



WORLD
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A photograph of a rural village with several white wind turbines in the background. The scene includes a dirt road, a blue gate, and several buildings, including a prominent white one with a red roof and green shutters. The sky is blue with scattered white clouds.

Enhancing NDCs by 2020

Resources for Strengthening National Climate Action

Overview

Power

Transport

Forests

Agriculture

Super
Pollutants

Ocean

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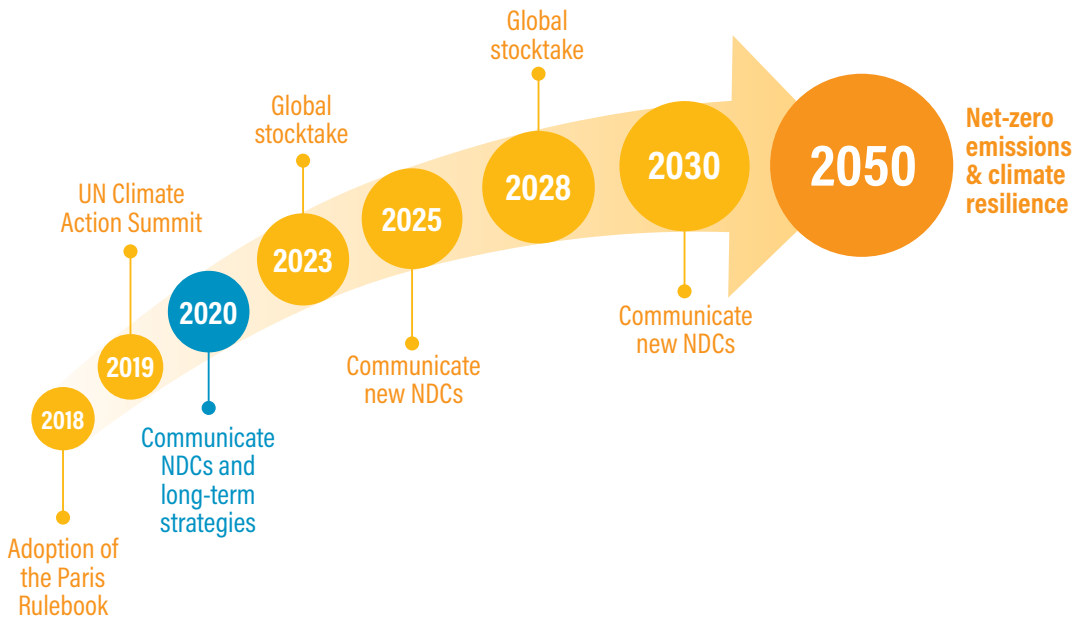
Introduction

To set the course for a net-zero emissions future, the historic 2015 Paris Agreement set a goal of limiting warming to well below 2 degrees C, and to pursue efforts to limit it to 1.5 degrees C.

Yet the national commitments made at Paris were not adequate to reach these temperature goals. To strengthen them, the Agreement set up a mechanism to enhance ambition for climate action over time, requiring each country to prepare and communicate nationally determined contributions (NDCs) every five years to reflect its highest possible ambition.

In line with these five-year cycles, the COP decision at Paris requests all countries to submit NDCs by 2020. The 2018 decision at COP24 in Katowice, Poland, reiterated this time frame.

The Arc of Ambition from Paris Goes Through 2020



Source: Fransen et al. 2017

Why should countries enhance NDCs by 2020?

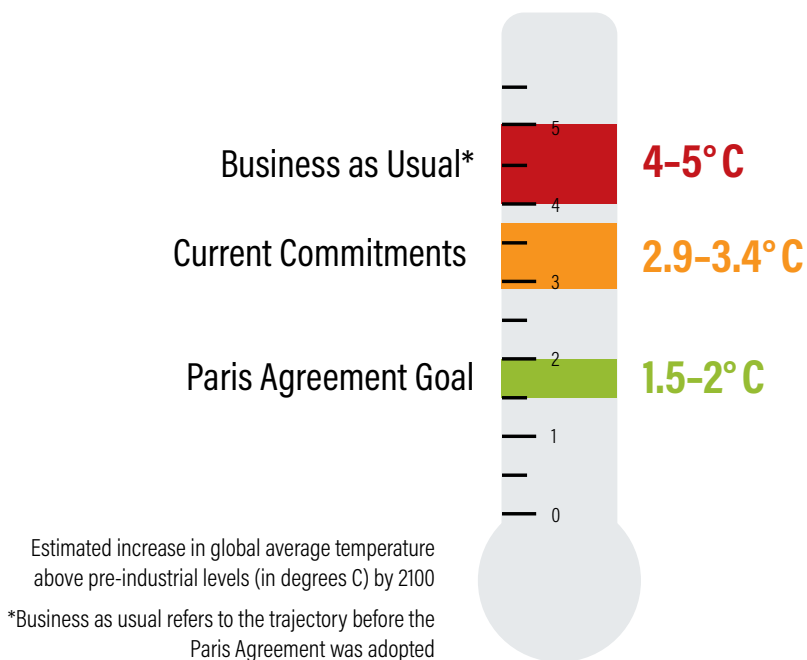
WE MUST.

The IPCC has emphasized that large-scale, immediate transformation is needed to keep the Paris goals in reach. Without urgent action, warming is likely to reach 1.5 degrees C as early as 2030. Greenhouse gas emissions must be slashed by roughly half from recent levels by 2030 to avoid pushing temperature rise above 1.5 degrees C.

Unfortunately, current NDCs put global temperatures on track to rise 2.9 to 3.4 degrees C by 2100. Postponing until 2025 or beyond to step up ambition will severely constrain options for achieving the Paris goals, requiring even more rapid and costly decarbonization and make us more reliant on unproven technologies.

Laying out a more ambitious vision and stepping up national commitments for 2030 is essential to keep the Paris Agreement's goals within reach.

The Climate Challenge: More Ambition Needed



WE CAN.

Since the initial NDCs were developed, innovation has flourished while the cost of technology has plummeted. Renewable energy is cheaper than fossil fuels around the globe, accounting for more than two-thirds of new electricity capacity. More affordable energy-storage options make wind and solar power even more attractive. Similarly, falling battery prices are expected to make electric cars cheaper than fossil-fueled cars by 2022. These changes create opportunities to set bolder targets in the power and transportation sectors.

Cities, states, regions, companies and investors have announced significant new commitments to climate action that are not reflected in initial NDCs. Actions announced at the U.N. Climate Action Summit and elsewhere by a wide range of actors can help create *ambition loops* – mutually reinforcing efforts that spur greater climate action – that enable governments to go further. Enhancing NDCs can also help create the conditions for local governments and the private sector to do even more.

