEDD) had co-developed sectoral decarbonization plans (PSD) for the seven key sectors in collaboration with the corresponding ministries and private sector federations.

These sectoral decarbonization plans will serve as operational guidelines for each ministry in its transition towards systemic decarbonization of its sectoral policy. For each sector, the plan outlines the sectoral vision as well as quantified objectives for its decarbonization within the framework of Morocco's overall Net Zero scenario. It also includes detailed lists of planned technical decarbonization measures and the associated investment costs estimated per decade.

By 2050, the implementation of the sectoral decarbonization plans and mitigation measures of the Moroccan LT-LEDS implementation roadmap should considerably reduce GHG emissions. Energy consumption in the building and transport sectors will be almost entirely decarbonized, while in industry, emissions linked to energy consumption are net negative when engineered CO_2 removal is taken into account. The forestry and land use sector (including arboriculture) is expected to be a major carbon sink, absorbing more than 50 $MtCO_2e$ by 2050. By way of illustration, here are the key sectoral objectives of Morocco's LT-LEDS:

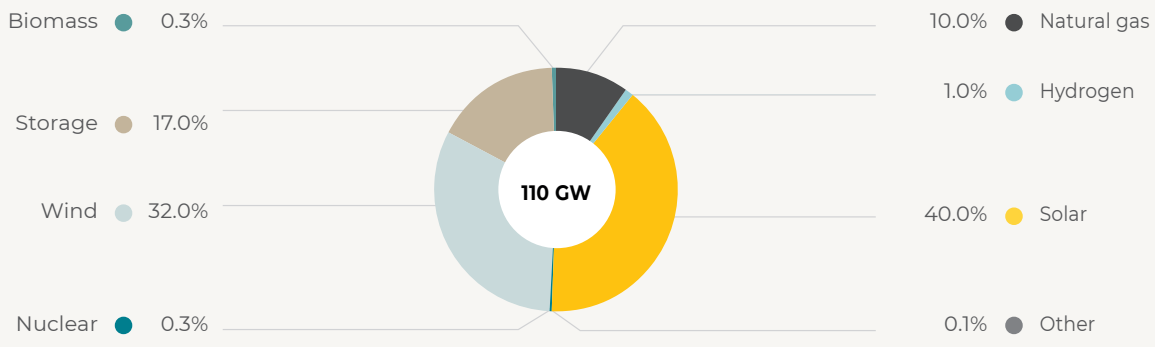
- a final decarbonized electricity mix of around 96% by 2050, with total installed capacities reaching 110 GW, predominantly from wind and solar energy, which will contribute in a balanced manner to Morocco's capacity and electricity mix by 2050. Installed renewable energy capacity will increase approximately 17-fold by 2050 compared with 2022,
- a reduction in energy emissions in all energy-consuming sectors compared with the Reference scenario, aiming for overall net zero for the national economy by 2050. These reductions will be 100% for residential and tertiary sectors, 129% for industry, 84% for transport, and 38% for waste,
- a decrease in fuel imports, with reductions of 20% by 2030 and 73% by 2050, compared to the Reference scenario,
- a complete phase-out of coal by 2040, following the decommissioning of all existing coal-fired power plants,
- a drastic reduction of the average emission factor for centralized national grid electricity generation in the Net Zero scenario from 730 [gCO_2e/kWh] to 16 [gCO_2e/kWh].

Main macroeconomic impacts of Morocco's LT-LEDS and net-zero trajectory

The Government of Morocco has carried out a preliminary analysis of the main economic and social impacts of LT-LEDS implementation. This chapter outlines the project's governance, methodological approach, and the first results of the medium and long-term macroeconomic impacts of the net zero trajectory.

Following the participatory and integrated modelling approach used in the LT-LEDS sectoral decarbonization trajectories, a similar participatory approach was adopted to characterize as accurately as possible the macroeconomic and financial consequences of Morocco's low-carbon strategy, and to gain a comprehensive and holistic view of the economic issues involved in the transition to a low-carbon economy. Finally, the exercise of formulating optimal policies is carried out with a view to mapping the best investment and financing trajectory, while formulating recommendations to enhance relevant public policies

Figure 6. Morocco's energy mix in 2050



Source: Morocco's LT-LEDS

(industrial, financial and fiscal) to maximize opportunities while mitigating vulnerabilities and transition risks associated with the Moroccan LT-LEDS.

