

Spring 2019

A Global Transformation Towards 1.5 °C

Identifying countries, sectors, and policies to lead climate change action



Master of Public Administration in Environmental Science and Policy at Columbia University



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A Global Transformation Towards 1.5°C

Columbia University | School of International and Public Affairs |
The Earth Institute

Workshop in Applied Earth Systems Management
Spring 2019

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Glenn, Erica., Hsu, William., Angeles, Elaine., Walani, Neha., Gosliner, Emma., Koppman Norton, Julia., True-Alcala, Tavo., Liebowitz, Anna., Stein, Ashley., Iveroth, Eva., Yen, Yu., Tjossem, Sara. "A Global Transformation Towards 1.5°C: Identifying Countries, Sectors, and Policies to Lead Climate Change Action". Capstone Report, Columbia University School of International and Public Affairs, 2019.

Cover image modified from:

Melo, Jaime De. *Modeling Developing Countries Policies in General Equilibrium*. Singapore: World Scientific Pub., 2015.

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PREFACE & ACKNOWLEDGMENTS

Preface

This report is the final deliverable for the course ENVP U9232 - Workshop in Applied Earth Systems and Policy Analysis, the capstone requirement for the Master of Public Administration in Environmental Science and Policy (MPA-ESP) at Columbia University's School of International and Public Affairs. All information contained in this report is believed to be accurate as of May 2019. The views, recommendations and opinions expressed in this report may not necessarily reflect those of Greenpeace International, Columbia University, or its affiliates.

Acknowledgments

This report was prepared for Greenpeace International to assist in the development of their global climate political strategy.

We would like to thank our faculty advisor, **Dr. Sara Tjossem**, for her invaluable guidance and insight throughout this project. We also thank our client contact, **Juan Pablo Osornio**, GPI Political Task Force Leader, for his guidance, expertise and feedback which shaped our direction throughout the project. Finally, we thank the following experts who took the time to share crucial knowledge and critical perspectives about the climate change policy landscape around the globe:

- **Derina Man**, Senior Managing Consultant – Climate Change and Sustainability at ICF
- **David Sandalow**, Inaugural Fellow at the Center on Global Energy Policy and co-Director of the Energy and Environment Concentration at the School of International and Public Affairs at Columbia University
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LIST OF ACRONYMS

AFOLU	Agriculture, Forestry and Other Land Use	HDI	United Nations Human Development Index
BR	Brazil	ID	Indonesia
CBDRRC	Common But Differentiated Responsibilities and Respective Capabilities	IN	India
CAT	Climate Action Tracker	INDC	Intended Nationally Determined Contributions
CN	China	IPCC	Intergovernmental Panel on Climate Change
CO₂e	Carbon Dioxide equivalent	LULUCF	Land Use, Land-Use Change, and Forestry
COP	Conference of Parties	MPA-ESP	Master of Public Administration in Environmental Science and Policy
EU	European Union	NDC	Nationally Determined Contributions
F-gases	Fluorinated gases	NG	Nigeria
GHG	Greenhouse gas	OECD	Organization for Economic Cooperation and Development
G20	Group of 20	R+C	Residential and Commercial
GPI	Greenpeace International	RU	Russia
GND	Green New Deal	UNFCCC	United Nations Framework Convention on Climate Change
Gt	Gigatonnes	US	United States

SCOPE AND LIMITATIONS

The project focused on identifying countries, sectors and policies that could drive the global transformation to limit temperature increase to 1.5° C. This report is intended to assist Greenpeace International's Global Climate Political Task Force in their efforts to build a global climate political strategy. The main body of this report provides a synthesis of the depth and breadth of research completed by the Project Team. Supporting documents including country fact sheets, case studies and other workshop outputs in the appendix, provide information that supports the analyses and recommendations in the report.

The limitations of the report include language barriers in primary research, inconsistent and unreliable information, and unavailability of updated data for some countries. For China and Russia, the majority of the primary documents lacked English translations. With regards to Nigeria, information on government websites was limited or altogether lacking. Lastly, the project was restricted to fifteen countries for the long list and eight for the short list to ensure the depth and quality of the analysis and recommendations.

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Country Case Studies

Short List

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|--|--|
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|  4. Indonesia |  8. European Union |

Executive Summary

Globally, policymakers have failed to keep pace with the scientific consensus on climate change. Unless this policy gap is corrected in a swift and decisive manner, the planet faces severe consequences. Greenpeace International (GPI), an independent, non-governmental organization, advocates for creative and practical approaches to address that gap and build a peaceful and sustainable future. GPI's Global Climate Political Task Force has partnered with students in Columbia University's Master of Public Administration in Environmental Science and Policy (MPA-ESP) program to develop recommendations for the global transformation needed to limit warming to 1.5° C.

The Global Climate Political Task Force develops strategies to effectively and efficiently advance the broader organization's climate agenda. Through this project, the MPA-ESP Project Team identified recommendations for key countries and sectors. This report will support the Global Climate Political Task Force as it works to intensify climate action.

The Project Team used a three-phase approach for this project. In the first phase, countries were ranked on an index of emissions, existing climate policies, the United Nations Human Development Index, and projected population growth. Countries with the highest scores were considered to have the greatest potential for impact. In the second phase, research focused comprehensively on existing policies and emissions by sector for the seven short-list countries and the European Union (EU). The Team tailored policy recommendations unique to each country to limit global temperature increase to 1.5° C. The final phase considered a holistic perspective and examined the countries' global positions in relation to each other.

In this final phase, the differences in countries' global power and care for the environment are highlighted. The Project Team analyzed the nature, direction, and strength of each short-list country's influence and found that developed countries tend to have greater influence on the rest of the world through trade, access to resources, and political capital. The synthesis of these relationships are discussed by outlining three potential scenarios about the sequence of and timeline for global change. In general, the Team found that China, the United States, and the EU continue to be the most important global players for climate action, yet as current policies and actions stand, none of these three countries is making significant strides internationally. As such, there is an opportunity for less influential countries to form coalitions, exert aggregate pressure and stand as leaders in the global transformation to limit temperature increase to 1.5° C.

The strategic recommendations in the report cover a wide range of geopolitical, policy advocacy and programmatic strategies at the international, national, and sub-national levels. These recommendations build on GPI's role in mobilization campaigns, "boots-on-the-ground" programs, as well as more creative, high-level interventions such as sector-based and global trade policies. The impacts of climate change are global and cut across sectors. This project identified priority countries and sectors as well as strategic pathways to drive global transformation and limit temperature increase.

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1

Introduction

Greenpeace International and Climate Change

Greenpeace International is an independent, non-governmental organization that develops and advocates for creative and practical solutions for a peaceful and sustainable world.¹ In the face of growing climate change, GPI promotes immediate global actions, solutions and change.² Greenpeace's strategic focus is to:

- Support renewable energy;
- Oppose fossil fuels and nuclear power;
- Oppose traditional industrial agriculture and fisheries; and
- Challenge the current economic model of consumption.

About this Project

This project leverages science to inform policy. It identifies strategic countries, sectors and policies that could drive global transformation to limit temperature increase to 1.5° C. This analysis will assist Greenpeace's Global Climate Political Task Force in their efforts to build a common global climate political strategy.

The key deliverables are:

- Selection criteria for countries, sectors and policies;
- Long list of countries;
- Short list of countries;
- Analysis of existing policies addressing current and projected emissions;
- Description of political processes that offer windows for intervention in the next 2-3 years; and,
- Three scenarios on how particular policy changes could lead to the global action needed for a global transformation.

The Project Team will present strategic recommendations for Greenpeace to consider in its efforts to intensify climate action and accelerate global transformation to stay within the 1.5° C limit.

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The Climate Change Problem

The Global Consensus

The global scientific consensus is that climate change is an existential threat to humanity and the natural world. The Intergovernmental Panel on Climate Change (IPCC) is the most visible international body that publishes scientific research on the issue of climate change. Their 2018 Special Report on Global Warming of 1.5° C highlights the necessity of limiting warming to this level.

Global temperature increases due to anthropogenic emissions have already reached 1° C, and emitted GHG will persist for centuries, causing long-term changes to the climate system.³ While this level of warming and climate change is locked in, the 1.5° C target is important. The IPCC Special Report states that it is still scientifically possible to stay under the 1.5° C limit, and demonstrates that 1.5° C is less severe than an increase of 2.0° C. Maintaining 1.5° C as compared to 2.0° C will likely result in lower sea level rise, lower rates of species loss and extinction, and greater preservation of ecosystems than is otherwise likely to occur. Limiting increases to 1.5° C also benefits human health, including fewer heat-related deaths, and greater availability of food. The faster emissions are reduced, the more likely it is that warming beyond 1.5° C can be avoided. Most models suggest that global CO₂

emissions should be reduced by 45% by 2030 (based on 2010 levels), and net zero emissions should be reached by 2050.⁴

Unfortunately, shifting the trajectory of society and governments has not been easy. Every step forward clashes with the status quo, as the world depends on fossil fuels. Despite this inertia, most of the world's countries have recognized the threat posed by climate change and the need to reduce GHG emissions across all sectors. At the national level, efforts to reduce emissions are perceived as negative for business. Such thinking affects both developed countries that have built their prosperity on fossil fuels, and developing countries that see fossil fuel development as the main path to achieve a higher standard of living. These perspectives result in hesitation, modesty in targets, and inaction rather than active steps toward global renewable transformation.

The Paris Agreement and the Climate Action Gap

Global efforts to limit GHG emissions have not produced the desired results. The United Nations Framework Convention on Climate Change (UNFCCC) was formed in 1992 to address the issue, and has resulted in several milestone agreements. The Kyoto Protocol, adopted in 1997, set legally binding emissions

reduction targets but covered only developed countries, and did not enter into force until 2005. Its first phase lasted until 2012, at which point a number of substantial emitters did not continue on. As a result, the Protocol now accounts for only 14% of global emissions.⁵ At the 15th Conference of Parties (COP15) in 2009, the Copenhagen Accord was proposed but not formally adopted. The Accord's target of warming below 2° C was later incorporated in the Paris Climate Agreement during the 21st COP in 2015.⁶ The Paris Climate Agreement was meant to be a momentous step forward, with every country uniting to recognize the severity of this threat and to commit to a limit of a 2° C increase.

The adoption and rapid ratification of the agreement was indicative of progress, yet it fell short in three key ways. First, it allows developing countries to increase emissions and push their peak emissions date further into the future. The agreement reinforces the outdated notion that development is dependent on the use of fossil fuels. This is despite the UN Climate Chief's observation that "[a]ll evidence from the past 10 years points to clear and overwhelming social and economic benefits of climate action."⁷ The Paris Agreement missed the opportunity to move beyond "common but differentiated responsibilities" and push developing countries to "fully capitalize on [the] benefits as they enter a new era of accelerated climate action."⁸

Second, the Paris Agreement settled on the goal of limiting warming to "well below" 2° C while "pursuing efforts" to further limit warming to 1.5° C.⁹ This is a failure to respect the scientific consensus and implies that the consequences of an additional 0.5° C of warming are

preferable to the additional effort required to prevent it.

The third, and perhaps most significant, flaw in the Paris Agreement is that the 2° C target is not legally binding. Each country's Nationally Determined Contributions (NDCs) merely state what they intend to achieve rather than a commitment to limit warming to a certain level. Thus, the Agreement has proven to be inadequate to even accomplish the 2° C goal. The UNFCCC's synthesis report on the aggregate impact of all submitted Intended Nationally Determined Contributions (INDCs) found that under current targets, global GHG emissions would increase by 16% relative to 2010, which is 15.2 gigatons (Gt) higher than 2° C scenarios, and 22.6 Gt greater than is required to limit warming to 1.5° C.¹⁰ So while the scope and ambition of the Paris Climate Agreement were an improvement over previous efforts, there is still a sizeable "Climate Action Gap" between where emissions will be under the NDCs and where they should be to have a chance at preventing warming above 1.5° C.

