

WRI Submission to the Talanoa Dialogue

The World Resources Institute (WRI) welcomes the opportunity to provide an input to the Talanoa Dialogue, in order to explore avenues for enhancing climate action to achieve the long-term goals of the Paris Agreement. Such enhanced climate action can reduce greenhouse gas emissions and also deliver on a broad set of objectives for sustainable development and well-being. We also hope the Dialogue will contribute to understanding the opportunities for enhanced ambition both for the pre-2020 time period and beyond to achieve the long-term goals of the Paris Agreement.

WRI is a global research organization that spans more than 50 countries, with offices in Brazil, China, Europe, India, Indonesia, Mexico and the United States. Our more than 700 experts and staff turn big ideas into action at the nexus of environment, economic opportunity and human well-being.

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1. Where are we?

- From 2000-2010 GHG emissions grew at a rate that was almost double the rate between 1970 and 2000.¹ Emissions from fossil fuel and industry have seen a staggering increase – 63 percent since 1990.²
- Global average temperature has already risen approximately 1 degree C since 1880.³ 2016 was the warmest year since 1880, and 2017 the second warmest. The five warmest years on record have all occurred since 2010.⁴
- While in the absence of NDCs, we would see 4-5 degrees C of warming, the fact is that even if fully implemented, the INDCs imply 2.7-3.7 degrees C of warming, according to a range of studies.⁵

- According to the scenarios presented in the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report, emissions in all regions of the world must peak by 2020 for a cost-effective, likely chance of limiting warming to 2°C.⁶
- By 1990, 19 countries had peaked their emissions (representing 21 percent of global emissions) and by 2030 this number is likely to grow to 57 countries (representing 60 percent of global emissions). Among the 57 countries that have peaked already or have a commitment that implies a peak by 2030 are some of the world's biggest emitters, including China, the United States, Russia, Japan, Brazil, Germany and Mexico. While this trend is encouraging, it's not enough.
- Countries are embarking on implementing their first NDCs and how they do so will determine the degree to which they are aligned with other critical sustainable development objectives and the long-term goals of the Paris Agreement.

2. Where do we want to go?

2.1 Achievement of the long-term goal in Article 4.1 of the Paris Agreement

Based on WRI's and other analytical work, the following are key objectives to pursue globally:

- **Phase-out net greenhouse gas emissions.** To have a likely chance of keeping warming to below 2°C, net carbon dioxide emissions have to drop to zero between 2060 and 2075 (with net greenhouse gas emissions declining to zero between 2080 and 2090).⁷ To have a likely chance of limiting warming to below 1.5°C, net carbon dioxide emissions have to drop to zero between 2045 and 2050 (with net greenhouse gas emissions declining to zero between 2060 and 2080). There is no expectation that all Parties reach net zero emissions at the same time, but these scientific guideposts indicate the scale of transformation required over the coming decades.
- **Peak emissions.** As noted above, according to the scenarios presented in the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report, emissions in all regions of the world must peak by 2020 for a cost-effective, likely chance of limiting warming to 2°C. The sooner emissions peak, the lower the required rate of reducing emissions each year, which can be less expensive and make for a smoother transition. Countries must make and achieve commitments to peak their emissions as soon as possible, set their peaks at lower emissions levels, and commit to a significant rate of emissions decline after peaking.
- **Consider cumulative emissions.** Temperature increase is directly related to the total amount of emissions in the atmosphere rather than emissions in a given year. Thus, it will be important to consider cumulative emissions, and the implications for the overall global carbon budget or cumulative emissions. Moreover, in planning to stay within this carbon budget and achieve the phase-out of emissions, it will be critical to ensure that the implied rate of decarbonization between emissions peaking and phase-out (i.e. the annual rate of emissions decline) is feasible while also ultimately achieving carbon neutrality.