Enhancement can bolster implementation of existing NDCs. Across a range of sectors, enhancing NDCs provides a key opportunity to take steps that will enable effective implementation of initial climate commitments. For example, countries with renewable energy targets can bolster them by adding targets on energy storage, which almost no NDCs addressed in 2015. Similarly, countries can adopt targets or measures on electric vehicles to strengthen existing efforts on sustainable transport, and they can adopt forest restoration targets to help achieve land-use objectives.

Taken together, these factors create many more options for climate action now than before the Paris Agreement.

WE BENEFIT.

Evidence of the alignment between climate action, economic growth and development benefits continues to pile up. The New Climate Economy estimates that ambitious climate action could generate \$26 trillion in economic benefits between now and 2030, create 65 million jobs in 2030 and avoid 700,000 premature deaths from air pollution. Reflecting enhanced ambition in NDCs can be an opportunity for countries to rally stakeholders in support of implementation and to attract finance, technology and capacity-building support from the international community.

Taking ambitious climate action also can deliver development benefits to countries, including achieving the Sustainable Development Goals. These benefits include increased access to energy and sustainable transport, improved agricultural productivity and food security, and healthier environments overall. Beyond such immediate benefits, transformative climate action is critical to building resilience to the growing impacts of climate change.

Enhancing NDCs also sends essential signals to attract climate finance and investment. Enhanced NDCs – including sectoral targets and policies – let public finance institutions and private investors know of investment potential. This must be complemented by increased finance and the alignment of financial flows with the Paris goals, so that countries can seize the benefits from action and meet their climate commitments.

Why enhance NDCs by 2020?



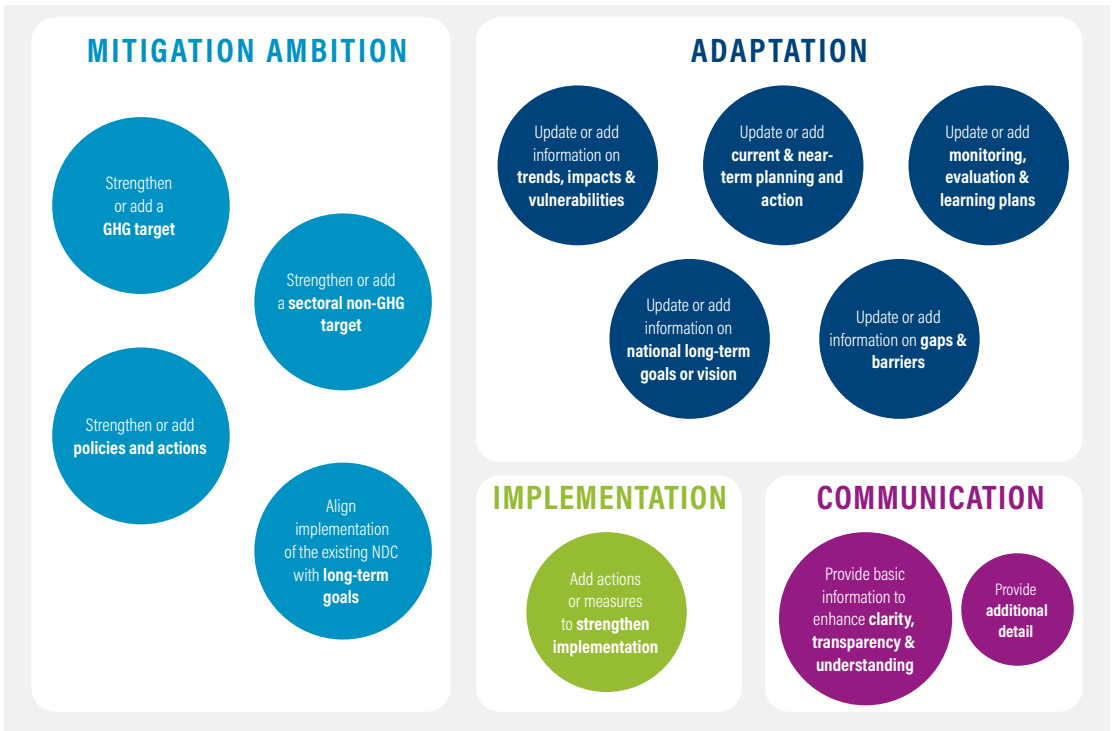
Source: New Climate Economy (2018)

INCORPORATING SDGs IN NDCs

The targets and actions in an NDC can be designed to maximize the development and economic benefits from climate action and avoid trade-offs. Moreover, an NDC could explicitly include targets and action to achieve those objectives. For example, NDCs could include targets or policies for:

- increased energy access through renewable energy;
- increased access to affordable, sustainable transportation and mobility;
- improved air quality and health outcomes;
- reduced damage from climate-related disasters through adaptation measures, such as better land-use planning or integrated coastal zone management;
- sustainable food and agriculture systems, including measures that increase food security;
- climate-appropriate green jobs and/or just transition programs and investments; and
- gender-related objectives, such as to ensure women's rights and tenure to land, water, forests, and housing.

Types of NDC Enhancement



Source: *Enhancing NDCs: A Guide to Strengthening National Climate Plans*, 2019, WRI and UNDP.



Take advantage of major shifts in technology and costs



Seize opportunities for economic growth and development



Avoid lock-in effects and increased transition costs



Send signals to attract climate finance and investment



Build on action by non-state actors, including cities and business



Achieve synergies with the SDGs (health, jobs, food, etc.)



Build broader buy-in from ministries and stakeholders



Bolster implementation of commitments in existing NDCs



Align with carbon neutrality and long-term strategies

GUIDANCE FOR NDC ENHANCEMENT

Access the full guidance at wri.org/stepup2020

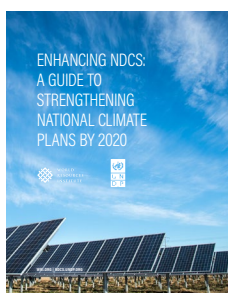
As countries consider how they can enhance their NDCs, WRI and UNDP have produced a set of guidance documents to help countries through the process of designing enhanced NDCs by 2020. *Enhancing NDCs* proposes an overarching framework that countries can use to think through the process of, and options for, updating their NDCs. This overarching guidance is supplemented by sector- and issue-specific guidance that provides additional insights.

Download this guidance at wri.org/stepup2020.

This document summarizes the overarching guidance provided in *Enhancing NDCs* as well as the key opportunities available in the power, transport, forest and agriculture sectors.

Overview of NDC Enhancement Guidance by WRI and UNDP

ENHANCING NDCs



Power



Forests



Ocean



Transportation



Agriculture



Short-lived climate
pollutants

Establishing a process for NDC enhancement

Establishing a clear and inclusive process is a vital first step to enhance NDCs. As they develop this process, countries should consider how to ensure coherence with national planning processes and gain support from affected constituencies and those who will implement the NDC. They should also define institutional arrangements to ensure leadership and coordination, engage stakeholders and develop a work plan with defined roles and responsibilities to undertake the enhancement. For both mitigation and adaptation, countries should explore how climate actions in the NDC can also help the country achieve national development objectives, including implementation of the SDGs.