Climate is a global issue, and a global reduction is the easiest way to address the climate action gap, an approach similar to the UNFCCC's synthesis report. However, the NDCs and other policies are implemented at a national level. It is important to assess whether a country's individual actions are consistent with reduced global emissions that will limit warming to 1.5° C. The simplest way to do this would be to determine that each country should cut its emissions by 45% of its 2010 levels by 2030. Universal reduction does not, however, take into account individual responsibility nor capacity. So, "common but differentiated responsibilities and respective capacities" (CBDRRC) are

considered when assigning global reduction goals. The Climate Action Tracker considers several methodologies for this determination of CBDRRC, with allowable emissions based on: historical emissions, at a consistent level per capita, on a graded scale based on a nation's level of development, and more.¹¹ This is an urgent problem, and swift and decisive action must be taken to address the Climate Action Gap.

Emissions and Sectors

A closer look at countries' emissions help to frame solutions at the national and global level. A deeper understanding of the primary sources by sector (see figure 1 and 2) takes into account "common but differentiated responsibilities and respective capacities" of

countries. This is a critical step towards addressing the Climate Action Gap.

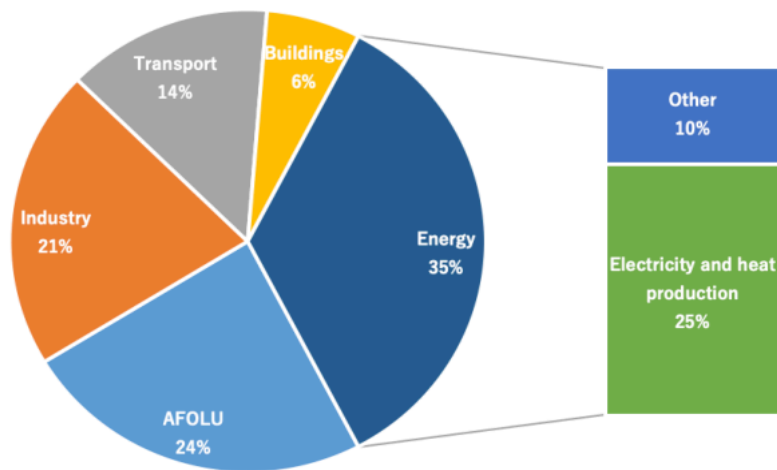
While this report presents analysis of five sectors listed below, the energy and agriculture, forestry and other land use (AFOLU) sectors are the two highest emitting sectors. Table 1 below shows main sources of global GHG emissions.¹²

As often is the case, grassroots citizens' organizations have taken the lead on environmental issues in the face of government inaction. Across the globe, people are demanding that their leaders make climate change a priority. One compelling example of this is the Youth Climate Strike movement (see following case study). It began less than a year ago in August 2018, when then-15-year-old Greta Thunberg, a Swedish student began her

Table 1. Primary sources of emissions by sector

Sector	Primary Sources
1. Energy	Mainly electricity generation and heat production; other sources include fuel extraction, refining, processing and transportation
2. AFOLU	Agriculture and deforestation (not taking into account carbon sequestration)
3. Industry	Fossil fuel combustion, chemical and metallurgical processes, waste management
4. Transportation	Fossil fuels (95% gasoline and diesel) for road, rail, air and marine transportation
5. Buildings	Onsite energy generation for heat and/or cooking

Figure 1. Direct global greenhouse gas emissions by sector¹³



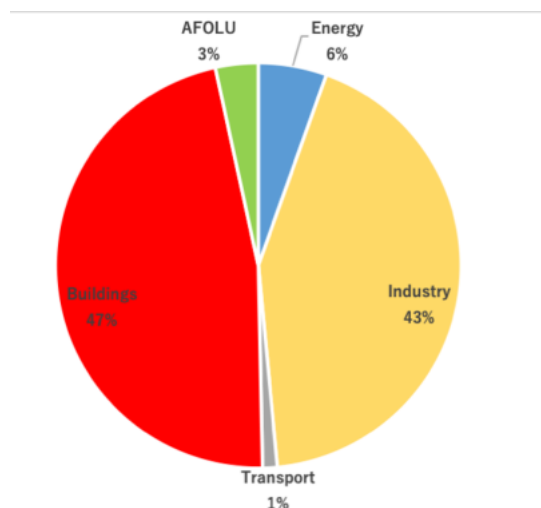
“school strike for climate” protest in front of the Swedish Parliament.²⁰ Since then the movement has gained international attention and support. On Friday, March 15, 2019 there was a coordinated “Fridays for the Future” event in which about 1.6 million students worldwide skipped classes to attend climate marches demanding change.²¹ This type of action from individuals and organizations is critical to show

world leaders that inaction will not be tolerated. While the initial INDCs for the Paris Agreement may fall short of the 1.5° C scenarios, there is room for change. Every five years, the NDCs are reviewed and there is a collective assessment of the progress towards the goals of the Paris Agreement. Countries could be pushed to commit to higher goals.²²

This Climate Action Gap is daunting, but not insurmountable. There are a myriad of sustainable development pathways consistent with limiting warming to 1.5° C or less. These are achievable without relying on carbon dioxide removal technologies. The IPCC’s Special Report dedicates a chapter to discuss the possibilities and challenges associated with limiting increases to 1.5° C. Based on extensive modeling of varying technology mixes and policy frameworks, the chapter presents scenarios in which emissions could be kept to acceptable levels.

This report considers similar scenarios and strategic recommendations. It identifies policy gaps and windows of opportunity for pathways where key countries can lead the global transformation to limit warming to 1.5° C.

Figure 2. Indirect emissions from electricity and heat production



Youth-Led Climate Strikes

The persistent failure of national governments to act on climate change, combined with the increasingly dire warnings from the Intergovernmental Panel on Climate Change (IPCC) and unprecedented damage from extreme weather events, have sparked a global groundswell of climate activism.

Greta Thunberg, a sixteen-year-old from Sweden, ignited the youth climate strike movement with her solo protest every Friday outside of the Swedish parliament. She argues that it is pointless to attend school if the government's inaction threatens the possibility of a good life for her and others.²³ On March 15, 2019, tens of thousands of students participated in school strikes in over 100 countries around the world.²⁴ Thunberg spoke formally before world leaders, met with the Pope, and was nominated for a Nobel peace prize for her activism.^{25,26}

Similarly, the Extinction Rebellion, founded in London, has gained attention in countries around the world by staging civil disobedience demonstrations. These include blocking bridges and traffic, gluing themselves to trains, and additional activities designed to disrupt daily life. The purpose behind this movement is to force a reckoning with the climate and environmental emergencies and put pressure on governments to act now. During the week of April 15, 2019, over 400 activists were arrested in London alone for blocking traffic and other nonviolent direct actions.²⁷

These movements, as well as increasing numbers of lawsuits between fossil fuel companies and more traditional environmental advocacy organizations, demonstrate the widespread feelings of urgency for climate action.²⁸ Greenpeace, with its storied history of direct action coupled with its experience working with policymakers globally, is well positioned to support and engage with the youth climate strikes, Extinction Rebellion, and similar movements. The great strength of the youth climate strikes - namely, the youth leading them - also implies inexperience and perhaps a lack of knowledge of the best demands to make. Greenpeace could consider support for youth climate strike leaders including Thunberg, and the Extinction Rebellion. If the leaders of these movements are interested, Greenpeace may be able to provide logistical, organizational support and policy suggestions to hone the effectiveness and precision of their demands.

Erica Chenoweth, an expert in public policy and political violence, has found that systemic changes can be brought about when only about 3.5% of a population is actively mobilized in strikes, direct action, or non-cooperation with a government.²⁹ Given the failure of traditional politics to address climate change, this course of action may mirror successful civil movements such as labor and civil rights movements. Greenpeace is well positioned to support and amplify these movements and help translate their activism into political successes and systemic change.



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3

Project Framework and Methodology

Framework

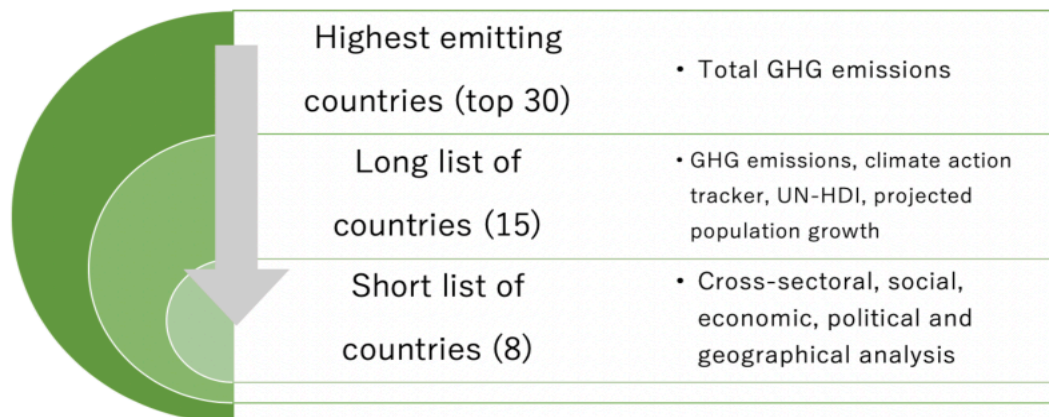
The Project Team took the following steps:

1. Conducted a literature review to answer these questions:
 - Are the countries' Nationally Determined Contribution (NDC) targets enough to stay within the global maximum of 1.5° C?
 - Are policies and strategies in place to reach these targets?
 - What are the governance and socio-economic issues affecting implementation of strategies?
2. Identified "big picture" solutions to the problems, and proposed creative and innovative actions at the national, regional and global levels.
3. Determined feasible actions within these big picture solutions to focus on short, medium and long-term policy changes that countries can adopt.

Project Methodology

Greenpeace International requested the Project Team to create a long list of 15 target countries, and a short list of 8 countries that characterizes those with great potential to impact climate action regionally and globally (see figure 3).

Figure 3. Overview of the country selection process



Long List Criteria

The Project Team developed a value-weighted index using four internationally recognized indicators: Our World in Data global Greenhouse Gas (GHG) emissions, Climate Action Tracker (CAT), United Nations Human Development Index (HDI), and United Nations projected population growth rates for 2020-2025 (see Table 2). These indicators were assigned different weights corresponding to the impact level or value of the indicator in achieving climate change goals. Each country was given a value based on their rank using the four indicators.

Each indicator addresses a particular aspect of a country's current socio-economic and political situation, as well as the potential impacts of its current and future emissions.

Table 2. Description and rationale for the long list criteria

Indicator and weighting	Description	Rationale
Greenhouse Gas (GHG) Emissions Rank (70%)	Uses data from <i>Our World in Data, 2010</i> . Countries ranked on their recorded amount of carbon dioxide emissions equivalents (in million tonnes of CO ₂ e). This data combined emissions from AFOLU, industry, residential and commercial, transport and energy. This project selected the top 30 highest ranked countries (highest emitters).	The level of GHG emissions is the most significant factor influencing climate change. Literature suggests a significant relationship between a country's development and its level of GHG emissions.
Climate Action Tracker (CAT) Status Rank (15%)	Each of the 30 countries was assigned a score based on its rank in the Climate Action Tracker as of February 2019, ranging from 1 (a role model country) to 6 (critically insufficient). Countries without a listed score were given a score of 6, and assumed to be not in line with the Paris Agreement. Scores were ranked in ascending order, and each score was converted to a rank.	The score is indicative of how sufficient the countries' targets and pledges are, how appropriate current policies are, and how much progress a country has made or is expected to make against its commitments to the Paris Agreement. Therefore, countries with critically insufficient targets and those falling significantly behind on their emission reduction targets have the greatest potential for impact - the worst of which are projected to result in temperature increases exceeding 4° C .