2.2 A sustainable, just, and equitable future

The Talanoa Dialogue can build a shared understanding of "where we want to go" in terms of broader societal, economic and development shifts that are closely tied to ambitious climate action, including:

- **The 2030 Agenda for Sustainable Development and climate action should be seen as mutually reinforcing.** WRI research has shown that climate actions communicated by countries in their NDCs were aligned with at least 154 of the 169 SDG targets.⁸ Climate impacts have the potential to slow, and perhaps even reverse, progress on the SDGs. Well-designed climate policies and

measures for both mitigation and adaptation can advance core development objectives, including health, decent employment, energy access, transport accessibility, sustainable agriculture, landscape protection, and biodiversity.

- **The importance of ensuring a just transition.** The critical role of government and other stakeholders is to ensure that the transition to carbon-neutral world brings jobs and sustainable growth. A just transition will be essential as economic activity shifts, with a clear need for strong support for workers, affected communities and low-income households. Local economies need to be diversified and strengthened to ensure communities remain viable for decades to come.⁹

3. How do we get there?

- Climate action must be taken now with long-term goals for decarbonization – global, national, subnational, and sectoral – as the key context for our steps forward. To achieve those goals, infrastructure, technology, landscape, policy and behavioral choices must avoid locking-in trajectories incompatible with a zero-carbon future. Delaying transformation raises the cost of doing so, and may make doing so technologically and socially infeasible later.
- There are many opportunities to pursuing the transformational approaches needed in ways that are closely aligned with broader sustainable development objectives.

3.1 Provide new or updated NDCs by 2020¹⁰

Much has changed since countries first developed their nationally determined contributions (NDCs) ahead of COP21 in 2015: the Paris Agreement has been adopted and subsequently ratified, establishing ambitious long-term goals and a clear collective direction of travel; the price of renewable energy keeps dropping; countries are increasingly decoupling economic growth from greenhouse gas (GHG) emissions;¹¹ the potential benefits of climate action for broad sustainable development objectives are increasingly being tapped; and a growing number of long-term, low-GHG emission development strategies recognize the need for transformative change to align with the Paris Agreement goals.¹² Parties can take advantage of this changed context by submitting new¹³ or updated NDCs by 2020.¹⁴

There are multiple domestic reasons why countries may want to communicate new or updated NDCs by 2020, especially to seize the economic and social benefits of doing so. These include to:

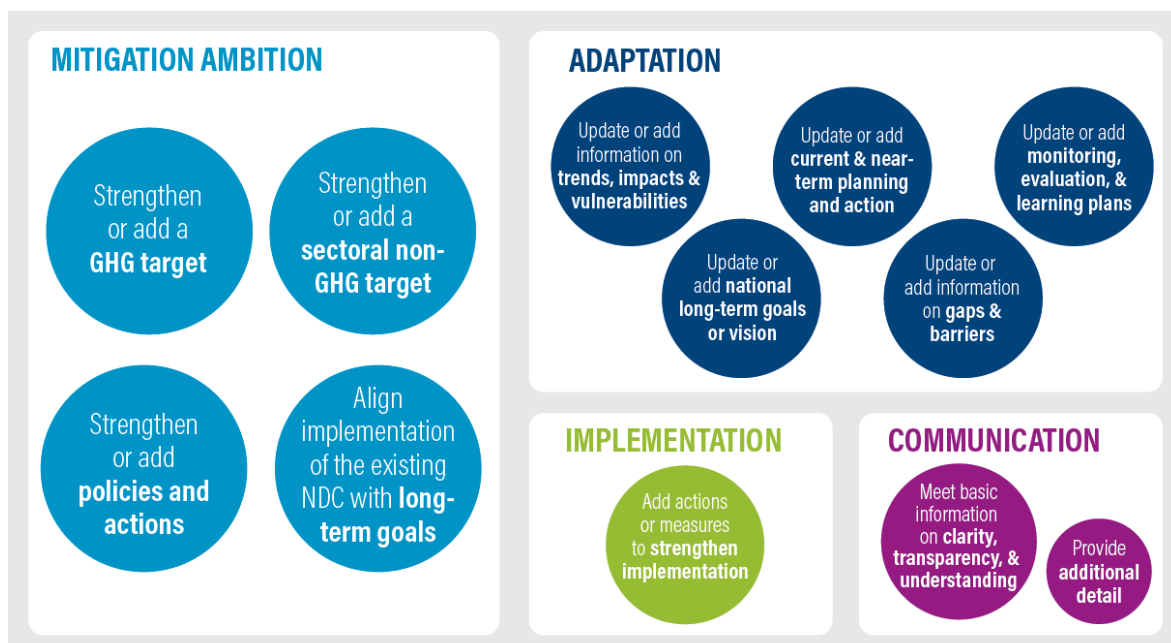
- Factor in recent advances in innovation and declining costs of emissions mitigation technologies that have occurred, and take advantage of economic and development opportunities in key sectors.
- Reflect shifts already occurring in the real economy and send accurate signals to the private sector to inform investment decisions.
- Align the NDC with domestic long-term goals and strategies, and perspectives to avoid investments that lock in high emissions and exacerbate climate vulnerabilities
- Factor in additional information and data that may uncover new areas of cost-effective mitigation potential.
- Capture early progress already made towards existing targets. Many countries have already made substantial progress and some appear to be on track to overachieve their existing targets.
- Strengthen multi-stakeholder engagement to ensure ownership for successful implementation.