It may not be necessary to establish new processes and institutional arrangements for NDC enhancement; some countries may have existing arrangements that can be harnessed for this purpose, including those that were used to develop the country's initial NDC. However, given that many of those NDCs were designed quickly in the lead-up to the Paris Agreement, NDC enhancement can also be an opportunity to revisit and improve the NDC design process.

Steps to Establish a Process for NDC Enhancement

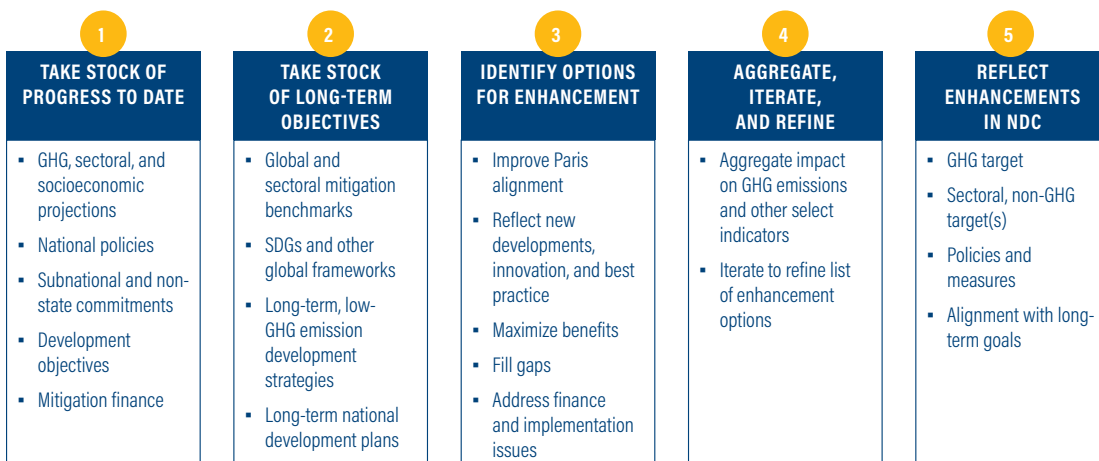


Enhancing mitigation

The first round of NDCs, if fully implemented, would lead to warming of 2.9 degrees C to 3.4 degrees C over the course of the century. Enhanced mitigation ambition is therefore essential to achieving the Paris Agreement's goal to limit warming to well below 2 degrees C, or 1.5 degrees C, and so it should be a strong focus of the NDC enhancement process.

In this guidance, enhanced mitigation ambition is defined to mean that the enhanced NDC, if fully implemented, results in lower cumulative emissions than the fully implemented initial NDC. Countries should undertake NDC enhancement with a view toward promoting this result, as not all NDC improvements related to mitigation will increase mitigation ambition. For instance, NDC enhancement can improve implementation, clarity, transparency and understanding without necessarily enhancing ambition. Fortunately, several factors set the stage for countries to enhance their mitigation ambition, such as falling technology costs, increased nonstate action, and a growing understanding of the benefits of climate action. The process comprises five steps.

Designing an Enhanced Mitigation NDC



DIAGNOSTIC QUESTIONS TO IDENTIFY OPTIONS FOR NDC ENHANCEMENT

Improving Paris alignment

- Does the NDC as a whole, and its treatment of each sector individually, lead to a trajectory that aligns with the benchmarks for achieving Paris Agreement temperature goals?

Reflecting new developments, innovation and best practices

- Does the treatment of the sector in the initial NDC reflect up-to-date assumptions regarding available technologies and their costs?
- Does the NDC as a whole, and its treatment of each sector individually, reflect the relevant plans, policies and measures that are being implemented and considered at the national level or that ought to be considered based on available best practices?
- Does the NDC as a whole, and its treatment of each sector individually, reflect the relevant climate action commitments being made by nonstate and subnational actors in the country?

Maximizing the benefits

- Does the NDC as a whole, and its treatment of each sector individually, maximize synergies and reduce potential conflicts with development objectives, including with the Sustainable Development Goals and with climate resilience? How can the NDC best achieve those objectives?

Filling the gaps

- Does the NDC address all relevant sectors, subsectors and gases?

Addressing finance and implementation issues

- Could the NDC better reflect finance needs for NDC implementation and/or policy actions to align finance flows with climate goals?
- Does the NDC address important cross-sectoral interactions?
- Could the NDC otherwise facilitate strengthened implementation?

Enhancing adaptation

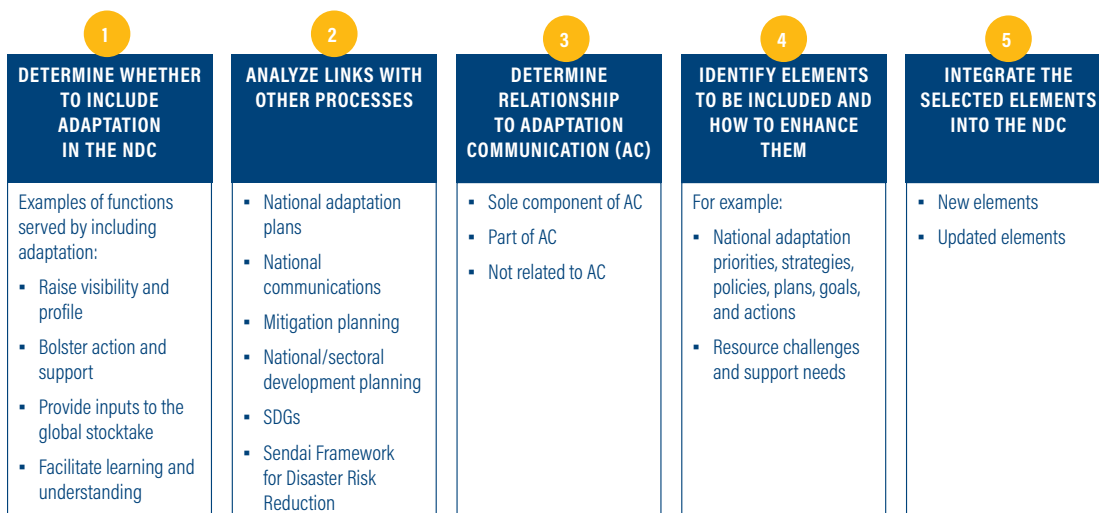
The importance of adaptation is undeniable. However, given that the inclusion of adaptation in the NDC is voluntary and countries may implement adaptation actions without mentioning them in the NDC, due consideration is required as to how to address adaptation in an enhanced NDC.