United Nations Human Development Index (HDI) (10%)	Uses data from the UN Human Development Index, 2018; assigns each of the 30 countries an HDI score, and ranks from low to high. HDI is a composite measure of health, education, and income that has been used as an alternative to purely economic assessments of national progress, such as GDP growth.	A country's level of human development can provide insight into its potential for change, as well as its vulnerability to climate change impacts. Countries most vulnerable to climate shocks were assigned the most weight. The assumption is that these countries have the biggest opportunity to change because they do not have the inertia from a fossil fuel-based infrastructure. Overall, the combination of being a significant emitter and being vulnerable makes it imperative that these countries address climate change issues.
Population Growth Rank (2020-2025) (5%)	Uses data from the United Nations World Population Prospects 2017 "Overall Population Growth Rate." The average annual rate of population changes for each of the top 30 countries (from the GHG ranking) was taken from this dataset. The European Union was given a score of 0.28 by summing the scores from each member state. These 30 countries were sorted by score from highest to lowest.	Projected population growth is a proxy for the total aggregate energy demand. This demand has direct impacts on GHG emissions, and as such faster growing countries merit special attention.

The total score of each country was computed using the following equation:

$$\begin{aligned}
 & (\text{GHG Emissions Rank} \times 0.70) \\
 & + (\text{CAT Rank} \times 0.15) \\
 & + (\text{HDI Rank} \times 0.10) \\
 & + (\text{Population Growth Rank} \times 0.05) \\
 & = \text{TOTAL SCORE}
 \end{aligned}$$

The long list was determined by ranking the countries by their calculated scores. The top 15 countries with the highest scores constituted the long list. For the purposes of this report, the European Union was considered a single entity with combined emissions of about 4.3 billion tonnes of CO₂ equivalent (CO₂e), making it the third largest emitter after China and the United States. The EU also has EU-wide climate goals and policies to reduce its GHG emissions over the next 30 years, as well as issued

climate-related regulations that member states must follow such as binding emissions targets for new cars and vans. The EU sets key priorities and regulations that affect all member states although many European climate decisions occur at the national level. For this reason, the Project Team identified and included the EU as an important region to focus on, and individual member nations were not considered separately. Below is a list of the 15 countries included in the long list.

Long List of Countries

- | | |
|---|---|
|  1. Argentina (Rank 14) |  9. Indonesia (Rank 4) |
|  2. Brazil (Rank 6) |  10. Japan (Rank 8) |
|  3. Canada (Rank 9) |  11. South Korea (Rank 13) |
|  4. Mexico (Rank 10) |  12. European Union* |
|  5. United States (Rank 2) |  13. Iran (Rank 15) |
|  6. Australia (Rank 11) |  14. Nigeria (Rank 7) |
|  7. China (Rank 1) |  15. Russia (Rank 5) |
|  8. India (Rank 3) |  16. Tanzania (Rank 12) |

* With combined emissions from countries in the region, EU ranks third in total emissions

The advantage of this weighted index approach is its systematic and standardized way of sorting countries using readily available data. These criteria point to developed countries with exceptionally high emissions as a result of past development. As leading economies, they are major contributors to the current environmental situation, and are in a position to lead global action. This ranking system identifies countries that could trigger or lead significant and viable actions towards GHG emissions reduction. One drawback of the design is that it invariably leads to focusing on developed countries that are mostly members of the Group of 20 (G20) and the Organization for Economic Cooperation and Development (OECD). This leaves the rest of the world outside the scope of this project. While these developing countries' emissions are not significant, there is still great potential for effective climate action. Additionally, the weighted averages rely on percentages that are, to a certain extent, subjective evaluations. While GHG emissions are the top priority, the remaining weight of the other attributes are subject to further discussion and justification. Finally, the ranking system does not account for governance or implementation challenges such as rule of law or government structure.

Short List Criteria

From the long list, the Project Team selected the top seven ranked countries and the EU to move forward to the second phase of more detailed analysis. The Project Team recognizes a need for a consistent selection methodology for both the long list and short list countries. Therefore, the top seven countries from the long list were selected in terms of rank order. These seven countries have outsized contributions in global GHG emissions, signifying their importance in limiting the effects of climate change. In particular, the inclusion of China, India, and the United States accounts for the top three GHG emitting countries. It is imperative that these countries address their GHG emissions as the world continues to look for solutions to limit global temperature increases. This selection is consistent with the project goal of identifying countries that could lead to limiting temperature increase to 1.5° C. Additionally, it maintains consistency with the selection of the long list countries where total GHG emissions was identified as the most significant contributor to climate change.

The countries listed below have the largest contributions to global GHG emissions, which signifies their importance in the global transformation to limit the effects of climate change.

Short List of Countries



Brazil (Rank 6)



China (Rank 1)



Indonesia (Rank 4)



Nigeria (Rank 7)



United States (Rank 6)



India (Rank 3)



European Union



Russia (Rank 5)

For this short list, the goal was to gain a deeper understanding of the countries' capacity, resources, and political willingness to act. The Project Team developed a set of qualitative criteria that required critical cross-sectoral, social, economic, political and geographical analysis. The following questions were considered in writing the analysis for each country:

1. Is the country doing anything significant or innovative to curb its GHG emissions?
2. What kind of political influence does the country exert internationally? If it were to make a change, will other countries follow?
3. Which economic sector has the highest emissions? What sector does Greenpeace International need to focus on to have the biggest impact on emissions?
4. What are the policies currently in place or being discussed that will affect the emissions from that sector?
5. What policies are needed in this sector? What are the gaps? How can the policy that is in place be improved?
6. What are the timeframes of these policies that Greenpeace International needs to be aware of?
7. If this country focuses on this sector or policy, by how much would their emissions decrease?

The Project Team conducted a comprehensive climate policy and political analysis covering the short list of seven countries and the EU. The analysis was conducted on different levels. First, a political map was developed to assess the power and influence of each country relative to the rest of the world. Second, the Project Team looked into the necessary emissions reductions and sectors where action is urgently needed. Finally, policy windows were identified. A synthesis of the research and analyses done on these countries are presented in Sections 4 through 6. The Country Factsheets (long list) and Country Case Studies (short list) attached as appendices provide detailed responses to these questions.

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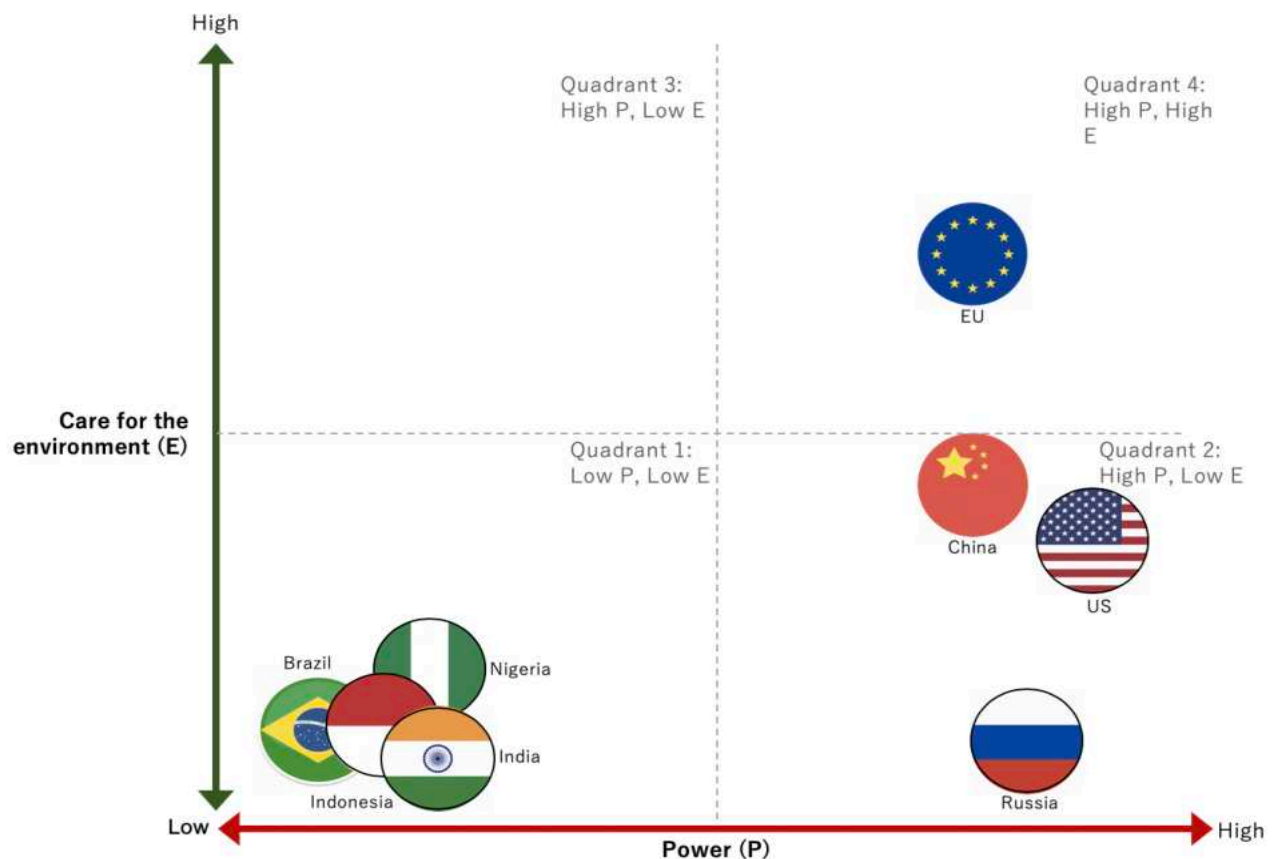
Analysis

Political Power and Climate Leadership

Who are the influencers and movers?

Using data from the U.S. News “Best Countries” survey published in collaboration with the BAV Group and Wharton School of Business and the Project Team’s own assessment based on Figure 5 (Global push and pull on next page), countries were plotted on a political map (figure 4) that shows their political and economic power (P) and care for the environment (E), ranked from low to high.³⁰

Figure 4. Political map of economic/political power and care for the environment of countries



This table shows environmental protection is not a top priority for developing countries. Two possible explanations are:

1. Socio-economic conditions in poorer countries force their governments to channel resources to improve delivery of basic social services. Environmental planning often takes a backseat to more immediate challenges of poverty alleviation and other development issues.
2. It is often difficult to reconcile economic growth and environmental management, especially when a country's primary product or industry is fossil fuel-based, or requires exploitation of resources (i.e., significant deforestation or land use change).

The above political map suggests two possible approaches to global climate action that GPI can undertake:

- Quadrants 1 and 3 call for **direct actions**: Mobilize campaigns/strikes, carry out “boots-on-the-ground” programs, and support grassroots and direct action social movements where possible.
- Quadrants 2 and 4 call for **more creative and high-level interventions**: Focus on strategic plans and trade-related policies that have knock-on effects on the rest of the world. In countries where there is narrower civic space, GPI can take a more indirect route and engage local actors to build momentum.

Countries with more power tend to have greater influence on the rest of the world through trade, access to resources and political capital. The Project Team closely examined the nature, direction and strength of influence on each of the countries in the short list. The figure below highlights key external factors that could “pull” each country towards significant policy change, as well as critical changes or policies that could “push” other countries into action through policies related to environment and climate change.