Lastly, given that the Paris Agreement entered into force so quickly, there is now much greater clarity in terms of the international regime. This will increase following adoption of the modalities, procedures and guidelines under Paris Agreement by COP24 in 2018.

3.1.1 A Menu of Options

Parties have a broad spectrum of possible options to choose from in terms of updating their existing NDC or submitting a new one by 2020. To assist Parties in identifying meaningful, impactful but relevant and achievable options for enhancing their NDCs by 2020, WRI has developed a menu of options.

A Menu of Options for NDC Enhancement



The options presented are not mutually exclusive – in many cases, it will be appropriate and desirable for a Party to enhance its NDC across all dimensions, and to implement more than one option in each dimension. Support (financial, technological and capacity building) will play a crucial role in enabling all Parties to enhance their actions over time as required by the Paris Agreement.

3.1.1.1 Options for Enhancing Mitigation Ambition

It is critical that Parties with the capability to do so to enhance the ambition of the current mitigation contribution in their NDC.

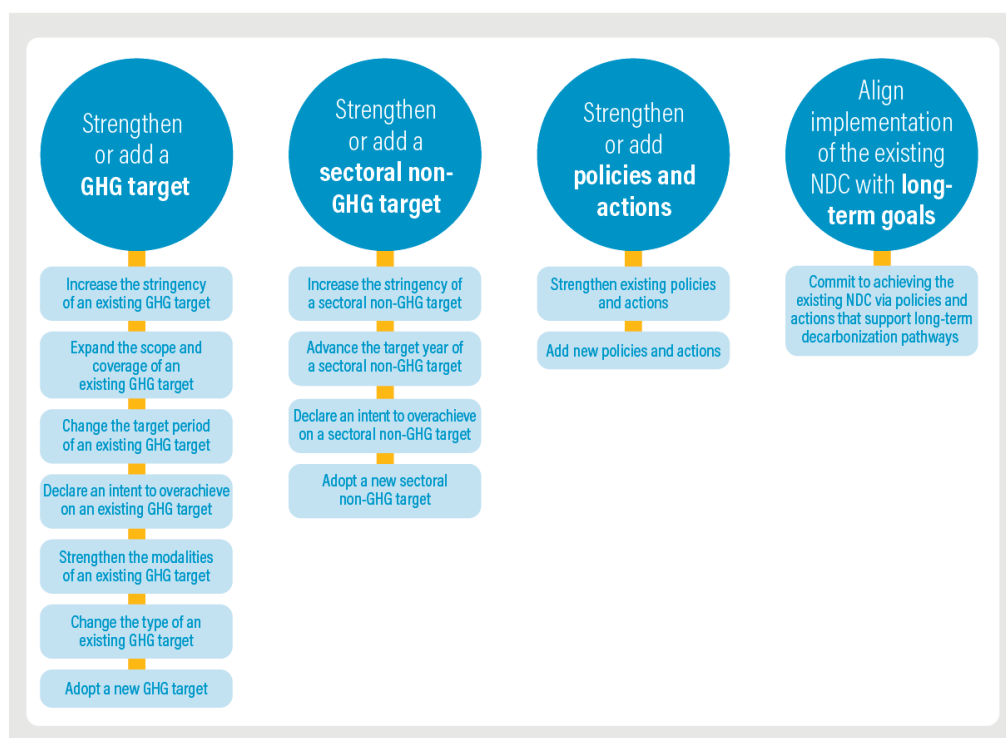
An NDC with enhanced mitigation ambition is one that will result, when fully implemented, in lower cumulative emissions⁶ than the existing NDC would if it were fully implemented.¹⁵ The options in the figure below have the potential to enhance the level of mitigation ambition of an NDC when certain conditions are in place. The following are examples (sectoral examples are further explored in section 3.1.2 below):