To identify and characterize the various elements of analysis needed for impact simulation, the project's governance was structured around a Technical Committee and four prospective working groups: "Local and international industrial integration", "Mobilization of national public and private finance", "Mobilization of international finance" and "Just transition and labour market". Below are a number of key points that emerged from the preliminary analysis of the low-carbon strategy's macroeconomic effects:

1. Investments and economic growth

- LEAP model simulations highlight a dynamic investment trajectory, ranging from 3% to over 5% of GDP until 2040, reflecting the scale of efforts needed to achieve the transition to a low-carbon economy.
- This investment drive, supported by a robust clean technology deployment strategy, is projected to make a significant contribution to economic growth, with an estimated increase in GDP of almost 15% by 2060, supporting value creation and long-term stimulation of economic activity.

2. Job creation and consumption gains

- The transition to a carbon-neutral economy is expected to generate positive socio-economic impacts, notably through job creation, with nearly 400,000 newly created positions anticipated by 2060.
- Moreover, gains in per capita consumption are expected to increase gradually, reflecting an improved standard of living for the Moroccan population and greater availability of resources for households, thereby strengthening domestic demand and supporting economic growth.

3. Impact on the trade balance

- Analysing the impact on the trade balance reveals a complex dynamic, with an initial increase in imports linked to investment in green technologies, such as photovoltaic cells and batteries for electric vehicles.
- However, this increase in imports is offset by a significant reduction in fossil fuel imports over time, resulting in a net gain for the trade balance, exceeding 3% of GDP by 2060. This development reflects the gradual reorientation of Morocco's trade structure towards more sustainable and renewable energy sources.

4. Tax and financial aspects

- In terms of taxation, the analysis underlines the importance of an effective carbon pricing strategy to generate substantial revenues, but also to encourage more sustainable behaviour and investments geared towards a low-carbon economy.
- However, it is essential to note that implementing such a policy requires a delicate balance between tax revenues and investment incentives, as evidenced by variations in the carbon tax break-even point over time.

5. Managing climate-related financial risks

- Finally, the management of climate-related financial risks is essential for maintaining the financial stability and resilience of the Moroccan economy in the face of climate change challenges.
- Close monitoring and effective mitigation measures, such as those proposed by the World Bank and the Central Bank of Morocco, are essential to prevent potential adverse impacts on the financial system and ensure a smooth transition to a low-carbon economy.

These results are encouraging, but to maximize the expected co-benefits for the Moroccan economy, significant coordination between low-carbon strategy and industrial strategy is necessary. Macroeconomic analyses based on sectoral reference and net-zero trajectories show that the encouraging results depend on assumptions about the integration of Moroccan value chains into investments. To maximize local co-benefits from the transition, innovation and industrial policies must be implemented, including:

- developing regional value chains, particularly through investment subsidies along the chain. This involves, for example, identifying products most likely to generate spillover effects, given Morocco's comparative advantages and existing production structures.
- supporting the creation of local markets, including local content requirements
- developing local maintenance services linked to infrastructure investment,
- accounting for the multi-dimensional impacts of industries (jobs, tax revenues, trade, finance, etc.),
- anticipating the comparative advantages associated with the introduction of an extended Carbon Border Adjustment Mechanism by the European Union in 2026 and the enforcement of the US Inflation Reduction Act (IRA),

- supporting national public and private financial institutions to improve the assessment of investment projects, and offering bridging loans to cover the subsidy schedule, etc.

Macroeconomic modelling has also taken into account the crucial aspect of a just transition, particularly addressing rising electricity prices projected for the period 2035-2040 and potential adverse effects such as job and income losses, or a mismatch between skills and vocational training and existing jobs on the labour market.