Figure 5. Global push and pull: Key political factors and critical internal changes that drive climate policy and action

Pull:
External factors that could lead to significant domestic policy change

Push:
Critical changes that could drive other countries to change their climate policies

EU and India: Decrease in dependence on oil and gas will reduce oil extraction in Nigeria (crude oil and petroleum gas make up 90% of Nigerian exports); in 2015, 41% of Nigerian oil exports went to EU, 20% went to India



No significant influence globally

US: Strategic adviser to India with influence over climate policy changes
EU: Germany carries out environmental programs in India
China: One of India's main trade partners; trade policies demanding better environmental performance could impact policy of India



India

No significant influence globally, but India's full country ban on imports of e-waste and textile waste could lead to more emissions if countries who used to export to India decide to burn their wastes

EU: Largest trading partner and biggest investor; Russia is significantly affected by EU trade policies



Russia

EU and rest of the world: Heavily dependent on Russia for natural resources (world's largest natural gas reserves, 2nd largest coal reserves, and the 8th largest oil reserves); without extraction and export of coal, gas and oil, the entire global energy market will be impacted, and other countries will be forced to transition into using non-fossil fuel energy sources

EU: Stricter criteria for biofuel imports would force Indonesia's palm oil industry to be more responsible



Indonesia

No significant influence globally, but Indonesia's untapped geothermal energy (40% of the world's geothermal reserves) can be a viable alternative for fossil fuels; innovation and research are needed to explore this

EU and US: China is more likely to pursue more stringent climate actions if another powerful nation or trading partner like the EU acts first



China

EU, US and rest of the world: China banned waste importation and recycling through National Sword Policy that could lead to more emissions if countries who used to export to China decide to burn their wastes
Asia: Through the Green Belt and Road Initiative, China has the potential to curb foreign investment in coal
Rest of the world: China is the world's largest manufacturer and exporter so trade restrictions would have a global impact

US and China: EU is the 3rd largest exporter in the world; trade policies demanding better environmental performance could impact EU climate policy



EU

Russia: Shift to renewable energy will limit dependence on Russia's natural resources, and could force Russia to change its climate policy
Rest of the world: EU is the 2nd largest importer in the world; limiting trade with countries that have not ratified the Paris Agreement could drive policy changes in countries with significant exports to the EU

China, US and Argentina: Top trade partners of Brazil; Stricter criteria for imported products could force Brazil to engage in responsible trade and reduce deforestation



Brazil

Rest of the world: Two biggest export companies in Brazil tied to goods produced in the AFOLU sector could help set new industry standards for companies elsewhere in the world

No significant external influences, but there is opportunity for Canada (main trade partner) to set (1) higher energy efficiency standards of products from the US, and (2) thresholds for fuel-efficiency of aircraft and vehicle imports that may incentivize changes in US policy



US

Rest of the world: US often sets the tone for political stances and actions; in terms of climate policy, trade restrictions or industry innovations will most likely create a ripple effect

These push and pull diagrams demonstrate the directions that each country could take to drive climate policy and action in relation to others. The synthesis of these relationships and illustration of the overall cascade effect on global action will be discussed further in Section 5, where three scenarios on the sequences of global change are laid out in greater detail. In general, China, the United States and the EU continue to be the most important players in moving the world towards climate action. However, as current policies and actions stand, none of these three countries are making significant strides internationally.

In China climate policy expert, David Sandalow's view, China is both a leader and a laggard in addressing climate change. An example of this is in 2018, the Chinese government announced plans to launch its national emissions trading program and showed a commitment to pricing carbon. A year later, implementation of this program has been very slow and it remains unclear if the program will have an impact on carbon emissions reductions. Without action on the part of other major powers, such as the United States and the EU, China remains reluctant to impose more stringent policies and action.

The United States, unlike the EU and China, is less influenced by other countries. Though trade may have some impacts on its actions, the United States' stance towards climate change is driven primarily by domestic politics. On the city and state levels, significant efforts to address climate change continue. On the federal level, climate change is currently not a priority. This suggests that for the United States to reemerge as a global player in the climate scene, its efforts would have to come either from partnerships between international actors and local and state governments, or through a drastic change in the national agenda.

To a significant extent, the US, China and the EU benchmark their actions on each other. This has resulted in an impasse where none of the three are able or willing to make the first move. Unless these countries assume a greater role internationally in climate actions, there may be an opportunity for less influential countries to form coalitions and exert aggregate influences. Instead of the major countries serving as the leaders in the global transformation to limit temperature increase to 1.5° C, perhaps the future is shaped by coalitions of less influential countries as leaders.

Emissions Reduction Targets

How ambitious should climate targets be?

The question on who should do what is a perennial problem. With knowledge of the role countries play in the global arena, and the push and pull influences they exert on each other, a deeper assessment of the emission reduction targets is needed.

Table 3 shows the current level of emissions generated by each country, current 2030 projections and NDCs. The Project Team computed the “ideal” 2030 levels.

Table 3. Current level of emissions generated by each country

Country	GHG Emissions (million tonnes CO ₂ e) ³¹	Ideal 2030 GHG Emissions (50% reduction from latest level)	Current 2030 policy projections excluding AFOLU (maximum) ³²	NDCs (maximum) ³³
 Brazil	1,237 (2012)	618	1,496*	991 (2025)
 China	11,320 (2012)	5,660	15,816	15,951 (2030)
 India	1,848 (2010)	924	4,593	6,179 (2030)
 Indonesia	2,430 (2010) ³⁴	1,215	1,843	1,857 (2030)
 Nigeria	540 (2010) ³⁵	270	900 ³⁶	720 (2030) ³⁷
 Russia	2,009.4 (2016)	1,004.7	3,002	3,232 (2030)
 United States	5,794.5 (2016)	2,897.3	6,522	5,753 (2025)
 European Union	3,989.8 (2016)	1,994.9	3,837	3,420 (2030)

* Includes land use and forestry emissions

In Table 3, the first column contains total GHG emissions by country as most recently reported. The second column identifies the “ideal” emissions reductions to limit temperature increase to 1.5° C. The third and fourth columns identify the maximum emissions projections based on current policies and each country’s NDCs.

The ideal 2030 emissions reductions were calculated based on the “Carbon Law,” which advocates for a 50% reduction in emissions every decade. For this project, the 50% reduction was computed based on most recent emissions levels (as indicated in the table). As nearly a decade has passed since 2010, a proxy baseline was used for 2020 in order to compute the 2030 target. This recent data reflect relatively more current conditions in each country. It is more useful in deciding next steps from the current scenario. The Project Team also considered the IPCC-recommended reduction of 45% from baseline 2010 emissions. However, the “Carbon Law” target is more ambitious than the IPCC target and was therefore used for the calculation. The purpose of this table is to show discrepancies between country targets and necessary future reductions, and is not in any way suggesting that the Carbon Law is a better methodology than the IPCC’s.

Since the Paris Agreement was adopted in December 2015, almost every country has established Nationally Determined Contributions (NDCs) to reduce GHG emissions. Based on the figures in the table, China, India and Indonesia may achieve their NDC targets with their current policies. However, in general, all of the NDCs are still insufficient to limit global temperature increase to 1.5° C. In most cases, the ideal emissions reductions are significantly greater than NDCs. This suggests that countries require significant support to establish necessary reductions in their NDCs, and assistance to achieve those reductions. This support could range from knowledge and technology transfers to financial investments. On the policy side, the Paris Agreement provides a framework to revise the NDCs, as well as a pathway to translate the necessary level of emissions reduction to actual targets.

While developing countries continue to argue that developed countries should contribute more to resolving climate change, the current urgency of the climate change problem renders this argument invalid. Rather, the argument should now be made for developed economies to support the rest of the world through financial instruments, technological transfers, and knowledge exchange. While recognizing the disproportionate impacts of climate change around the world, it is crucial to view climate change mitigation as a global economic development tool that can facilitate greater international trade and productivity instead of framing it merely as a negative influence on developing economies.

Therefore, the response to the question posed at the beginning of this section can be summed up by three points:

1. Current NDCs are not enough to limit global temperature increase to 1.5° C. Even countries on target will not reduce enough emissions.

2. Necessary emissions reductions for each country are significantly greater than NDCs. The Paris Agreement provides a basic framework and pathway for institutionalizing needed reductions.
3. Global economic opportunities are greater if developed economies provide support for developing economies - equity is about the global support provided by the developed economies and not about how much more developed economies should contribute to global emissions reductions.

Sectoral Analysis

What is the necessary level of emissions reduction per sector to reach the target?

Following the point that current targets are not sufficient to reach the 1.5° C goal, the Project Team examined the high impact sectors by country. Table 4 below identifies the current emissions by sector, and determines how much these emissions should be reduced in order to meet the “Carbon Law” target.

The percentages of emissions reductions in each sector have been recommended based on three main factors: level of emissions by sector, current policy scenario in each country, and potential for future growth.

Table 4. High impact sectors by country

Country	Sector	2010 Sector Emissions (million tonnes CO ₂ e) ³⁸	Recommended Emissions Reduction to achieve 50% reduction target by 2030
 Brazil	AFOLU	666.6	75%
	Energy*	419.1	25%
 China	Energy*	9,337.3	55%
	Industry	1,462.4	35%
 India	Energy*	1,510.1	58%
	Industry	135.5	35%
 Indonesia	AFOLU	1,844.7 ³⁹	66%

	Nigeria	AFOLU	413.8 ⁴⁰	65%
	Russia	Energy	1,777.6	52%
		Transportation	256.1	20%
		Buildings	141.7	20%
	United States	Energy	3,139.6	70%
		Transportation	1,786.2	30%
	European Union	Energy	1841.7	45%
		Transportation	931.5	80%
		Buildings (R+C)	575.1	40%
		Industry	374.5	30%
		AFOLU	128.5	30%

* Includes emissions from Transportation and Buildings (R+C) sectors

Since AFOLU is a particularly high emitting sector for Brazil, Indonesia and Nigeria, the largest emissions reductions should stem from this sector in these countries. In more developed economies, energy use, transportation and buildings (both residential and commercial) contribute more emissions, so the largest reductions were assigned to these sectors. There is a general trend in which developing countries are high emitters in the AFOLU sector, while developed countries are especially high emitters in the energy, transport and building sectors. China exhibits both, which may be an indication of its global role and potential role as an influencer.

Overall, the amounts of emissions generated by the energy and AFOLU sectors are significantly larger than other sectors. This is mainly due to:

1. *Proliferation of fossil fuel-based economies.* These economies depend on fossil fuels, whether for industrial, commercial or residential consumption. In some of these countries, particularly India, China and the United States, the high level of end-user energy consumption and motorization contributes to high GHG emissions.
2. *Deforestation and land use change.* Preference for other lucrative industries such as cattle ranching and soy production in Brazil, and palm oil production in Indonesia causes significant damage to the world's largest forests. This is doubly problematic as natural carbon sinks become GHG sources.

These emissions reduction targets by sector reflect the need for policy change. In many countries, there are existing climate-related policies but these need to either be strengthened, revised, clarified or implemented. The next section identifies policy windows for GPI.

Cooling a Warming Planet: Alternative Coolants

Since their invention, refrigeration and cooling technologies have and continue to be integral to modernization for their role in food, safety and human health.¹⁴ As global temperatures continue to rise as a result of climate change, the need for cooling becomes even more pressing.¹⁵ This is especially true for countries in the tropics and desert where temperatures in the summer can reach dangerous levels. Yet, the irony is that cooling systems often use chemicals that have very strong global warming potential, first with chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) and now with hydrofluorocarbons (HFCs). These chemicals, once leaked into the atmosphere, have thousands of times more warming potential than carbon dioxide.¹⁶

This problem is compounded by the fact that as countries develop their economies, they experience rapid growth in cooling demand; most recently seen in China, India, and Brazil.¹⁷ Therefore, the transition from these coolants has become a global policy concern. As the climate gets hotter, developing countries need more cooling which then further warms the planet.