- An existing target to peak emissions by 2025 around 500MtCO₂e is revised to peak around 400MtCO₂e.
- An existing target to reduce energy-sector emissions by 30 percent by 2030 from 2005 levels is expanded to reduce economy-wide emissions by 30 percent by 2030 from 2005 levels.
- An NDC target that currently covers only three greenhouse gases is expanded to also include others.
- A target to peak emissions by 2027 is advanced to peak emissions by 2023.

- A Party that has historically excluded certain land-use categories or suites of activities from its accounting practices commits to including all land-use categories and suites of activities in accounting.
- A Party adds a new commitment to phase out of fossil fuel subsidies by 2030.

When the conditions for enhanced ambition are not in place, the enhancements outlined in this menu can still facilitate implementation – for example, by sending a signal to investors in key sectors – or to enhance clarity, transparency, and understanding – for example, by clarifying the pathways by which a given GHG target is expected to be met (for example, through renewable energy, energy efficiency standards or reforestation).

Menu of Options for Enhancing Mitigation Ambition



3.1.1.2 Options for Enhancing Adaptation Content

Many countries have used NDCs to communicate national adaptation goals, priorities, plans, actions and needs. In submitting a new or updated NDC, Parties have an opportunity to revisit the adaptation content of their initial NDC and consider options for strengthening and/or expanding that content. This can include updating or adding: national long-term adaptation goals; steps for near-term planning and action; and information on gaps and barriers.

3.1.1.3 Options for Enhancing Implementation Content

NDCs can describe and send important signals regarding how targets, measures and actions will be implemented. Options for enhancement include additional measures and actions that could be included in an NDC that would be aimed at strengthening implementation (e.g. strengthened governance arrangements, more inclusive decision-making processes, robust monitoring and evaluation progress, and open and accessible data). Including such measures and actions could also support greater

alignment with a country's sustainable development objectives under the 2030 Agenda for Sustainable Development.

3.1.1.4. Options for Enhancing Communication

Parties also have room to improve the clarity, transparency and understanding of the NDC, recognizing that provision of such information is an obligation under Article 4.8 of the Paris Agreement. The initial round of INDCs left many gaps in transparency.¹⁶ While the guidance on information to be provided in order to enhance clarity, transparency and understanding of NDCs is still forthcoming, countries can still assess gaps in the information provided in their NDC and look to strengthen it. This includes information provided on scope and coverage, assumptions and methodological approaches (e.g. for land sector emissions and use of market mechanisms), and assumptions regarding the reference point, especially for baseline scenario targets and intensity targets.