2024, a pivotal year for implementing the LT-LEDS and aligning public policies and the NDC 3.0

Following the November 2023 adoption of the Final LT-LEDS Report by the National Commission on Climate Change and Biodiversity, and in light of the GST recommendations and the recent COP28 decisions on raising NDC ambitions, the MTEDD carried out a gap analysis between the 2021 version of the NDC trajectory and the net-zero trajectory of the LT-LEDS. In 2024, the MTEDD launched the development of NDC 3.0 for the 2025-2035 period. The government's priorities for NDC 3.0 include increasing mitigation ambitions, aligning with the quantitative net-zero trajectory of the LT-LEDS, improving transparency on adaptation, and improving coordination with government institutions, the private and financial sector and sub-national players such as regions and cities. Additional priorities are to provide better cost estimates for NDC mitigation measures, strengthen financial planning for NDC implementation, and ensure the coherent and effective integration of the Ministry of Economy and Finance into the multi-year budgeting process for the unconditional component of the NDC.

In parallel, in 2024, the Government of Morocco launched an in-depth analysis of the institutional, policy, legislative and regulatory implications of implementing LT-LEDS decarbonization measures across each of the seven key sectors, at both cross-cutting and sectoral levels. These analyses were carried out in close collaboration with key stakeholders (i.e., Ministries and private and financial actors), which made it possible to draw up operational action plans identifying the specific reforms and measures to be scheduled, along with those responsible for their implementation through 2030, 2040 and 2050. Once consolidated, this work will provide the government with a programmatic framework for implementing the net- zero trajectory, including sector-specific decarbonization funding plans based on the quantified investment costs of the LT-LEDS and an inventory of the various technological decarbonization options available on the market.

In 2024 there was also a strong drive to increase national and regional initiatives to implement LT-LEDS guidelines and measures and to align Morocco's public policies and sectoral strategies with the net-zero trajectory. At regional level, the Guelmim-Oued Noun and Tangiers-Tétouan-Al Hoceima regions have included the long-term net-zero objective in their strategic planning documents. Furthermore, the Moroccan Agency for Energy Efficiency (AMEE) is currently developing 12 regional energy efficiency and decarbonization programmes.

At the sectoral level, the following initiatives are worth noting:

- finalization of the draft law on climate change, which includes LT-LEDS guidelines and a net-zero target by 2050 at sectoral and territorial levels,
- final drafting of the new national industrial strategy, placing decarbonization at the heart of its strategic orientations and positioning green technology development as a new strategic industrial sector,
- launch of an integrated development programme for seawater desalination, green hydrogen and agricultural irrigation
- launch of a study aiming to develop the national roadmap for sustainable mobility, in line with LT-LEDS quantified objectives
- launch of the National Urban Mobility Strategy by the Ministry of the Interior, which includes a national roadmap for sustainable mobility by 2040,
- finalization of the National Electric Mobility Master Plan by the National Water and Electricity Authority (ONEE), with quantified targets for the deployment of zero-emission vehicles,
- launch of the National Green Finance Strategy 2035 by the Ministry of Economy and Finance, which aims to integrate the net-zero objective and LT-LEDS investment projections,
- government adoption of strategic guidelines for the State's shareholding policy within public establishments and companies, including objectives for decarbonization and adaptation to climate change.

Process alignment: LT-LEDS implementation and the NDC 3.0 process

In Morocco, the MTEDD is the institutional leader for the design of both the NDC and the LT-LEDS. It plans to finalize the NDC 3.0 process before the end of 2025 relying on the same governance bodies used for the LT-LEDS, namely:

A Steering Committee, a Technical Committee, and:

- seven sectoral decarbonization groups: energy, transport, industry, agriculture, buildings, forestry, and waste, each led by the respective ministerial department. Members include representatives of the relevant ministries, public institutions and the private sector.
- a working group on decarbonized regions and cities. The aim of this group is to ensure that the NDC 3.0 incorporates mitigation measures implemented by regions and cities as part of their planning and development programmes.
- a working group on finance, chaired by the Budget Directorate of the Ministry of the Economy and Finance, whose objective will be to finalize the programme for mobilizing public and private funding for the NDC 3.0 project pipeline.