The Montreal Protocol has been extremely successful in eliminating the use of CFCs and HCFCs since its ratification. Similar to the research that catalyzed the protocol, recent research has suggested that if HFCs are phased out, it could prevent approximately 0.5° C in global temperature increase.¹⁸ The adoption of the Kigali Amendment to the Montreal Protocol to address HFCs provides a pathway for this phase out.¹⁹ The next step is to ensure that countries do achieve HFC phaseouts, especially in countries with emerging economies . With many of the countries that experience rapid growth in cooling demand in the tropics, where average temperatures are the highest, the phaseout of HFCs in refrigeration and cooling technologies continue to have important climate action potential.



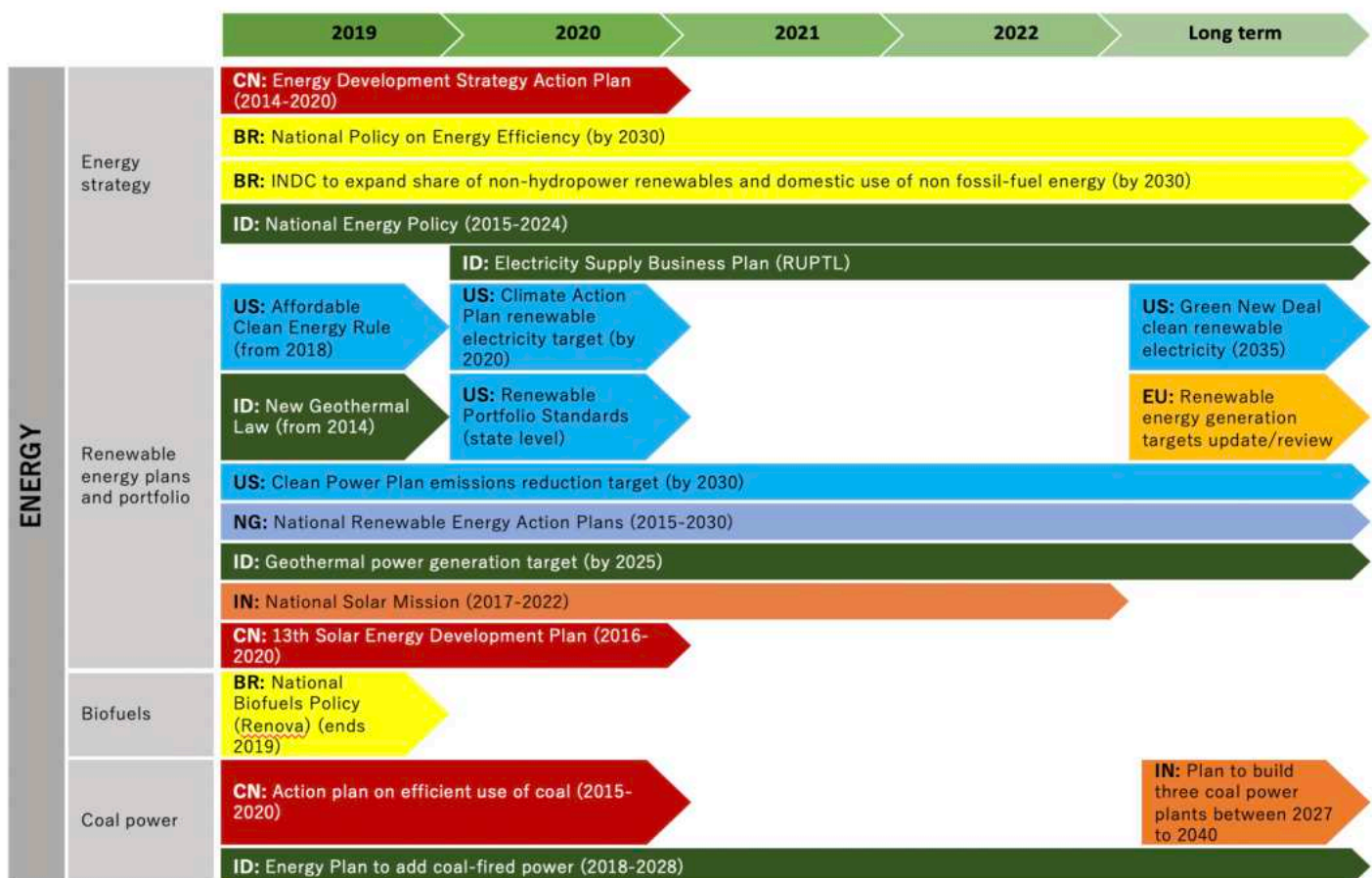
Policy Windows

When are the strategic opportunities for action?

Strategic opportunities for GPI action are presented below (figure 6, 7, 8) in timelines that span from 2019 through 2050. These timelines show specific policies, events, and opportunities across the different sectors in the countries studied. The timelines also highlight overlaps across sectors and countries. Details about these policies can be found in Section 6.

Policy Window: Energy Strategy and Renewable Portfolio Development

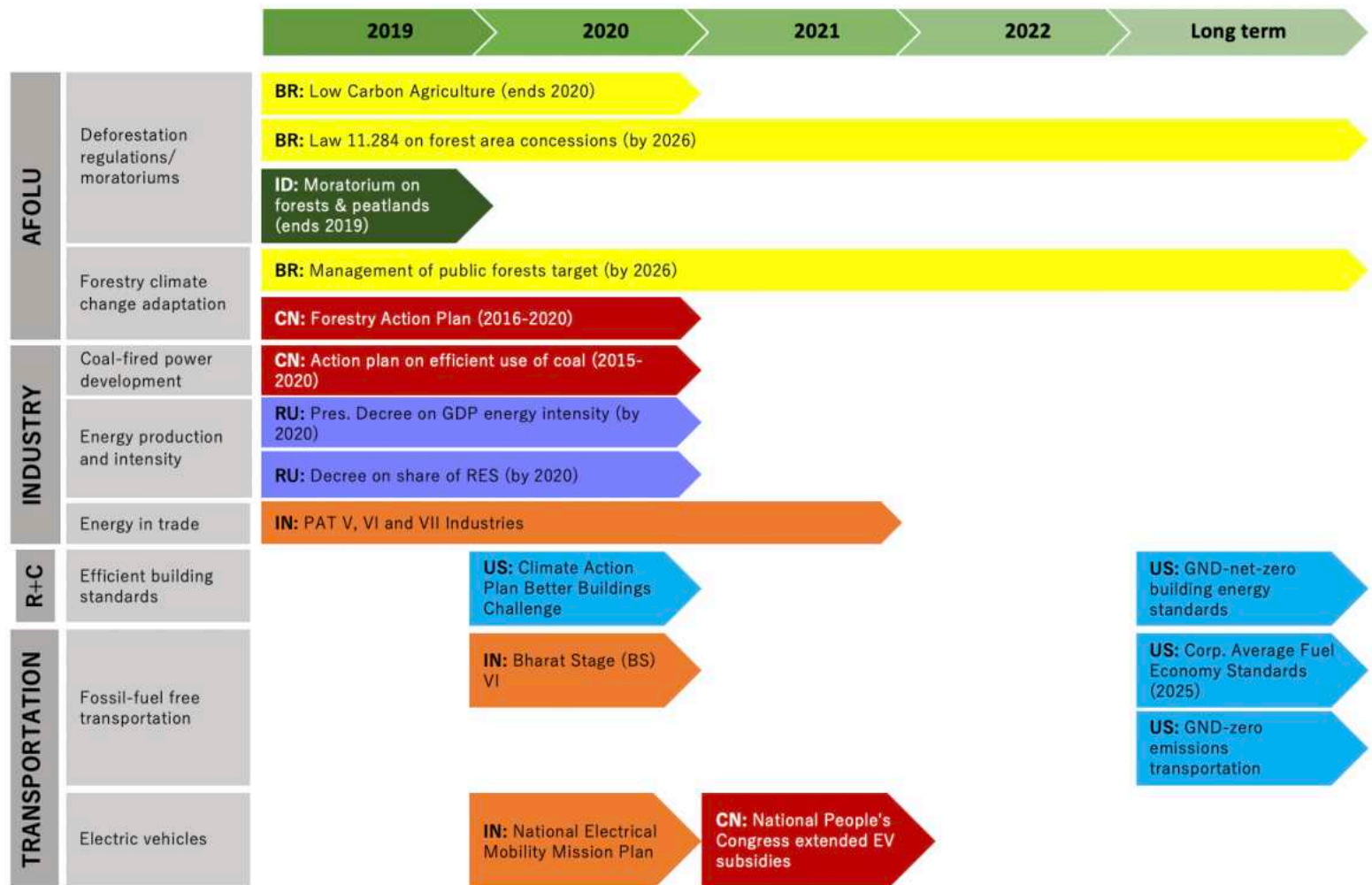
Figure 6. Policy windows in the energy sector (2019 to 2040)



Beginning with the energy sector, the policy windows identified were related to each country's national energy strategy, renewable energy plan and portfolio, biofuels and coal power development. Across the seven countries and the EU, several energy policies are up for review within the next two years, and many also have new renewable energy projects in the pipeline. During this period, GPI could influence the countries' energy plans and targets to promote a clean energy mix. Starting now and looking through the long-term at 2040, GPI could oppose plans to develop coal-fired power plants and continue to monitor the global energy policy scenario.

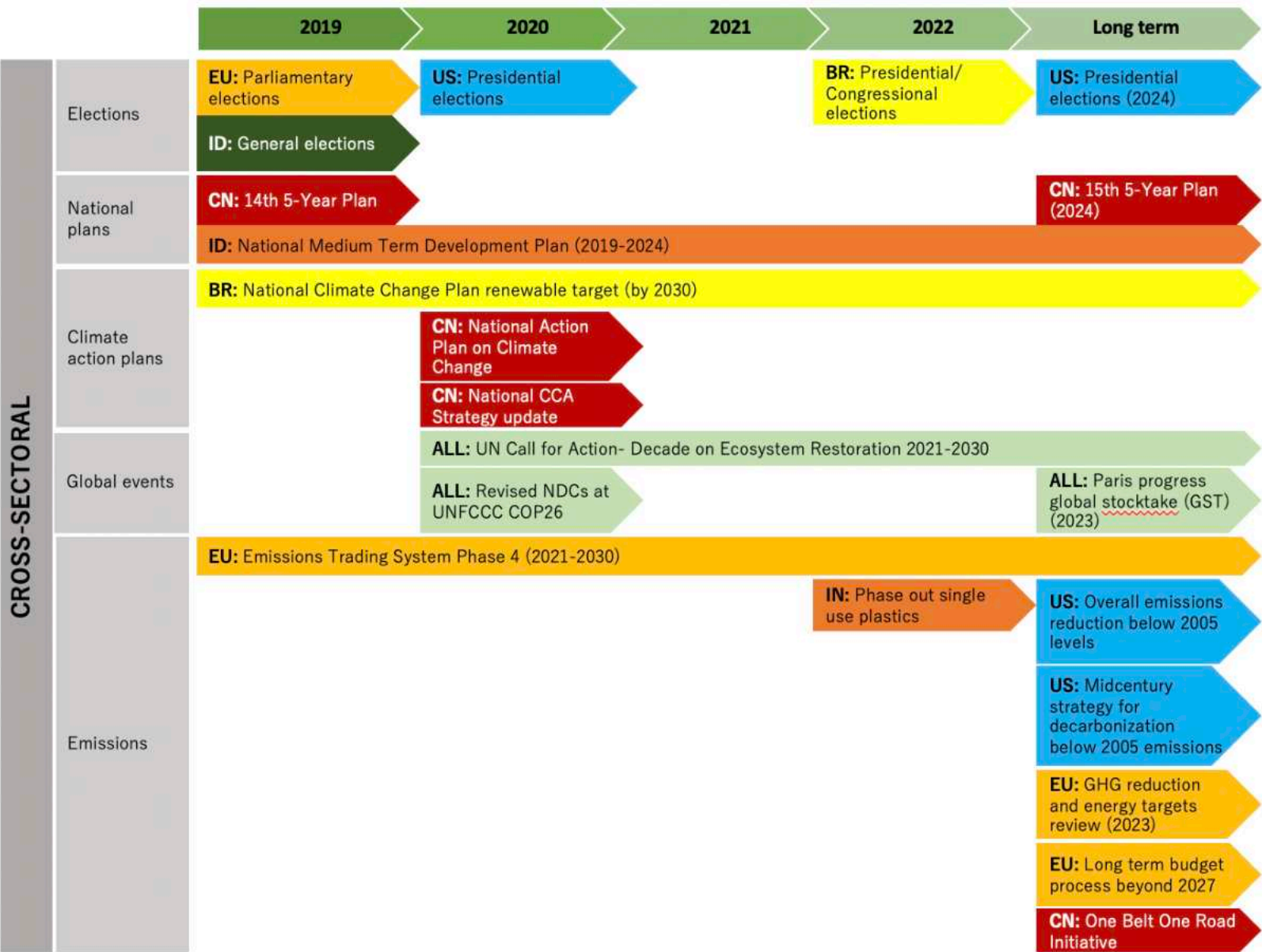
Policy Window: Decarbonization of Industries and Domestic Energy Efficiency