3.1.2 Specific opportunities for key sectors and gases

3.1.2.1 Forests

Globally, forests account for approximately 8 percent of the world's annual GHG emissions, and net carbon dioxide emissions from tropical deforestation reach an estimated 1.0 Gt per year.^{17,18} However, given forests' capacity to act as carbon sinks, the land-use sector also has immense potential as a climate solution. Reports from the IPCC have highlighted the importance of the forest sector in reducing global emissions;¹⁹ research has shown that tropical forests have the potential to mitigate up to 30 percent of the carbon needed through 2030 to keep global temperature rise below 2°C.²⁰ Put simply, forests are 8 percent of the problem, and 30 percent of the solution.

Opportunities to strengthen action on forest and landscape restoration through enhanced NDCs include:

- Add a new GHG target or strengthen an existing GHG target for the forestry and land-use sector;
- Emphasize land-use and restoration strategies to meet existing economy-wide GHG targets; and
- Set a target for restoring a certain number of hectares of forest by 2030.

3.1.2.2 Transport

Climate action often focuses on energy and industrial activity, but the transport sector must be included to keep global warming below the dangerous two-degree scenario. Transport is responsible for 23 percent of energy-related greenhouse gas emissions worldwide, and its emissions are increasing at a faster rate than any other sectors.²¹ In developing countries, growth in transport sector emissions is increasing at a rapidly higher rate than developed countries at an average of 4.8 percent.²²

Opportunities to strengthen action on transport through enhanced NDCs include:

- Add a new GHG target or strengthen an existing GHG target for the transport sector;
- Add a target to electrify the transport sector by a certain percentage by 2030; and
- Incorporate policies for compact, coordinated and connected cities and add a target for a percentage of trips by public transport.

3.1.2.3 Building

Buildings and construction together account for 36 percent of global final energy use and 39 percent of energy-related carbon dioxide emissions when upstream power generation is included. The energy intensity per square meter of the global buildings sector needs to improve on average by 30 percent by 2030 (compared to 2015) to be on track to meet global climate ambitions set forth in the Paris

Agreement.²³ If countries were to pursue strategic low-carbon and energy-efficient buildings technology deployment, they could achieve 4.9 GtCO₂ of potential annual emissions abatement.²⁴

Opportunities to strengthen action on buildings and infrastructure through enhanced NDCs include:

- Add a new GHG target or strengthen an existing GHG target for the building and construction sector;
- Add a target for a percentage of zero-carbon buildings by 2030; and
- Add policies for technology approaches, such as building envelope, space heating, space cooling, water heating, and lighting.

3.1.2.4 Food Loss & Waste

One-third of all food produced in the world is lost or wasted from farm to fork. This level of inefficiency in the food system has tremendous economic, social, and environmental consequences. Reducing food loss and waste, however, can generate a “triple win.” It can save money for farmers, companies, and households. It can help feed more people. And it can alleviate pressure on water, land, and climate. Food loss and waste is responsible for approximately 4.4 GtCO₂e each year, or about 8 percent of global GHG emissions, if the entire food supply chain is considered.

Opportunities to strengthen action on food loss and waste through enhanced NDCs include:

- Add new policy targets or strengthen existing policy targets for food loss and waste, such as a target to reduce food loss and waste by 50 percent by 2030 (aligned with Sustainable Development Goal target 12.3).

3.1.2.5 Oceans

Oceans and marine and coastal ecosystems offer significant mitigation and adaptation opportunities that can be reflected in a country’s NDC. Per acre, “blue carbon” ecosystems (mangroves and seagrasses) can take up 20 times more CO₂ from the atmosphere than land-based forests. Unlike land-based forests, the carbon sequestration opportunity lies in the underwater sediments that are created by these plants. Underwater, low-oxygen sediments can store carbon for decades or longer.²⁵

Opportunities to strengthen action on oceans through enhanced NDCs include:

- Add a new policy or strengthen an existing policy, such as restoring seagrass meadows; and
- Add new policies and measures focused on capturing the mitigation or adaptation potential of coastal and marine ecosystems, such as requiring all coastal developments to protect, rehabilitate or restore mangroves on-site or ensure offsets.