The first step is to consider whether to include an adaptation component in the NDC and, if so, what it is meant to achieve.

In designing an adaptation component in the NDC, it is useful to take stock of related national and international processes and consider how these and the NDC adaptation component can reinforce and/or be streamlined with each other. This step is important given the strong linkages between adaptation and various sustainable development agendas. Another point of consideration is how the adaptation component of the NDC relates to the nation's adaptation communication, which the Paris Agreement encourages countries to report periodically. Depending on its relationship with the adaptation communication, countries may wish to adjust NDC content to reflect the guidance on adaptation communication provided by previous COP decisions.

While there is no specific guidance provided for adaptation elements to be included in an NDC, the COP decision on guidance for adaptation communication (decision 9/CMA.1) provides a useful list that countries may wish to consider communicating through their NDCs. This list is wide-ranging and includes elements such as national adaptation priorities, strategies, policies, plans, goals, and actions. Additionally, countries with severely limited resources and capacities in planning and implementing adaptation actions may wish to include information related to barriers, challenges and gaps as well as support needs. Once the elements are identified, countries can develop information on those elements while ensuring coherence with each other and with other components of the NDC.

Steps for Enhancing an Adaptation Component in NDCs



Communicating an enhanced NDC transparently

Countries can enhance the clarity, transparency and understanding of their NDC by providing additional information so domestic and international stakeholders can better understand its content. Countries should also articulate how its actions constitute an enhancement.

Steps for Communicating an Enhanced NDC



Abbreviated list of information to facilitate Clarity, Transparency and Understanding

(see full guidance for complete list)

- Quantifiable information on the reference point (such as baseline emissions for the NDC)
- Time frames and/or periods for implementation
- Scope and coverage (such as sectors and gases covered)
- Planning processes (e.g., to prepare the NDC and implementation plans)
- Assumptions and methodological approaches (including for estimating and accounting for GHG emissions and removals and implementation of policies and measures; information on which IPCC methodologies and metrics were used; and sector/activity-specific assumptions)
- How the country considers that its NDC is fair and ambitious in the light of different national circumstances
- How the NDC contributes toward achieving the objective of the Convention as set out in Article 2



Sectoral Opportunities for NDC Enhancement



POWER

Access the full guidance at wri.org/stepup2020

Why the power sector matters

Global electricity demand is surging as global population continues to rise, urban sprawl continues unchecked, and emerging economies electrify their development to lift their populations out of poverty. At the same time, the power sector today is the largest source of energy-related CO₂ emissions, the leading cause of climate change. Achieving the objectives of the Paris Agreement will hinge on whether a deep transformation of the power sector is achieved, at unprecedented scale and speed.

The power sector is crucial for economic, social, human and sustainable development. Providing affordable and reliable power has been essential to raising and maintaining decent standards of living. Fortunately, there are many synergies between decarbonizing power supply and the Sustainable Development Goals. In addition to limiting climate change over time, decarbonization strategies – especially through the use of renewable energy – provide immediate co-benefits. These include employment generation, accelerated energy access for all, economic and social development in remote areas, reduced water stress, and improved resilience. Especially in developing countries, reduced air pollution and associated harmful health impacts can be a serious motivator to move away from coal-generated electricity.



Renewable energy costs have plummeted since the first round of NDCs, especially for wind and solar. As they continue to fall, they have started to compete directly with fossil fuel-based power generation in many geographies.



Electrification: The world's pathway to a sustainable energy sector foresees electricity's share of final energy demand growing from less than a fifth to nearly half in 2050 (IRENA 2019). End-use electrification met with increased RE generation can deliver 60 percent of the required energy-related CO₂ emissions reduction.



New business models that promote RE deployment, energy efficiency, energy access, and local revenue generation can improve the power system's flexibility and accelerate the transition to clean energy while also providing people with better access to affordable, reliable, and sustainable power.



Storage technologies are essential for reliability of a decarbonised grid, and show huge deployment and cost reduction potential. Large deployment of lithium ion batteries has been driving costs down drastically over the last decade.



Digital technology for the power grid is a key amplifier of power system transformations. It creates new intersections among the transport, buildings and power sectors, and can unleash economic opportunities: by 2025 the annual revenue from energy digitalization will be \$64 billion, up from \$54 billion today (Bloomberg 2017).

Opportunities in the power sector

Falling costs of renewable energy technology, grid modernization including digitalization and advances in storage technologies, and new business models have unlocked the potential to transform power systems in ways that seemed improbable just five years ago. To deliver on the potential of this transformation, countries will need to put foundational strategies in place – including enhanced grid flexibility, plans to address existing fossil fuel assets and integration of end-use sectors such as buildings and transport with the power sector.

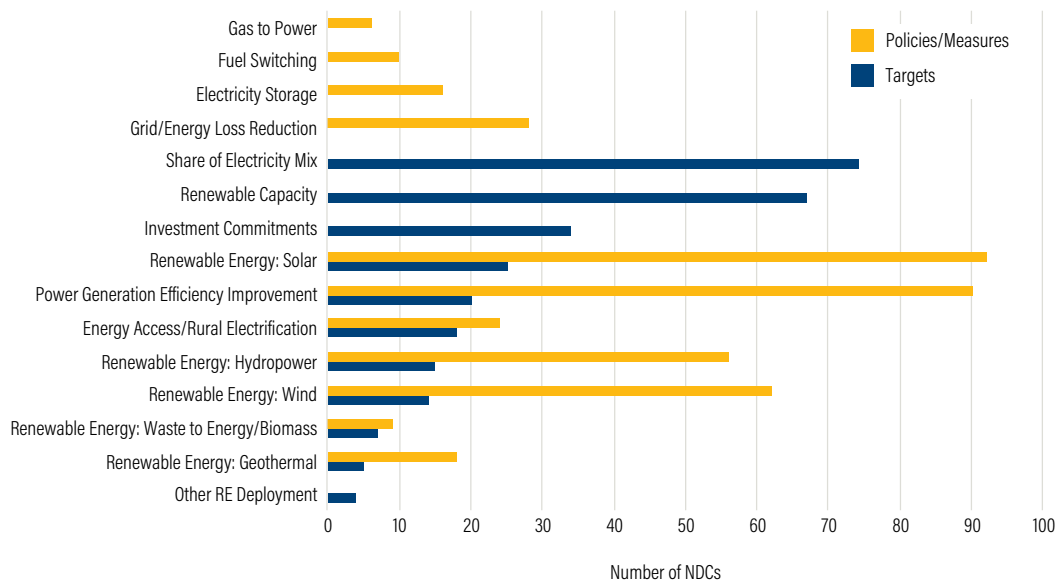
Countries can take advantage of this new context both to reassess the level of ambition of their initial NDCs and to leverage the NDCs to advance the needed transitions in the sector. Key opportunities include the following:

- further expansion of renewable energy capacity and generation, including distributed renewables that can enable energy access
- grid improvements in parallel with the deployment of renewable energy, such as energy storage that can bolster the penetration of renewables
- policies to tap into synergies between the power sector and electrification and efficiency in end-use sectors, such as buildings and transport
- commitments to end inefficient fossil fuel subsidies and policies that would enable a just transition toward a coal phase-out

Addressing these opportunities in the NDCs can send transformational signals to global industry and relevant stakeholders to move the power sector toward full decarbonization and catalyze holistic planning, avoiding lock-in of carbon-intensive infrastructure.