Figure 7. Policy windows in the AFOLU, industry, buildings (R+C) and transportation sectors (2019 to 2040)



For the AFOLU, industry, residential and commercial buildings, and transportation sectors, most of the policy windows identified will occur in the next two years. A few will require more long-term attention and intervention. Figure 7 highlights policy windows in the AFOLU sector are related to deforestation regulations or moratoriums on land use change. In the industry and buildings sectors, policies are linked to energy production and intensity, while the transportation sector focuses on opportunities to promote zero-emission transportation and fuel efficiency.

Figure 8. Cross-sectoral policy windows (2019 to 2050)



Across sectors, policy windows include general elections, medium and long term planning, climate action planning, and global events that affect all targeted countries (shown in figure 8). During elections in the coming years, GPI has the opportunity to influence platforms of candidates to include the climate agenda, and back candidates with strong environmental platforms. The planning periods are critical for GPI to campaign for stricter climate targets, monitor progress of plans, and work with stakeholders. The aim is to facilitate deployment of renewable infrastructure and fully integrate decarbonization of the economy in each of the countries.

The Green New Deal

Submitted as a resolution in the US House of Representatives by Representative Alexandria Ocasio-Cortez, the Green New Deal is an example of a policy that envisions economy-wide and cross-sectoral approaches to address climate change. It acknowledges the Intergovernmental Panel on Climate Change (IPCC) research about the potential impacts of climate change on the economy, human livelihood, ecosystem degradation, migration patterns, and infrastructure.⁴¹ Further, the proposed policy addresses the socioeconomic inequalities that the US was built on, which will likely be exacerbated by climate change, and addresses climate change as a threat to the country.⁴² Inspired by former President Franklin D. Roosevelt's New Deal, the Green New Deal aims to create new markets that promote net-zero greenhouse gas emissions, sustainability, and resilience to develop a massive employment opportunity for all.⁴³ The resolution further details a 10-year mobilization plan with the goals of:

- Building resilience
- Upgrading infrastructure
- Promoting a 100% renewable, zero-net greenhouse gas emissions target
- Improving energy efficiency, building efficiency, and grid efficiency
- Working with the manufacturing and agriculture sectors to reduce associated emissions
- Improving public transportation
- Removing atmospheric greenhouse gases from the atmosphere
- Restoring ecosystems
- Cleaning up hazardous waste sites, and
- Promoting international technological exchange.⁴⁴

In addition to the climate-related goals, the Green New Deal seeks to improve labor rights and leverage both public and private financing in order to implement its goals.⁴⁵

On March 26, 2019, Senate Majority Leader Mitch McConnell forced what Democrats considered an early vote on the Green New Deal, and while the resolution failed, it was in part a result of 43 Democrats voting “present” in order to preserve the prospect of a Green New Deal passing in a different form at a later date.⁴⁶

A main criticism of the Green New Deal has been the lack of explanation on its implementation. So, what can Greenpeace do? The Green New Deal embodies values and goals aligned with Greenpeace's mission. Therefore, it may be in the best interests of Greenpeace to support and promote the Green New Deal as a starting point for change on the federal level. Further, Greenpeace could develop an implementation proposal with congress-members and organizations involved in the legislation. This will help reduce potential criticism as well as determine the way forward, if the resolution passes.



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5

Moving the World to Action: Three Scenarios

Global temperatures will continue to rise for the coming decades. Cumulative global GHG emissions coupled with the current rate of emissions have now resulted in a critical stage. Immediate global action for change is imperative in order for that increase to stay under safe levels for life on earth. Though this may seem daunting, the good news is that over 75% of global emissions come from only twenty countries.⁴⁷ The bad news, however, is much like the rest of the world, these countries are reluctant to do more to mitigate climate change. Focusing on the top GHG emitters, this report tackles the challenge of identifying countries of significance for global action, and more importantly, formulates unique strategies for each country. The previous sections provide analyses on sectors, push and pull influences, and policy windows. While important to look at countries individually, climate change is a global problem that requires holistic and coordinated solutions. The next step is to expand beyond the individual countries and explore pathways for the world to come together. The question is no longer who are the dominoes, but rather how will the dominoes fall?

Scenario 1: Traditional Great Powers (International Diplomacy)

The modern world order,⁴⁸ established since the Second World War and predicated on United States' primacy with European support, has changed with the fall of the Soviet Union and the rise of China.⁴⁹ Although the poles of power have remained the same, with the United States and the EU on one end and Russia and China on the other, the balance of power has been slowly changing. China's rapid rise since the 1990s along with the resurgence of Russia and the emerging economic might of India has shifted the power balance to the East.^{50,51} Furthermore, in recent years the rise of nationalism and populism in the United States has resulted in a retreat from its global political leadership.⁵²

Aside from Russia, the United States is almost unique in its refusal to act at a national level on climate change. Yet, the size of its economy and its political influence continue to dominate global affairs. Its potential to lead global efforts in tackling climate change is still unmatched. Fortunately in the United States, state and local governments continue to pursue GHG emissions reductions goals and transitions to clean energy.⁵³ This dynamic may lead to a future scenario in which the federal government finally commits to tackling climate change and assumes international leadership.

The most conventional pathway to global climate transformation comes through this traditional great power structure. On one end of the balance is the United States, with its continued primacy in global affairs. It can easily step back into its traditional leadership role. With its historically strong ties to the European Union and the fact that the EU has lead the way in emissions reductions, if the United States takes decisive and substantial international action - either through direct negotiation, trade policies, or a combination of the two - global transformation becomes substantially more likely. After the United States and the EU, the next countries to follow will likely be their allies and those with close ties: Canada, Japan, South Korea, Australia, and Mexico. Though Saudi Arabia is an ally, its economic reliance on crude oil makes its initial support for climate action unlikely. Nevertheless, these countries collectively would represent half of the top fifteen global GHG emitters and a significant step towards limiting climate change.

However, for the whole world to come together effectively, the United States, the EU and their allies have to engage with the other pole of powers: Russia, China, and India. In particular, they will need the support of China and India, ranked first and fourth in global GHG emissions, respectively. Like Russia, both China and India are often on the opposite side of the EU and the United States in international discussions regarding climate change, yet any global effort on climate change will require their support.⁵⁴ At the same time, China and India have been making commitments to emissions reductions, including participating in the Paris Climate Agreement, suggesting that they may be open to joining further international agreements regarding climate change. By bringing these great powers together, their collective influence, both regionally and globally, can catalyze the necessary global transformation of policies and economic sectors to limit temperature increase to 1.5° C.

Scenario 2: Trade Agreements and Organizations (Macroeconomics)

Traditional great power politics aside, global trade policy and agreements present another viable pathway for climate action. The total value of global trade is now at roughly \$18 trillion USD or around 25% of the global economy.⁵⁵ To put this in perspective, the global economy is valued at approximately \$80 trillion USD.⁵⁶ This suggests significant potential for global transformation through trade once countries adjust their economies to lower carbon intensities. Trade agreements

can help facilitate that transition, yet international trade policy has long lagged behind in addressing global GHG emissions and climate change.⁵⁷

Newer trade agreements, especially those that remove barriers to the trade of green goods and services as well as prevent the expansion of fossil fuels or other harmful goods, have yet to be created. The reason behind that may be because the fossil fuel industry still holds

considerable influence on national policies and politics. Furthermore, international trade laws also contain certain prohibitions against restrictions.⁵⁸ These types of new agreements are important because the biggest exporters and importers in the world also tend to be the largest GHG emitters (e.g. China, United States, and Japan).⁵⁹ The European Union, as a whole, would top the list of exporters. On the other hand, though the list of top importers is similar, United States is by far the biggest and accounts for 13.4% of global imports, although the EU taken as a whole would again top the list.⁶⁰ The data here again suggests the significance of the United States, China, and the EU as key movers on the pathway to global climate action.

Based on trade data compiled by the World Trade Organization, the top products traded globally are transportation equipment, office and telecommunication equipment, chemicals, fuels, agricultural products, automotive products, and food.⁶¹ Each of these product categories are valued between \$1.5 to \$2 trillion USD, and together they make up close to 60% of the total value of goods traded globally (\$18 trillion).⁶² Furthermore, these products would have significant impacts on emissions; they are all inputs to the sectors with the most GHG emissions: energy, transportation, building, and AFOLU.

The United States, the EU and China account for over half of all imported products, at over \$9 trillion USD. While the EU tops the list with \$5.9 trillion USD, the United States and China trail behind at \$2.4 trillion and \$1.8 trillion USD, respectively.⁶³ Here, key differences from Scenario 1 emerge. The significance of the EU in global trade and its willingness to take on

climate action gives it primacy to move trade agreements in favor of climate action and lower carbon intensities. Not only could the EU export and import products with higher environmental standards to affect the world, it could also work with other major trade nations such as China. Together, these countries could implement international policies such as trade sanctions against countries that did not ratify the Paris Agreement, do not have adequate emissions goals, or do not have emissions standards. This could function much like the Montreal Protocol, where the threat of sanctions combined with the incentive of financial assistance generated the global momentum for change.⁶⁴ If the EU does indeed move on the trade front and obtains China's support, countries to follow will likely be Japan, India, Brazil, Australia and Mexico as they are the EU's largest trade partners.⁶⁵ Furthermore, each of them could influence others in their regional trade agreements or organizations, such as countries in the Asia-Pacific Economic Cooperation.

From this perspective, consumer effects in which countries can refuse to import goods from those that do not meet certain emissions standards or have not ratified the Paris Agreement would be another pathway. Countries that may not be the biggest exporters or importers but collectively could have a larger impact, such as India, Brazil, and Indonesia, would move together and move first. By moving their respective regional trade agreements, or organizations towards limitations on environmentally harmful goods and incentives for green goods and services, large exporters such as the EU, the United States and China could be incentivized to be more aggressive and engaged in global climate

action. In a globalized world, trade agreements and organizations can be useful levers. If these countries are actively seeking opportunities to guide climate action through policies

impacting trade, it is possible to achieve global consensus similar to the way in which the Montreal Protocol achieved success.

Scenario 3: Cities as Climate Change Leaders (Urban Theory)

Since 2007, the majority of the world's population now lives in urbanized areas and this proportion of urbanized population continues to rise.⁶⁶ This concentration of socio-economic activity in cities has subsequently translated into a concentration of power and potential. Urban theorists have long contended that cities hold the keys to social change.⁶⁷ The ongoing climate strikes and other climate-related social movements hold power precisely because they occur in cities, where the exchange of ideas and people is greatest.