This NDC 3.0 governance structure will ensure consultation with LT-LEDS stakeholders and ensure the full inclusion of all societal actors, while aligning with the LT-LEDS trajectory and increasing overall ambition.

In addition, the Moroccan government plans to establish effective governance for implementing and mobilizing funding to ensure the vertical and horizontal convergence of public policies and their alignment with LT-LEDS objectives. This includes their localization at regional and city levels, based on:

- the National Commission on Climate Change and Biological Diversity (CNCCDB), with expanded responsibilities to manage the implementation of the LT-LEDS and its updates, and which will monitor the achievement of sectoral decarbonization objectives aligned with carbon neutrality,
- the National Low Carbon Strategy Unit (UNSBC), composed of national experts from ministerial departments and public offices trained in the LEAP software, which will support the CNCCDB. The UNSBC will be responsible for:
  - translating LT-LEDS guidelines into sectoral decarbonization action plans and operational programmes,
  - setting-up and managing an information system with performance and result indicators,
  - assessing and updating the LT-LEDS national net-zero trajectory and sectoral decarbonization trajectories every five years while identifying obstacles and proposing necessary adjustments,
  - producing biannual reports on progress in sectoral and national decarbonization trajectories and their alignment with the national net-zero objective.

To this end, the MTEDD conducted training sessions in September 2024 to transfer skills in modelling LT-LEDS decarbonization trajectories to designated members of the UNSBC. These members are responsible for monitoring and periodically updating national and sectoral decarbonization trajectories, as well as the NDC trajectory, and contribute to measuring and reporting progress within the Biennial Transparency Report (BTR) framework.

In addition, LT-LEDS governance will be connected to other climate bodies, in particular the GHG inventory system (SNI - GES), the MRV and BTR reporting platform, and the Climate Finance Unit of the Ministry of Economy and Finance.

Close coordination between national and regional levels will ensure alignment of financial and human resources with territorial carbon neutrality objectives, particularly through State-Region Multi-Year Contracts and Urban Development Programmes. Furthermore, the constant evolution of green technologies and their competitiveness, and the long-term nature of the LT-LEDS, will imply continuous monitoring of international trends, technologies, and regulations to provide Morocco with the most effective options.

INDIA

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Content alignment

Net Zero 2070

During COP26 in Glasgow, Prime Minister Modi declared that India will be net zero by 2070.[48] India was also one of the first nations to declare net-zero at a sub-sectoral level, with Indian Railways pledging to become net zero by 2030.

The Prime Minister also announced Lifestyle for Environment (LiFE), a mass movement to be mindful of the environment and promote environmentally conscious lifestyles through sustainable consumption and production. In October 2022, Mr. António Guterres, UN Secretary General along with PM Modi launched LiFE as a global mass movement to achieve sustainable lifestyle change.

Long-Term Strategies

As a follow-up to the Glasgow declaration, India submitted its LT-LEDS[49] to the UNFCCC at COP27 in 2022. The LT-LEDS underscores the importance of energy in meeting India's development needs and aspirations amid rural to urban demographic transitions and subsequent infrastructure transformations. India continues its efforts to decouple its emissions from economic growth by means of promoting low-carbon development in every sector. Aware of the trade-offs and relating costs, India has acknowledged the co-benefits of integrating climate action in its development pathways, in consideration of its national circumstances.

India's LT-LEDS adopts an economy-wide multiple objectives approach, including integrating dimensions of gender equity and the inclusion of marginalized and vulnerable groups, that consciously seeks to move to a low-carbon development path. To become *Aatmanirbhar Bharat* (Self-Reliant India), the document systematically outlines the current policies in electricity, industry (energy intensive and light industries), transport (passenger and freight), buildings (residential and commercial), agriculture and forestry sector. It emphasizes development priorities such as eradicating poverty and hunger, providing housing to all, increasing employment as well as income support, recognizing the need for financial backing for these objectives.