3.1.2.6 Water

Water and energy are inextricably connected around the world. Often overlooked, the water sector is extremely important for countries to achieve and enhance their NDC mitigation targets, not just to adapt effectively to climate change. In many parts of the developed world, such as the U.S., thermal power plant cooling is the single largest consumer of water, and significant quantities of water are required to run hydropower turbines. Globally, water consumption for electricity generation is projected to increase 85 percent by 2035.²⁶ At the same time, pressure for more water supply and better sanitation are claiming large, and growing, amounts of energy. Wastewater treatment is also a major source of untapped biogas energy and a way to cut methane gas releases.

Opportunities to strengthen action on water through enhanced NDCs include:

- Add new policy targets or strengthen existing mitigation targets for the water sector, such as water reuse and efficiency targets in order to reduce overall energy demand per litre of water in key sectors (e.g. agriculture, energy, industry, municipal buildings).

3.1.2.7 Short-lived Climate Pollutants

Early and stringent action on a set of powerful climate forcers—often referred to as short-lived climate pollutants (SLCPs)—including methane, hydrofluorocarbons (HFCs), black carbon, and tropospheric ozone can limit near-term temperature rise by 0.6°C by 2050. Moreover, reducing SLCPs will also deliver many sustainable development benefits including for human health and crop productivity.

Opportunities to strengthen action on SLCPs through enhanced NDCs include:

- Expand the coverage of gases in an existing GHG target, such as expanding a target to include all GHGs, including SLCPs;
- Add a target to reduce emissions for specific pollutants, such as methane, HFCs, or black carbon;
- Add or strengthen a target for pollutants in a specific sector (such as methane in the oil and gas, waste, or agriculture sectors); and
- Add new or strengthen existing policies and actions focused on SLCPs, such as the recovery or utilization of methane from the oil, gas, and waste sectors or improve waste and wastewater management and reduce food loss and waste.

3.2 Long-term strategies

Even if current NDCs are implemented, it has been estimated they will only limit warming to 2.7-3.7°C.²⁷ Mid-century strategies can play a key role in closing this gap, by promoting alignment between long-term global mitigation goals and short and medium-term national mitigation goals.

These strategies also provide several important domestic benefits, including:

- identifying the real economic benefits from investing in long-term climate action;
- setting a longer-term agenda, providing political certainty for bold and concrete action by all actors;
- informing near- and long-term investments, catalyzing sustainable economic transformation and supporting economic stability;
- providing a foundation to conduct long-term planning in the context of climate risks;
- outlining a framework for low emissions development that allows for a flexible implementation approach;
- engaging and catalyzing external stakeholders, supporting policy progress on a range of issues, including development, climate change mitigation and adaptation; and
- supporting a just transition, by sending early and predictable signals to businesses that are tied to a high-carbon economy.

WRI encourages all countries to develop robust and transparent long-term strategies ahead of 2020 to inform the update of new NDCs. To this end, WRI and the United Nations Development Programme are developing a suite of resources to help policymakers integrate robust and transparent long-term strategies ahead of 2020 to inform the update of new NDCs.

3.3 Challenge Companies, Subnational Governments and National Governments to Reinforce One Another²⁸

The Talanoa Dialogue can highlight the potential for a powerful, positive “feedback loop” between action by non-state actors and the targets, policies and measures set by national governments in their NDCs. Countries and companies, subnational governments, and other non-state actors can only achieve individual and global climate goals (i.e., well below 2C) if they are pushing and supporting one another.