Power in the first round of NDCs

In their initial NDCs, countries have included different power-related targets, policies and measures. The most common target is one for renewable energy as a share of the power or energy mix, followed by targets for RE installed capacity, and investment commitments for renewable power. Policies and measures focus on the growth of solar energy and improvements in power-generation efficiency.



ENHANCE POWER SECTOR COMMITMENTS IN 2020 NDCs

- Strengthen or add an economy-wide GHG target to reflect more ambitious abatement options in the power sector
- Strengthen or add an ambitious GHG target for the power sector (e.g., a power-sector carbon-intensity target or a coal plant emissions-reduction target)
- Strengthen or add targets to support planning for renewables, for example:
 - Renewable energy targets as a share of total electricity generation mix
 - Renewable energy targets aligning with longer-term national plans and with national cost-effective renewable energy potential
 - Energy access targets (e.g. through the deployment of decentralized energy solutions)
 - Rooftop solar targets
- Strengthen or add targets to support grid flexibility
 - Energy storage targets to support renewable energy deployment
 - Targets for smart meter deployment and forecasting technologies to predict real-time output of variable renewable energy generation
- Strengthen or add targets and commitments to address existing fossil fuel assets, for example:
 - Coal phase-out targets for the power sector, coupled with just transition plans
 - Commitments to no new added traditional coal-fired capacity after current project pipeline
 - Air quality targets related to the power sector
- Strengthen or add targets to address integration with end-use sectors such as buildings and transport
- Strengthen or add policies and actions for the power sector



TRANSPORT

Access the full guidance at wri.org/stepup2020

Why transport matters

Demand for transportation of people and goods is surging. Driven by GDP growth, population growth and urbanization, demand for passenger and freight transport has risen on the order of 70 percent since 2000, and continues to climb. Our current attempts to meet this demand are ineffective and unsustainable. Transport is on track to generate GHG emissions by 2050 that are approximately three to six times higher than in scenarios consistent with the Paris Agreement, and unsustainable transport harms far more than the climate. Every year, road fatalities, air pollution and a lack of physical activity kill millions of people. Furthermore, in many cities, most residents can't access jobs and services because of congestion and limited transport options. Transforming transport is critical to ensure that people and goods can get around while we achieve the Paris Agreement and the Sustainable Development Goals.



Electrification: The cost of lithium-ion batteries has fallen 80% over the past decade, transforming the potential to power transport through an increasingly clean grid.



Avoid/Shift: Support for “avoid/shift” solutions like land use planning, public transport, walking and cycling is vital to a sustainable transportation sector.



Freight: While freight accounts for 40% of transport emissions, only a small fraction of NDCs mention it, even as clean fuels and improved logistics are increasingly viable.

Opportunities in the transport sector

We identify three big opportunities to enhance NDCs via the transport sector:

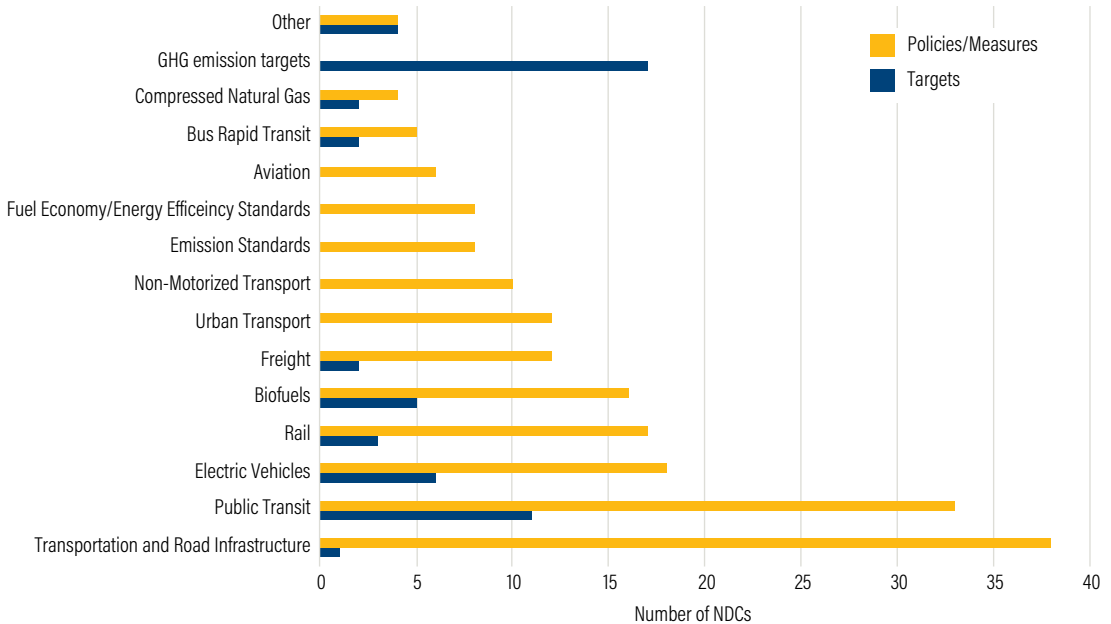
First, accelerate **electrification** while continuing to advance fuel economy. Rapidly declining lithium-ion battery costs, combined with a cleaner grid, offer a major opportunity to decarbonize the transport sector by electrifying vehicles. At the same time, improving fuel efficiency also offers immediate gains. NDCs can commit to Zero Emission Vehicle mandates and incentives, smart charging infrastructure, and policy/regulatory development to maximize the environmental, economic, social and operational benefits of electric mobility for the transport and energy sectors.

Second, amplify **avoid/shift** solutions, such as land use and mobility planning, public transport, walking and cycling. Most current NDCs do not address the need to avoid unnecessary travel and shift to or retain low-carbon modes such as walking, cycling and public transport. NDCs can promote land use and planning to induce shorter trips or foster more compact development while boosting public transport, walking and cycling. Promising measures include eliminating fuel subsidies, adopting national urban growth and transport master planning, investing in high-quality public transport, and encouraging safe walking and cycling in cities.