48 National Statement by PM Modi at the COP26 Summit in Glasgow. https://pib.gov.in/PressReleasePage.aspx?PRID=1768712

49 India LT-LEDs 2022. https://unfccc.int/sites/default/files/resource/India_LTLEDS.pdf

Updated NDCs

India's first NDC[50] was submitted as an Intended Nationally Determined Contribution (INDC) in response to COP decisions 1/CP.19 and 1/CP.20 for the period 2021 to 2030. The mitigation strategies include:

- Promote a sustainable lifestyle based on conservation and moderation. (NDC Target 1)
- Reduce emissions intensity of GDP by 33-35% by 2030 from 2005 levels. (NDC Target 3)
- Achieve approximately 40% cumulative installed electric power capacity from non-fossil fuel sources by 2030, supported by international finance, including the Green Climate Fund (GCF). (NDC Target 4)
- Create an additional carbon sink of 2.5 to 3 billion tonnes CO_2 equivalent through forest and tree cover by 2030. (NDC Target 5)

In August 2022, India submitted an updated NDC,[51] with targets including:

- Elevate the lifestyle objective into a global mass movement for Lifestyle for Environment (LiFE).
- Increase the emissions intensity reduction target to 45% by 2030.
- Raise the non-fossil fuel power capacity target to 50% by 2030.
- Retain the carbon sink goal of 2.5 to 3 billion tonnes CO_2 equivalent by 2030.

Under this revised NDC, the renewable targets increased from 175 GW to 500 GW in 2021. Solar targets have increased from 20 GW (in 2008) to 100 GW (in 2015, the Paris Agreement) which is a fivefold increase compared to 2010 levels. The updated NDC also prioritizes energy storage and the launch of a green hydrogen policy for India. Estimated cumulative investments, based on numerous sources, range from $6-10 trillion between 2015 and 2030.[52] It also emphasizes the need to mobilize domestic and new funds, including additional funds from developed countries to implement mitigation and adaptation actions.

Current status: According to India's third national communication to the UNFCCC, submitted in December 2023, the emission intensity of its GDP has reduced by 33% between 2005 and 2019. As of 31 October 2023, the cumulative installed capacity from non-fossil fuel-based energy resources is 186.46 MW, which is 43.81% of the total cumulative electric power installed capacity.

50 India's First NDC 2015. https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf

51 UNFCCC Second NDC 2022. https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf

52 India LT-LEDs 2022. https://unfccc.int/sites/default/files/resource/India_LTLEDS.pdf

Alignment of the NDC with LT-LEDS and Net Zero 2070

In December 2022, the upper house of the Indian Parliament introduced the Net Zero Emissions Bill, which provides a legislative framework for India to achieve its net-zero target based on the NDC under the UNFCCC. The bill has been highlighted as essential for a) building resilience and providing relief for vulnerable persons and communities affected by extreme climate events, b) to minimize and address the adverse impacts of climate change and c) to respond to the commitments as a signatory to the UNFCCC and the Paris Agreement.[53]

Both the NDC and LT-LEDS are "dynamic" documents by nature. The NDCs are updated periodically to reflect the pace of policy implementation. Current analyses indicate that, among the countries on track to meet their NDC commitments by 2030, India is one of the largest. However, without technology transfer and low-cost finance, further acceleration of climate actions may stall as the emphasis remains on efficient and equitable development-centric growth.

Development priorities

India is committed to promoting development-centric climate transformations and technology transitions. With one-sixth of the global population, India's sustainable development, aligned with its climate commitments, has significant benefits for the entire world.

India aims to become a "self-sufficient economy" in the next three decades, meeting the essential needs of its citizens (food, housing, energy, water), while advancing from a lower-middle-income to an upper-middle-income economy. India's commitment to welfare and quality of life is reflected through key policies such as *Pradhan Mantri Awas Yojana* (Housing for All), *Ujjwala Yojana* (LPG connections for low-income household), *Swachh Bharat Abhiyan* (Clean India), *Jan Dhan Yojana* (financial inclusion), *Ayushman Bharat-PMJAY* (healthcare), *Ayushman Arogya Mandir, PM-Mudra Yojana* (microfinance), *Saubhagya* (electricity access), and Start-up India.[54]