Cities consume approximately two-thirds of all the electricity generated globally and emit a significant amount of GHG emissions.⁶⁸ From this perspective, the ultimate solutions to climate change lie in cities. Yet, much like trade policy, cities have often been overlooked as significant actors in international and national policy discussions on climate action. However, numerous local governments have started to play an increasingly significant role in climate actions.⁶⁹ This rise of urban initiatives was demonstrated dramatically in 2016, when the United States federal government announced its withdrawal from the Paris Agreement.⁷⁰ Nonetheless, numerous cities in the country continued to pledge adherence to a low-carbon future and to make

significant progress in emissions reductions.⁷¹ In taking the lead in global climate action, cities offer an alternative pathway for global transformation to limit temperature increase to 1.5° C.

Local city governments can continue to devise and implement policies on climate change and identify opportunities to influence national policies where possible. In particular, Asia should be a major focus as many of the world's biggest cities and many of the highest-emitting countries (e.g. China, India, and Japan) are located there. If cities in Asia are able to move their respective nations forward with decisive policies and action to limit emissions in their cities, they could set an example for the way forward. These changes will likely entail changes in behavior and consumption patterns in cities, leading to effects on global trade, cascading down the pathway listed in Scenario 2. Furthermore, in countries where the national government is reluctant or unwilling to tackle climate issues, the lead by cities can maintain progress in climate action until the national agenda or administration changes.

Currently, the C40 Cities organization has been a major actor in mobilizing cities to climate action. Cities from the EU, the United States,

China, Japan, and South Korea are on its steering committee. In addition to the cities on its steering committee, another 77 cities are also involved in the organization. If national governments begin to follow their cities' leads, the first countries to potentially move could be the greatest emitters. However, the potential for simultaneous and coordinated climate action is much greater with the global network of cooperating cities. In this scenario it is easier to imagine a concurrent pathway rather than a sequence of nations following the lead of key movers like the EU or China.

It is important to note that the relationships and power dynamics between local city governments and state or national governments are different in every country. Certain cities with special statuses, whether administrative or otherwise, such as Hong Kong, Tokyo, or Seoul could operate without national support or completely shape national policies. Other cities have less impact on their national stages. Though the analysis of these specific power relationships is beyond the scope of this report, these dynamics could inform strategic decisions on cities that can influence national and international policies.

Drivers and Roadblocks

Ultimately, all of the scenarios outline here could occur concurrently. Without the participation of the United States in global climate action, the common factor for all the pathways is the significance of the EU and China. They will either be the first movers in the transition to global climate action or will become the main targets for change as other countries begin to act first. Other countries with major GHG emissions are also important, such as Russia and Australia, but their involvement in global climate action will likely be secondary based on these scenarios. Politically, Russia may continue to be a major roadblock. The only way to move it will require the global community to make common cause and establish deterrents and incentives for the remaining countries to join in global climate action. Through this isolation, even countries as powerful as Russia will be swayed to cooperate. Finally, the involvement of city governments should not be overlooked in their importance to drive global climate action. More

and more people will move into cities and as such policies must be designed at the local level in order to truly impact global GHG emissions to limit temperature increase to 1.5° C.

The following strategic recommendations cover a wide range of geopolitical, policy advocacy and programmatic strategies at the international, national, and sub-national levels in light of these scenarios.

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6

Recommendations

With the understanding that impacts of climate change are global and solutions should be both inclusive and comprehensive, the Project Team identified these recommendations that build on GPI's role in mobilization campaigns and "boots-on-the-ground" programs, as well as more creative, high-level interventions such as sector-based and global trade policies.

Geopolitical Strategy

The following recommendations take into account political powers and interests, as well as identify next steps and opportunities for Greenpeace International to navigate the geo-political dynamics globally and in each country.

Geopolitical Strategy	
International	National
Support viable alternative development pathways for countries in the Global South: Years of dependence on fossil fuel exports did not improve the lives of Nigerian people (NG) Mobilize youth and citizens in different countries to join climate strikes Advocate for reduction in energy imports to the EU from Russia to force Russia to change its energy policies	Support candidates who support environmental efforts (BR, IN, ID, EU) Influence campaigns and candidates running in the 2020 elections, including presidential and congressional candidates (US) Inform ongoing medium and long term planning processes (CN, ID, NG) Oppose plans to develop coal plants: - Energy plan to generate 27 GW of coal-fired power in the next decade (ID) 3 new coal plants (planned/under development)(IN)
Sub-national	
Focus on states with fastest rates of deforestation (BR) Identify forested states that historically hold the greatest political sway both in terms of environmental stances and on the national stage (BR) Work with cities and states that have taken the lead on climate action and passed more robust state-level policies to make up for federal inaction (US)	Mobilize civil society and private sector to advocate for transparency and good governance (ID) Hold the government accountable for its renewable goals (NG) Build popular support for just transition from petroleum to renewable (NG, CN) Call for hard target dates to phase out coal (US) Strengthen environmental, human rights and social movements (RU) Lobby for increased energy efficiency (RU)

Climate Policy Advocacy

The following recommendations focus on necessary policy changes and identify the policy gaps and issues affecting implementation.

Climate Policy Advocacy	
International	National
Campaign for more ambitious NDCs during the annual COP/ world climate conference: - Address AFOLU emissions (projected to increase) (ID, BR) Push for accuracy and transparency of emissions data (IN, CN) Advocate for competitive markets for solar energy - no ceilings on the tender prices in the auction and bids (IN) Demand stricter standards on traded products: - Impose a Meat and Grain Moratorium to reduce quantity of products from deforested lands (BR) - Impose stricter criteria for biofuels import (EU) to force Indonesia to adhere to standards - Ban imports of machinery and equipment that does not meet certain thresholds for energy-efficiency (US) - Ban imports of aircraft and vehicles that do not meet certain thresholds for fuel-efficiency (US) - Work directly with major food processing exporters (José Batista Sobrinho and Brazil Foods) to limit deforestation by requiring suppliers' products do not come from newly deforested lands (BR) Call out WTO to impose higher import duties to compensate for unfair trade practices: - Impose higher tariffs on countries with weaker environmental laws (EU)	Push for extension and stricter implementation of moratoriums: - Soybean moratorium to include the land in the Cerrado (BR) - Forest moratorium and the National Strategy for Forest Law Enforcement (ID) - New fossil-fuel based power plants (NG) Work with experts to "advise" the government on how to achieve their current policy goals (CN) Advocate for development of renewable energy sources: - Solar power generation, transmission and storage (CN, IN) - More sophisticated grid integration technologies (IN) - Geothermal power (ID) - Solar panels, batteries, and other key renewable energy technology (NG) - Renewable storage and infrastructure development (US) Oppose fossil fuel subsidy (NG) Promote subsidies for renewable energy installations (IN, NG), climate-sensitive agriculture (NG), and electric vehicles (CN) Push for proper implementation of key policies: - Renewable Purchase Obligations and National Clean Energy Fund (IN) - One Map Policy for transparent monitoring system of forest areas (ID) Support the Green New Deal to keep this policy on the agenda (US) Support the implementation of strong policies consistent with EU goals within the member states (EU) Support the ENTSO-E (EU): - Set up internal energy market with the EU - Develop reliable and renewable-heavy grid - Streamline/prioritize interconnection of renewable generating assets to lower costs Collaborate with WWF Russia to protect forests and lobby for improved forest management (RU) Lobby for more comprehensive and cohesive legislative framework to regulate the energy sector (RU)
Sub-National	
Promote better coordination and alignment among centre, state and local governments (IN) Participate in consultative meetings or technical working groups to develop policies, programs or strategies on key land-use policies (ID) Work directly with Senator Udall (New Mexico) on developing a new Renewable Electricity Standard Act (US) Support the Women and Climate Change Act introduced by US Congresswoman Barbara Lee, which addresses the disparate impact of climate change on women (US) Make impactful strides towards 100% renewable energy targets on a state- and city- wide basis (US) Advocate for improved building codes, land use zoning and strategic transportation plans (US)	

Program Development and Research

The following recommendations focus on strategies and important program areas of work for Greenpeace.

Program Development and Research		
International	National	Sub-national
Invest in research and innovation: - o Large-scale reforestation projects as offsetting mechanism (BR) - o Better agriculture/ cultivation methods and pasture management to minimize land use change (BR, ID) - o Soil carbon sequestration (BR) Round-up environmental protection I/NGOs: - o Green Belt and Road Initiative roll out and implementation (CN) Increase information, education and communication (IEC) campaign efforts to inform public about climate change	Support Conservation International's tree planting project (73M new trees in the Amazon by 2023) (BR) Demand better supply chain management: work with major food processing exporters (BR) Provide training programs for former coal-based employees to move into the renewable energy sector (US) Identify ways to turn the vast boreal forests into a global carbon sink (RU)	Launch a massive information campaign on Forest Code and relevant policies (BR) Promote the Low Carbon Emission Agriculture Programme for low-interest loans for farmers to develop and implement sustainable agriculture practices (BR) Motivate communities to self-regulate and to take ownership over protection of the forest (BR) Promote responsible agriculture and engage palm oil stakeholders in multidimensional, cross-sectoral discussions on climate change issues (ID)

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7

Conclusion

Climate change is a problem that requires an urgent and cross-sectoral response. Action is needed from the grassroots level up to the international sphere. Taking this into consideration, this project presented important factors on seven countries: Brazil, China, India, Indonesia, Nigeria, Russia, the United States, and the European Union, combined with insights on these countries' relationship with the rest of the world. The project's policy advocacy propositions were based on well-established knowledge of GHG emissions, sectors, international frameworks and agreements on climate change mitigation. The combination of scientific data, critical political and policy analysis, and "big picture" thinking in this project aims to drive meaningful change in the selected countries, and drive transformations that would impact the rest of the world.

Globally, the climate policy gap needs to be corrected in a swift and decisive manner, otherwise the planet faces severe consequences. Greenpeace International is in a strategic position to influence policy decisions and advance the climate agenda. There are several strategies that can be taken at the international, national, and sub-national levels. The countries studied in this project are strategic influencers and movers, not only because they generate the highest GHG emissions, but because of the power and influence they have globally. Their geopolitical influence, trade relations, and other socio-economic factors are therefore important leverage points where GPI can intervene and deliver the most impact.

In using this report, it is important to recognize the critical roles of specific countries. The United States, EU and China could either be the first movers in the transition to global climate action, or become the main targets for change as other countries initiate action. Involvement of other countries with major GHG emissions, such as Russia, is also important. There are several roadblocks that need to be addressed. Particularly, resource-rich countries such as Russia do not have incentive to change or be active in climate action. The global community has both the responsibility and an opportunity to make climate action a common cause by establishing deterrents and incentives for the remaining countries to join the movement. Finally, the involvement of city governments should not be overlooked in their importance in driving global climate action.

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“Pie-in-the-sky” Recommendations

Agriculture, Forestry and Other Land Use (AFOLU)

Promote new technologies such as the artificial leaf: While we currently hold the tools and policies needed to address climate change, there are some exciting technological advances that are worth exploring to reduce carbon emissions in the atmosphere. Researchers at the University of Chicago have recently published a paper in the journal of ACS Sustainable Chemistry & Engineering where they discuss their creation of an artificial leaf that converts carbon dioxide and water into carbohydrates.¹ According to the researchers, the artificial leaf could be 10 times more efficient than real leaves at converting carbon dioxide to cut down on climate change and produce cleaner energy.² These leaves could be used on a small scale such as on the roof of a house, or on a larger scale such as a powerplant or in the ventilation system of an office building. For instance, using 360 “leaves” across a 1,600 square-foot area reduced CO₂ levels by 10%. While there have been many researchers creating artificial leaves, this could be a potentially effective solution for decreasing harmful gasses in the atmosphere.