Businesses and investors can encourage governments to match the ambition found in numerous private sector commitments (e.g., Science Based Targets, carbon pricing, renewable energy). Governments, in turn, can offer clear, strong policy signals in enhanced NDCs that support further private sector investments and ambition. Currently, however, a disconnect often exists between private sector action and government ambition on climate change. There are more than 2,600 climate commitments from businesses and investors. Few, if any, are described in terms of how they relate to countries’ NDCs or other national climate policies. Meanwhile, among the 190+ countries that articulated their contributions to the Paris Agreement, only a few governments have NDCs aligned with a well below 2°C pathway. Importantly, many also fail to highlight roles for businesses to contribute to achieving their NDCs or to send clear market signals or establish incentives to encourage private sector investment in climate solutions.

Potential links among public and private sector climate commitments include ways in which business commitments to buying renewable energy can spur government action and NDC enhancement. Similarly, companies are committing to GHG reductions and climate adaptation investments in their supply chains, steps that are mutually reinforcing with government commitments to resilient infrastructure and land use policies.

Similarly, the actions taken by local, state and regional governments are not only a key part of the solution – they can also mutually reinforce national governments’ NDCs. In many countries, subnational governments can play a unique role in supporting the adoption of key transformations, including electric vehicles, driving improvements in the energy performance of buildings, increasing the use of renewable energy, supporting local industries to improve the carbon intensity of manufacturing, restoring state and local forests and supporting the agricultural sector switch to low carbon and climate resilient practices.²⁹ This subnational action can help to spur even greater national commitments, while national targets, policies and measures can unlock even greater action by subnational governments by providing incentives or reducing barriers and restrictions.

Understanding this “feedback loop” and pursuing opportunities to enhance coordination and coherence between national and non-state action will move us toward the goals of the Paris Agreement faster.³⁰

4. Conclusion

There has never been a more urgent moment to steer the world in a better and safer direction than right now. Today’s decisions – and indecisions – will shape what the world will look like for decades, even centuries to come. Our ability to limit dangerous climate change and achieve development goals will be determined by whether we can fundamentally change the way we frame problems and make decisions, moving from a myopic and reactive approach to a far-sighted approach that is transformational and guided by a shared vision.

Accordingly, we need to adopt a “2050 is now” mindset and approach in making key decisions in relation to planning national development goals and policies. Acting on the best available information and data, such a mindset will prioritize the decisions that allow for as many major shifts as soon as possible, create incentives to drive the needed innovation, and avoid short-sighted decisions. Such a mindset would steer decisions in a way that catalyzes a low-carbon future while also ensuring food, water and energy security in decades to come.