Considering the GST outcome

The first GST recognized the need for deep, rapid and sustained reductions in greenhouse gas emissions in line with 1.5°C pathways and calls on Parties to strengthen their NDCs and to base them on the GST outcomes. Below is a proposal for how India could integrate GST signals into its future NDCs:

1. Tripling renewable energy capacity globally and doubling the global annual rate of energy efficiency improvements by 2030
   - India already tripled its renewable energy capacity in NDC 2, raising its ambition fivefold (pre-NDC the renewable energy target was 100 GW in 2010). Similarly, solar targets have been increased since the first NDC.
   - India's National Solar Mission includes solar rooftops, solar parks, solar pumps, etc.
   - India's 2023 National Electricity Plan includes an Updated Wind Policy, Biofuel Policy, Battery Storage Policy, and guidelines for Grid Transmission and Flexibility.
   - Solar, Wind and Battery Storage require resources (critical minerals) and policies that support domestic manufacturing.

2. Accelerating efforts towards the phase-down of unabated coal power

Carbon Capture Utilization and Storage (CCUS) is used as a method for reducing carbon emissions from coal power. A CCUS policy for India is under discussion for NDC3. Given the current stage of CCUS, multilateral agencies and development financial institutions are more likely to be key sources of finance.

3. Accelerating efforts globally towards net-zero emission energy systems, utilizing zero- and low-carbon fuels well before or around the mid-century
   - India is committed to achieving Net Zero in 2070, with power sector decarbonization probably needed to decarbonize before 2060.
   - Development and energy security will remain priorities for India
   - India has already stated ambitious renewable energy and energy efficiency targets.

4. Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in line with the science
   - In-country modelling outputs and recommendations are needed, via peer-reviewed and grey literature, to inform national decision-making on this matter.

5. Substantially reducing non-CO_2 emissions globally, including methane emissions by 2030
   - India has already developed ambitious renewable energy and energy efficiency targets.
   - Industries are also committing towards net zero.

53 The Net Zero Emissions Bill, 2022. http://www.indiaenvironmentportal.org.in/files/file/net%20zero%20emissions%20bill%202022.pdf

54 Economic Survey of India 2023-2024.

Table 1. Evolution of the renewable energy targets across different NDCs in India

	NDC1 [Paris Agreement 2015]	NDC2 [Glasgow Pact 2021]	Recent Analysis *
Renewable Energy Target	175 GW by 2022	500 GW by 2030	480 GW - 530 GW
Solar	100 GW by 2022	360 GW by 2030	300 GW – 400 GW
Wind	60 GW by 2022	120 GW by 2030	75 GW - 120 GW
Battery Storage		47 GW	~90 GW

* Garg A., Patange, O., Vishwanathan S.S., Nag, T., Singh, U., and Avashia V., (2024). Synchronizing energy transitions toward possible Net Zero for India: Affordable and clean energy for all. A report prepared for Office of the Principle Scientific Advisor (PSA) to Government of India and Nuclear Power Corporation of India Limited (NPCIL).

Table 2. Evolution of energy efficiency targets across different NDCs in India

	NDC1 [Paris Agreement 2015]	NDC2 [Glasgow Pact 2021]	Current Analysis
Emission intensity of GDP	33-35% reduction in CO_2 intensity of GDP	45% reduction in CO_2 intensity of GDP	45-55% reduction in CO_2 intensity of GDP CO_2 intensity will fall from 900gCO_2/kWh in 2020 to 500gCO_2/kWh in 2030.
National Mission on Energy Efficiency	Perform, Achieve and Trade (PAT) scheme is a mechanism designed to achieve emissions reduction in energy intensive industries	PAT is being implemented across 11 industry sectors, commercial buildings (hotels), thermal power plants, mines, petrochemicals.	Energy intensity is reduced in the industry sector. As industry transitions away from fuel, electricity demand will rise.
Standards and Labelling [lighting, AC, fans, water heaters, heaters, batteries, stoves, pumps, etc]	Appliances covered under voluntary regime	30 appliances under mandatory regime 19 appliances under voluntary regime	Building sector energy efficiency is considerably improved, however as India builds infrastructure, the total electricity demand will rise.