And third, address **freight** emissions by leveraging new clean fuels and information technology. Freight accounts for around 40 percent of transport emissions, yet most NDCs don't include it. A variety of emerging options can help address this sub-sector. Thanks to rapidly declining battery costs, a growing selection of electric trucks is available. But countries can also promote the use of new information technology to improve logistics and operational efficiency and can encourage shifting road freight to rail where feasible.

Transport in the first round of NDCs

Countries included a variety of targets, policies and measures in the first round of their NDCs. Most NDCs acknowledge the important relationship between transport and climate, but few include concrete, quantitative targets to address it.



ENHANCE TRANSPORT COMMITMENTS IN 2020 NDCs

- Strengthen or add economy-wide GHG targets reflecting more ambitious abatement options in the transport sector
- Strengthen or add an ambitious GHG target for the transport sector (e.g., to reduce transport GHG emissions by a certain percentage by 2030 from a base year)
- Strengthen or add non-GHG targets addressing the transport sector, for example:
 - Modal shift targets (e.g., a certain % of trips within cities to be done by walking, cycling and/or public transit)
 - Targets for kilometers of high quality public transit (e.g. BRT, LRT, metro)
 - Targets for walking/cycling infrastructure (e.g. kilometers of protected cycling infrastructure, bicycle share systems, standards for inclusion of pedestrian infrastructure)
 - Vehicle electrification and alternative fuel targets (passenger and freight, light-duty and heavy-duty vehicles)
 - Electric vehicle charging infrastructure targets
 - Phase-out targets for internal combustion engines
 - Fuel efficiency targets
 - Targets for phase-out of fossil fuel subsidies, coupled with policies to offset any economic impacts on vulnerable populations
- Strengthen or add transport-related policies and actions



FORESTS

Access the full guidance at wri.org/stepup2020

Why forests matter

The forest and land-use sector (not including agriculture) is responsible for about 10 percent of global net GHG emissions, but if properly managed this sector can help reduce global GHG emissions. Forests have a huge potential to absorb and store carbon and are the only proven carbon removal option currently available to deploy at scale. Moreover, through protecting and enhancing forest ecosystem services, forest-based solutions can provide local communities with a range of benefits for climate change adaptation and sustainable development. The benefits are vital for poor and vulnerable populations whose dependence on local forest ecosystems is highest.



Reducing deforestation and forest degradation, particularly conserving primary forest, offers significant low-cost mitigation opportunities along with adaptation and sustainable development benefits.



Reforestation and restoration offer the biggest GHG mitigation potential in the sector with up to 10 GtCO₂e per year globally by 2030.



Mangroves and peatland forests are carbon-rich forests capable of storing 2-3 times more carbon per area than upland forests but so far have attracted less attention in NDCs than upland forests.

Opportunities in the forest sector

There are significant cost-effective emission reduction opportunities in forest conservation, restoration and improved management.

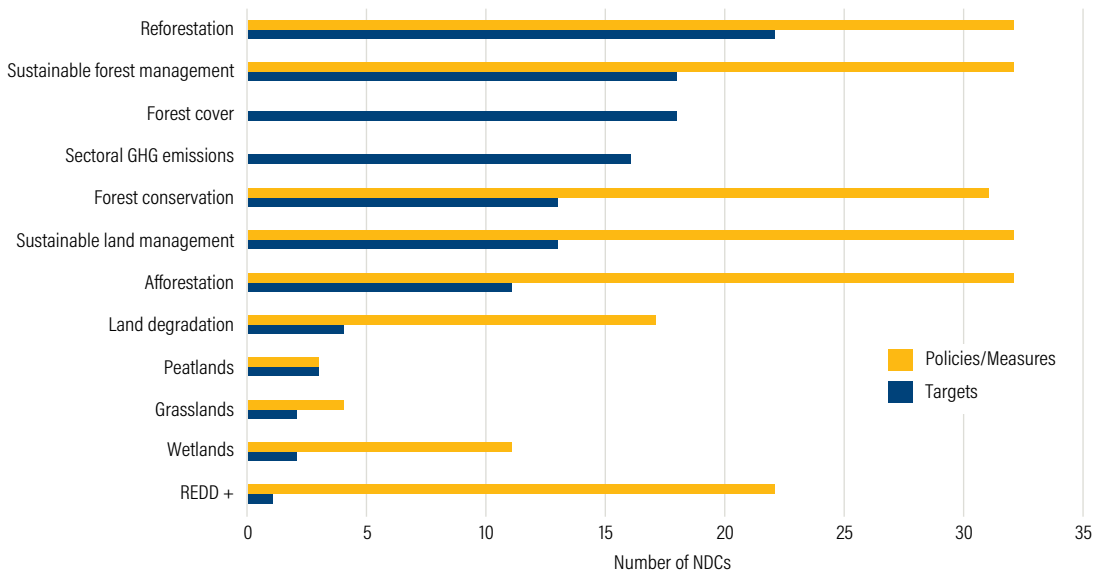
Forest conservation offers large mitigation potential with low costs. Countries can implement policies such as designating protected areas, establishing land tenure for indigenous people or local communities, strengthened forest monitoring and improved law enforcement, or developing REDD+ implementation capacity to conserve forests. Conserving primary forests is especially beneficial, not only for the high climate change mitigation potential, but also for adaptation and sustainable development because of the rich ecosystem services they provide. For example, mangroves and peatland forests are very carbon rich forests and can store more carbon per area than upland forests. Nonetheless, these forests are often given less attention and consequently are often missing in NDCs. Expanding the scope of forest sector targets and policies to mangroves and peatlands, if a country has not done so, can be a key opportunity for enhancement in the sector.

Reforestation and afforestation also have large mitigation potential, offering significant carbon removal opportunities. Where land-use demand for food production is high and conversion of lands to forest is not feasible, **agroforestry and silvo-pastoral systems** may provide alternative mitigation opportunities. Carbon stock potentials of trees in croplands and grazing lands are substantial, and they also provide additional adaptation and development benefits locally. Jurisdictional sustainability certification of forest products and agricultural commodities or reformation of subsidy policies can help countries create deforestation-free supply chains.

By ramping up those forest-based solutions in combination, countries will find opportunities for further emissions reductions in the NDCs while creating adaptation and development benefits.

Forests in the first round of NDCs

Major forest-sector solutions with significant emission reduction potential, such as reforestation, forest conservation, and afforestation, were commonly found in the countries' first round of NDCs. Wetland forests (e.g. mangroves) and peatland forests, despite their larger carbon storage capacity per unit area, attract much less attention than upland forests.