Notes

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- ² Global Carbon Project. 2016. "Global Carbon Budget 2016." *Earth Syst. Sci. Data*. 8. 605-649. http://www.globalcarbonproject.org/carbonbudget/16/files/GCP_CarbonBudget_2016.pdf
- ³ NASA. 2018. "Global Climate Change: Vital Signs of the Planet." <https://climate.nasa.gov/>.
- ⁴ NASA. 2018. "Long-term warming trend continued in 2017: NASA, NOAA." <https://climate.nasa.gov/news/2671/long-term-warming-trend-continued-in-2017-nasa-noaa/>
- ⁵ Levin, K. and T. Fransen. 2015. "With Latest Climate Commitments, How Much Will the World Warm? It's Complicated." WRI Insights, November 18. <http://www.wri.org/blog/2015/11/latest-climate-commitments-how-much-will-world-warm-its-complicated>.
- ⁶ IPCC. 2014. "Summary for Policymakers." In *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwicker and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- ⁷ UNEP. 2017. *The Emissions Gap Report 2017*. Nairobi: United Nations Environment Programme (UNEP).
- ⁸ Northrop, E., H. Biru, S. Lima, M. Bouye, and R. Song. 2016. "Examining the Alignment Between the Intended Nationally Determined Contributions and Sustainable Development Goals." Working Paper. Washington, DC: World Resources Institute.
- ⁹ Mountford, H. and J. Jaeger. 2017. "America Doesn't Have to Choose Between the Economy and the Climate." WRI Insights, March 6. <http://www.wri.org/blog/2017/03/america-doesnt-have-choose-between-economy-and-climate>.
- ¹⁰ This is based on the WRI working paper, Fransen, T., E. Northrop, K. Mogelgaard, and K. Levin. 2017. "Enhancing NDCs by 2020: Achieving the Goals of the Paris Agreement." Working Paper. Washington, DC: World Resources Institute. <http://www.wri.org/publication/NDC-enhancement-by-2020>.
- ¹¹ Aden, N. 2016. "The Roads to Decoupling: 21 Countries Are Reducing Carbon Emissions While Growing GDP." WRI Insights, April 5. www.wri.org/blog/2016/04/roads-decoupling-21-countries-are-reducing-carbon-emissions-while-growing-gdp.
- ¹² UN Framework Convention on Climate Change (UNFCCC). 2015. Paris Agreement, Articles 2.1, 4.1 and 7.1
- ¹³ UNFCCC. 2016. Decision 1/CP.21. Adoption of the Paris Agreement. FCCC/CP/2015/10/Add.1. para. 23, applicable to Parties whose NDC contains a time frame up to 2025.
- ¹⁴ UNFCCC. 2016. Decision 1/CP.21. Adoption of the Paris Agreement. FCCC/CP/2015/10/Add.1. para. 24, applicable to Parties whose NDC contains a time frame up to 2030.
- ¹⁵ The baseline for determining this is the complete set of target(s) and/or action(s) articulated in the original NDC; the cumulative emissions under the new NDC would need to be lower than under the original NDC to constitute enhanced mitigation ambition. In determining the effect on mitigation ambition, it is important to consider the cumulative impact of all changes to the NDC, including the extent to which they overlap with each other as well as the targets, policies, and measures in the existing NDC.
- ¹⁶ Damassa, T., T. Fransen, M. Ge, K. Pjeczka, K. Ross, and B. Haya. 2015. "Interpreting INDCs: Assessing Transparency of Post-2020 Greenhouse Gas Emissions Targets for 8 Top-Emitting Economies." Working Paper. Washington DC: World Resources Institute.
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- ²² Huizenga, C., K Peet, and S. Gota. 2015. *Analysis on National Transport Sector Emission Trends 1990-2012*. Paris: Process on Mobility and Climate. <http://www.ppmc-transport.org/wp-content/uploads/2015/08/Analysis-on-National-Transport-Sector-Emissions-1990-2012.pdf>
- ²³ UN Environment, International Energy Agency, and Global Alliance for Buildings and Construction. 2017. *Global Status Report 2017: Towards a zero-emission, efficient, and resilient buildings and construction sector*.
- ²⁴ IEA. 2017. "Energy Technology Perspectives 2017." www.iea.org/etp.
- ²⁵ Bedolfe, S. 2017. "Seaweed could be scrubbing way more carbon from the atmosphere than we expected." Oceana blog, October 6. <http://oceana.org/blog/seaweed-could-be-scrubbing-way-more-carbon-atmosphere-we-expected>.
- ²⁶ Of the electricity consumed for water, around 40 percent is used to extract water, 25 percent for wastewater treatment and 20 percent for water distribution. IEA. 2016. *World Energy Outlook 2016*. Paris: IEA.
- ²⁷ Fransen, T. and K. Levin. 2016. "How Countries Can Align Long-Term Climate Strategies with the Paris Agreement." WRI Insights, August 5. <http://www.wri.org/blog/2016/08/whats-paris-agreements-long-term-climate-change-strategy>.
- ²⁸ See, for example, the "Pathways to Low-Carbon and Resilient Development" action platform, as outlined in the [Global Climate Action Playbook 2018](#).
- ²⁹ For detailed information on what cities and states in the United States are doing, see America's Pledge. 2017. *America's Pledge Phase 1 Report: States, Cities, and Businesses in the United States Are Stepping Up on Climate Action*. New York: Bloomberg Philanthropies.
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