6. Reducing emissions from road transport via a range of pathways, including through the development of infrastructure and rapid deployment of zero and low-emission vehicles
   - India plans to reduce road transport emissions through a combination of standards, economic instruments, a shift to electric vehicles and investing in a modal shift towards railways.
   - India has policies in place to transition its two-wheeler (2W), three-wheeler (3W) and four-wheeler (4W) fleets to electric vehicles by 2030
   - India's freight transportation share will increase to 45% by rail by 2030

7. Phasing out, as soon as possible, inefficient fossil fuel subsidies that do not address energy poverty or the just transition,
   - India removed subsidies from petrol and diesel in 2016
   - India has relatively high taxes on petrol and diesel, which are intended to act as a carbon tax
   - India has increased its tax on coal (also called the Clean Energy Cess) threefold, from $0.8 per tonne in 2010 to $3.2 per tonne in 2016. This translates to about $4 per tonne of CO_2.

This type of national analysis is key for integrating global GST signals into country-specific objectives and plans, fostering local ownership and context. Furthermore, India may consider including the GST signals into future LT-LEDS, deepening the analysis of what these global benchmarks mean for the country, and paving the way to be reflected in future plans, such as new NDC iterations.

Process alignment

Coordination within government

In the past, the NDCs have been prepared by an expert committee. However, for the LT-LEDS, Ministries that govern the resources, electricity, industry, transport, urban, agriculture, forestry and land use sectors have been organized into seven taskforces to develop the document. Each Ministries is working to transform systems not only at the national level but also the institutional levels.

Planning and policy coherence

The Net Zero Emission Bill 2022 provides a regulatory framework for net-zero. The Bill introduces a commission of experts and representatives from eight Ministries to plan and implement relevant policies.

Under the Enhanced Transparency Framework (UNFCCC), countries must track their NDC progress and report to the UNFCCC every two years. India is currently setting up this reporting system to meet the framework's requirements.

Conclusion

This guide provides a framework to help countries align their NDCs with the long-term goals of the Paris Agreement. It argues that LT-LEDS are essential for this task, as they reveal transformations and actions that might be overlooked with a short-term focus, thereby expanding the scope of the alignment process. To this end, LT-LEDS should include specific features, outlined in Chapter 2.

The proposed framework comprises a set of questions for countries to consider on both content and process. The guide then illustrates, through four case studies, how countries are working practically towards alignment.

On content alignment, the case studies of Chile and Morocco demonstrate different approaches to aligning NDCs with LT-LEDS and net-zero targets. The EU case offers a clear example of short and medium-term targets, with goals for 2030 and 2024 aligned with the overarching 2050 net-zero objective. Morocco's case study highlights how a country can include a sectoral target in its NDC, with a specific target for renewable energy. NDCs can also incorporate near-term action and policies. For example, Chile's 2022 NDC references its Renewable Energy Law and Climate Change Framework Law, both of which outline policies aimed at meeting Chile's NDC targets.

Countries are also encouraged to integrate GST outcomes into their NDCs. This guide suggests that an LT-LEDS can translate global benchmarks into national realities. For example, the India case study shows how, in the view of the authors, India could integrate some GST signals into its NDC. Countries can also use their NDCs to signal their assumptions and needs for international cooperation. For example, India's NDC emphasizes the importance of technology transfer and financial support.

On process alignment, the case studies provide clear examples of coordination, inclusion, and planning. For instance, Morocco has established coordination among different sectoral Ministries to define its new NDC. In Chile, a broad stakeholder process shaped its LT-LEDS. Finally, the EU case demonstrates how the European Climate Law serves as a comprehensive framework for long-term climate action in the EU.

Alignment is a continuous process that should be viewed as an ongoing effort rather than a one-off task. The case studies show that, while no country has achieved perfect alignment, all are making significant progress. Countries are encouraged to apply this framework consistently in their ongoing alignment efforts to fully realize its benefits.

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