ENHANCE FOREST COMMITMENTS IN 2020 NDCs

- Strengthen or add an economy-wide GHG target to reflect more ambitious abatement options in the forest and land-use sector
- Strengthen or add an ambitious GHG target for the forest and land-use sector; for example,
 - tons of CO₂e net emissions reduction from forest and land-use sector relative to base year
 - tons of CO₂e removal through reforestation of a set number of hectares
- Integrate forest-related targets from other international processes (e.g. the Bonn Challenge) or domestic policy into the NDC
- Expand the scope of non-GHG targets to include additional forest types (e.g., mangroves and peatlands), type of solutions (e.g. agroforestry and silvo-pastoral systems) and/or geographical areas
- Strengthen or add non-GHG targets addressing the forest and land-use sector; for example,
 - Total area under legal protection, sustainable forest management or forest certification
 - Forest cover as a ratio of the country's total land area
 - Reduction in total area of deforestation
 - Total area of mangroves or peatland forests protected or restored
 - Total area to be reforested or afforested
 - Total area with secured land tenure for indigenous people or local communities
- Strengthen or add policies and actions for the forest and land-use sector

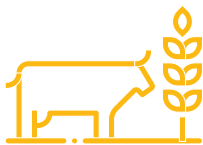
An aerial photograph of a vast, golden-brown agricultural field, likely a wheat or corn field, showing distinct rows of crops. A red tractor is visible in the lower-middle section, moving across the field. Several white hay bales are scattered across the right side of the field. The overall scene is captured from a high angle, emphasizing the scale and organization of the farming operation.

AGRICULTURE

Access the full guidance at wri.org/stepup2020

Why agriculture matters

Climate change is already directly and indirectly impacting food production in many regions of the world, including in the form of lost crops and dwindling employment opportunities. These impacts are likely to become increasingly severe by 2030 and beyond, placing global food security and the livelihoods of hundreds of millions at risk. At the same time, the agriculture sector is the second-largest source of GHG emissions globally. Now is the time to act and scale up efforts to reshape the agriculture sector in ways that support farmers and improve the productivity of farms. Although more than 90 percent of current NDCs mention agriculture in some way, the coming round of NDC updates in 2020 presents an opportunity to more fully seize the opportunities available in the agriculture sector.



Boosting yields of crops and livestock through sustainable intensification can reduce emissions per unit of food produced and greatly relieve pressure on the world's remaining forests.



Consumption can be more efficient by reducing food loss and waste and by shifting to healthier and more sustainable diets in wealthier countries.



Potential **synergies between agricultural adaptation and mitigation** are not always explicitly described in the NDCs, despite the possibilities that abound.

Opportunities in the agriculture sector

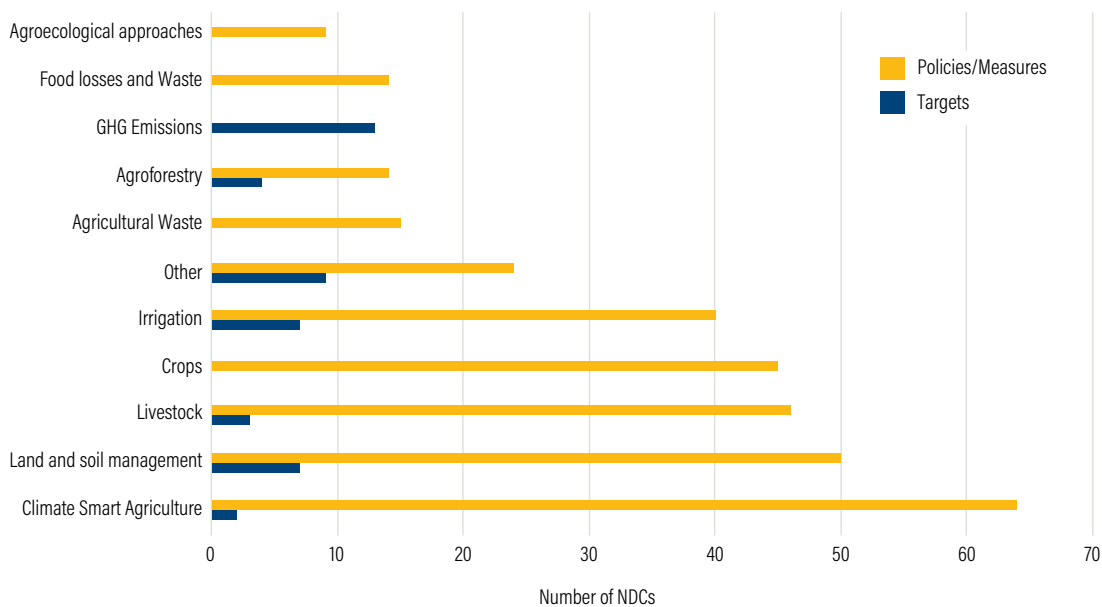
There are many opportunities to enhance NDCs through strengthened actions in the agriculture sector. Importantly, these actions can achieve many concurrent benefits: reduced GHG emissions, improved resilience, enhanced adaptation, and better outcomes for farmers and livelihoods. We identify the following four big areas for improvement:

- **Better crop management** can increase the potential yield of crops under ideal conditions and help farmers achieve better yields by better coping with environmental constraints, including a changing climate.
- **Better livestock management** (i.e., better feed, animal health care and breeding) can support higher ruminant productivity and hence the livelihoods and resilience of livestock producers.
- **Broader land management**, such as improved pastures for grazing; improved soil and water management, including through agroecological approaches; reduced use of fire as a management strategy; and improved soil fertility.
- **More sustainable production and consumption measures**, such as reduced food loss and waste and shifts to healthier and more sustainable diets.

The actions are not exhaustive but rather illustrative of the range of possibilities that exist in the agriculture sector. We do not argue for full implementation of all actions in every country, as some solutions will not be relevant or feasible everywhere. Policymakers will need to decide which actions are relevant for them and whether they merit inclusion in an enhanced NDC.

Agriculture in the first round of NDCs

Most NDCs identify agriculture as a key sector for action, both in terms of mitigation and adaptation, but few include quantified, sector-specific targets.



ENHANCE AGRICULTURE COMMITMENTS IN 2020 NDCs

- Strengthen or add an economy-wide GHG target reflecting more ambitious abatement options in the agriculture sector
- Strengthen or add an ambitious GHG target specific to the agriculture sector (e.g., to reduce agriculture GHG emissions by a certain percentage from a base year by 2030)
- Strengthen or add quantitative non-GHG targets for the agriculture sector such as the following:
 - Targets for better crop management (e.g. improved crop breeding, improved agriculture extension, improved irrigation services, better crop insurance)
 - Targets for better livestock management (e.g. improved livestock productivity)
 - Targets for land management (e.g., installation of renewable energy on farms [solar/wind/biomass], zero burning of agricultural residue)
 - Targets for more sustainable production and consumption measures (e.g., food loss and waste targets and nutrition targets)
- Strengthen or add agriculture-related policies and actions



SHORT-LIVED CLIMATE POLLUTANTS

Why these pollutants matter

Reducing short-lived climate pollutants (SLCPs) such as methane, tropospheric ozone, HFCs and black carbon is one of the most powerful tools to slow down the rate of global warming. Action to quickly curb these powerful climate forcers is essential to avoiding dangerous temperature increases in the near-term since they are more potent than carbon dioxide but live a relatively short time in the atmosphere. Reducing SLCPs can also deliver multiple benefits for development and human well-being to those who need it most, supporting efforts to improve health, enhance food security and alleviate poverty.

Opportunities to reduce SLCPs

SLCPs are a missing piece in almost all NDCs. This is a lost opportunity to make a measurable and immediate impact on global temperature rise in the near-term while producing extraordinary benefits in public health and food security for those most vulnerable to climate change. Research shows that the projected global temperature rise can be reduced by about 0.6 degrees C by 2050 and 1.2 degrees C by 2100 by making maximum use of existing, cost-effective technologies to reduce SLCPs, which are already being implemented around the world.

SLCP Control Measures

Residential Sector

- Replace traditional biomass cookstoves with modern fuel cookstoves
- Replace traditional cooking and heating with clean-burning biomass stoves
- Replace wood stoves and burners with pellet stoves
- Replace lump coal with coal briquettes for cooking and heating

Industry

- Replace traditional brick kilns with improved kilns
- Replace traditional coke ovens with modern recovery ovens

Transport

- Diesel particulate filters for road and off-road vehicles
- Eliminate high-emitting diesel vehicles

Agriculture

- Ban open-field burning of agricultural waste
- Intermittent aeration of continuously flooded rice paddies
- Improve manure management and animal feed

Fossil Fuel

- Pre-mine gasification, recovery and oxidation of methane from ventilation air from coal mines
- Recovery and utilization of gas and fugitive emissions from oil and natural gas production
- Reduce leakage from long-distance gas transmission pipelines

Waste Management

- Separation and treatment of biodegradable municipal waste and landfill gas collection
- Upgrade wastewater treatment with gas recovery and overflow control

HFCs

- Replacement of high climate impact HFCs with low impact alternatives

CCAC, 2014. *Time to act to reduce short-lived climate pollutants. Climate and Clean Air Coalition. Paris: France.*

ENHANCE SHORT-LIVED CLIMATE POLLUTANTS COMMITMENTS IN 2020 NDCs

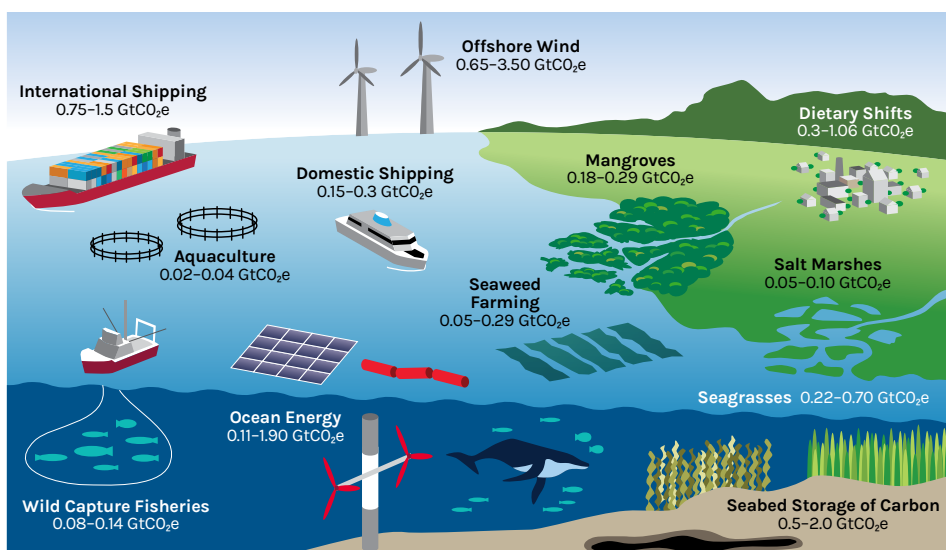
- Strengthen or add economy-wide GHG targets taking into account mitigation opportunities from SLCPs
- Strengthen or add an ambitious economy-wide SLCP-specific target (e.g., reduce economy-wide methane emissions)
- Strengthen or create an ambitious, sector-specific, SLCP-specific target (e.g., reduce methane emissions from the agriculture sector)
- Strengthen or add non-GHG targets related to activities that reduce SLCPs, such as the following:
 - Residential targets (e.g., replace traditional biomass cookstoves with modern fuel cookstoves)
 - Industry targets (e.g., replace traditional brick kilns with improved kilns)
 - Transport targets (e.g., install particulate filters on road and off-road vehicles)
 - Agriculture sector (e.g., ban open-field burning of agricultural waste)
 - Fossil fuel targets (e.g., improve efficiency of oil and gas operations)
 - Waste management targets (e.g., achieve full separation and treatment on biodegradable municipal waste with accompanying landfill gas collection)
- Strengthen or add SLCP-related policies and actions

OCEAN

Why the ocean matters

The ocean and its coastal regions and industries offer an array of opportunities for emission reduction and sequestration. Action to reduce emissions from ocean-based industries or utilize nature-based solutions can also deliver multiple benefits for development and human well-being to those who need it most, supporting efforts to improve health, enhance food security and alleviate poverty.

Ocean-based Mitigation Options



Opportunities in the ocean

Research shows ocean-based actions to reduce or sequester greenhouse gas emissions could deliver emission reductions of up to 4 billion tonnes CO₂e per annum by 2030 and 11 billion tonnes CO₂e per annum by 2050. Many of these options are ready for implementation now, and offer significant co-benefits in terms of resilience, food security and jobs. Ocean-based opportunities include decarbonizing domestic and international shipping, scaling up offshore wind and other forms of renewable ocean-based energy, reducing emissions of wild fisheries and aquaculture, and protecting and restoring “blue carbon ecosystems” such as mangroves, salt marsh and sea grasses.

To learn more about how the ocean, its coastal regions and economic activities can provide opportunities in the fight against climate change, read *The Ocean as a Solution to Climate Change* at www.oceanpanel.org/climate.

ENHANCE OCEAN COMMITMENTS IN 2020 NDCs

- Strengthen an existing economy-wide target to take into account mitigation opportunities in ocean-based sectors, such as domestic shipping or offshore energy
- Strengthen or create an ambitious GHG target specific to an ocean-based industry or sector (e.g., reduce GHG emissions from domestic shipping)
- Strengthen or add non-GHG targets to advance ocean-related climate action; for example,
 - improve coastal resilience by protecting mangroves
 - install offshore wind capacity
 - target date for decarbonization of domestic shipping fleet
 - fuel emissions reduction targets for domestic fishing fleets
- Strengthen or add ocean-related policies and actions

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Access these publications and more at wri.org/stepup2020

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