Demand “zero deforestation” supply chains: According to the Carbon Disclosure Project’s new report, 71% of global greenhouse gas emissions since 1988 can be traced back to just 100 fossil fuel companies.³ Therefore, corporations and consumers have a large role to play in the transition to a zero carbon economy. The concept of a zero deforestation supply chain requires pressuring governments and corporations to buy commodities only from forest regions certified as “deforestation-free”. In 2016, Norway was the first country to commit to a zero deforestation policy by announcing that products that contribute to deforestation will not be used in the country.⁴ Additionally, Norway has made significant investments in Brazil to protect the Amazon

forest: In 2015, Norway paid Brazil \$1 billion for completing a 2008 agreement to prevent deforestation, and this investment helped save 33,000 square miles of rainforest and decreased deforestation by 75%.⁵ Furthermore, Greenpeace can create education campaigns surrounding the five main forest-risk agriculture commodities: soy, palm oil, beef, wood and paper products, and cocoa. The production of these goods was responsible for the loss of more than a hundred million hectares of forest between 2000 and 2012 and Greenpeace can promote specific policies surrounding proper sourcing of these five main products.⁶

Promote incentives or spearhead an education campaign on conservation agriculture: Conservation agriculture is a set of soil management practices that minimize the disruption of the soil's structure, composition and natural biodiversity in order to improve crop yields and improve the long-term environmental and financial sustainability of farming.⁷ Specific technologies and practices in this arena include silvopasture, carbon farming and more. Silvopasture integrates trees and pasture into a single system while simultaneously raising livestock. The practice prevents removal of trees while promoting a sustainable and symbiotic system. This process goes hand in hand with carbon farming practices, which is the idea of implementing a series of conservation practices in our traditional agricultural system that enhances storing organic matter, or storing carbon, in the soil itself. Soil is a very important factor for sequestering carbon emissions, and as such proper agriculture techniques are necessary to mitigate climate change.

Energy

Promote efficiency across all sectors and devices: Modern technology has the potential to reduce the need for end-use energy devices as a means of drastically improving the efficiency of the work being done. These changes can lead to a global decrease in energy demand even accounting for the electrification of key sectors.²

Transport

Incentivize EVs and create caps on ICEs: Many households purchase electric vehicles as an additional car to add to their driveway while still keeping their traditional internal combustion engine vehicles as a second or sometimes even third car. In order to effectively ban ICEs, countries could incentivize the purchase of EVs as *replacements*, not additions to, conventional cars.

Advocate for free public transport: One of the main sectors contributing to greenhouse gas emissions within the European Union is the transportation sector, and a large part of this is passenger cars. Sales of new passenger cars in the EU increased by 9% in 2015 compared to the previous year, with a total of 13.7 million new cars registered.¹⁴ An important measure to reduce passenger cars is to increase and promote public transport. One way to do this is through making public transport free. Several European cities have already done this (e.g. Dunkirk in France and Tallin in Estonia), and are seeing a significant increase in the use of public transportation. The EU would benefit from introducing free public transport as it would not only reduce CO2 emissions but would also improve public health and reduce congestion.

Advocate for congestion taxes in cities: As a way to pay for the increased costs associated with free public transportation, the EU should introduce congestion taxes within the larger cities, which has already been done in capitals including London and Stockholm. The most sweeping congestion pricing plan recently approved for New York City will cut tailpipe emissions of carbon dioxide, the main greenhouse gas, by an estimated 950,000 metric

Industry

Find alternatives to the big five industries: Taken together, the chemical, iron and steel, nonmetallic minerals, pulp and paper, and refining industries account for over 50% of industrial thermal energy demand (non-electric energy).²¹

- Chemical industry emissions should be significantly reduced by eliminating plastic demand through alternative materials and behavioral changes.²² Further reductions can be achieved by using agricultural best practices that do not rely on heavy fertilizer usage.²³ These solutions will simultaneously address the issues of plastic waste proliferation and nutrient runoff.
- In a world with higher renewable penetration, iron and steel emissions can be reduced through increased usage of electric arc furnaces or other innovative production methods rather than traditional fossil fuel heating sources.²⁴ Demand reduction through new building practices or alternative materials should also be pursued.
- Cement manufacture accounts for 85% of nonmetallic mineral emissions. While this industry is frequently cited as one that could successfully implement carbon capture and that the product itself could be used for sequestration, the best solution is to transition to low or non-emitting alternative construction materials.²⁵
- While the pulp and paper industry frequently use biomass waste from their own processes to fuel cogeneration that meets up to 50% of their energy needs, the digital age is reducing the need for paper. This trend should be supported and accelerated, as reducing demand not only could reduce emissions, but also keep forests intact and sequestering.
- The energy transition should eliminate demand for refined petroleum products, and therefore emissions from this industry should be eliminated by default.

Residential & Commercial

Ban HFC's in air conditioners: Air conditioners have a high negative impact on the climate due to the refrigerants they use called hydrofluorocarbons, or HFCs. These fluorinated gas pollutants heat the planet even more than the average carbon dioxide molecule and have a high impact on global warming. There must be a phase-out of HFCs through a ban, and requirements for the highest energy efficiency standards for air conditioners. A combination of consumer

buying power and political legislation can help us achieve this goal which can provide 89.74 GT total atmospheric CO₂e reduction.⁸ Please see HFC case study for more information.

Make it easier to live without cars: There is no way to sufficiently reduce our emissions while cars are still on the road, and as long as we design our streets for only cars, we are perpetuating a high-carbon future. We need to redesign our transportation system to make it safer and more convenient for people to walk and bike more in order to drive less. This can be accomplished through the implementation of Complete Street Policies which include sidewalks, bike lanes, special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, accessible pedestrian signals, roundabouts, and more.⁹ Complete Streets make it easy to cross the street, walk to shops, and bicycle to work.

Promote mass affordable housing: The climate impact of buildings and transportation continue to rise with aging infrastructure and rising property prices in cities forcing low income individuals to the outskirts. This movement away from urban centers creates the need to drive more and longer distances in gas-powered cars. These two things- buildings and transportation- represent more than one third of US carbon emissions.¹⁰ Therefore, urban sprawl-related emissions and the affordable housing crisis are intrinsically linked. The solution to build mass affordable housing near public transportation aids both the housing crisis and climate change strategy. Suburbs and urban sprawl are inherently unsustainable, and if we want to have a chance of meeting carbon emission goals, cities must get denser, clean mass transit must be expanded, and suburbs must be cleared to make way for parks and carbon-sequestering forests. Urban density is proven not only to decrease emissions from both transportation and buildings, but also to decrease public spending and promote economic growth and innovation.^{11, 12, 13}

Require all new homes to be net zero energy and incentivize energy efficiency standards in buildings:

Buildings are responsible for at least 40% of our energy use and GHG emissions, but also offer some of the fastest, easiest, and least expensive solutions for reducing climate impacts.¹⁶ Net-zero energy homes can produce as much energy as they consume and are built to optimize energy efficiency through airtight construction of roofs, walls, windows and foundations.¹⁷

Other

Create education campaigns for women/girls and family planning and support politicians who do:

UN Figures suggest that around 80% of people displaced by climate change are women.¹⁸ US Congresswoman Barbara Lee introduced the Women and Climate Change Act “to address the disparate impact of climate change on women and support the efforts of women globally to address climate change and for other purposes”.¹⁹ By supporting politicians who are making these sorts of proposals, Greenpeace can help advance this cause. Drawdown estimates the education of women and girls could reduce CO2 emissions by 51.48 gigatons.²⁰

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COUNTRY FACT SHEET

ARGENTINA

BY THE NUMBERS:	464.05	1.12	6	0.825	=	15
CRITERIA	Total GHG Emissions (million tonnes)	Annual Population Growth (%)	Climate Action Tracker Rank	Human Development Index Score		Overall Rank



SECTORS & EMISSIONS



#1: AFOLU
(450.98 million tonnes CO₂e)



#2: Energy
(6.09 million tonnes CO₂e)



#3: Residential & Commercial
(3.24 million tonnes CO₂e)



#4: Transport
(2.91 million tonnes CO₂e)



#5: Industry
(834,147 tonnes CO₂e)



COUNTRY DATA

Population (2016): 43,600,000⁷

Population density (2017): 16.18 people/sq km⁸

Literacy rate (2015): 99.13% (men: 99.1%; women: 99.14%)⁹

Poverty incidence (2014): 4.5%⁹

GDP per capita (2017, in US\$): 14,398.4¹⁰

Main industries: Services (over 60% of GDP) including banking and tourism; Industry (15% of GDP) Agriculture (9% of GDP), Natural Resources (4%)¹¹

Government/Political Stability (2017, The World Bank):

Government Effectiveness Index (-2.5 weak; 2.5 strong): 0.17¹²

Political Stability Index (-2.5 weak; 2.5 strong): 0.18¹³

COUNTRY OVERVIEW

Argentina is one of the largest economies in Latin America.²⁶ The country is endowed with natural resources in energy and agriculture, and contains significant industries such as agriculture, livestock, manufacturing, and services in high tech industries.²⁷ Argentina has a growing population, with the majority living in poverty. Its economy is growing in the automobile, textile and power sectors despite recent economic recessions.²⁸ Its total greenhouse gas emissions rank 29th globally mainly due to its energy-intensive industries and large-scale agricultural processes.²⁹ Argentina's long history of economic crises and foreign debt since its independence in 1816 has created many challenges and changes in its political structure of ministries and corresponding decrease in government spending.³⁰ This include changes in departments dealing with climate change, and uncertain future impacts on climate policy.³¹

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COUNTRY FACT SHEET

ARGENTINA

CLIMATE CHANGE POLICIES

Existing Policy A (<u>Cross Sectoral</u>) - National Decree 1070/05 (2005) Creation of the Argentine Carbon Fund	Key Issues: Establishes the Carbon Fund of Argentina that incentivizes the development of Clean Development Mechanism (CDM) projects¹⁴ - There are significant infrastructure gaps in the transportation and energy sectors ranking 122 out of 140 in the Global Competitiveness Index measuring quality of overall infrastructure¹⁵ - The same sectors are heavily subsidized, with a large share of supply costs shouldered by consumers creating price distortions¹⁶
Existing Policy B: (<u>Energy</u>) - Law 27191 on Renewable Energy (2015)	Key Issues: Sets national renewable energy targets and minimum requirements for large consumers and funds renewable energy projects. By 2025 at least 20% of total electricity consumed will come from renewable sources¹⁷ - Currently behind target. Barriers include lack of financial support and infrastructure - The recent economic crisis has increased capital costs and reliance on international funding and lag in job creation¹⁸
Existing Policy C: (<u>Energy</u>) - Law no. 27424: Creating the Promotion Regime for Distributed Generation of Renewable Energy Integrated in the Public Electricity Grid (2017)	Key Issues: Sets contractual conditions for renewable electric power generation and ensures free access to the national grid. Proposed the Fund for the Distributed Generation of Renewable Energies. - Lack of incentive for installing new technology because of low costs in energy consumption by current users¹⁹ - Heavily dependent on economic scenario, decrease in public sector investment is predicted²⁰
Existing Policy D: (<u>Transportation</u>) - Law 26.093 (2006) Regimen of Regulation and Promotion of the Production and Sustainable Use of Biofuels	Key Issues: Creates a special regime for 15 years establishing a 5% mandated percentage of bioethanol and 7% of biodiesel minimum in fossil gasoline and diesel. It defines domestic prices and quality standards for biofuels and grants fiscal benefits.²¹ Small economic losses may be incurred because a percentage of biofuels will be diverted from exports to domestic consumption (low returns)²²
Existing Policy E: (<u>Forestry</u>) - Joint resolution 1/2018 creating the Environmental and Insurance Sustainability Program (PROSAS)	Key Issues: Creates the reforestation initiative ForestAR 2030. It aims to promote investments in new forestry ventures²³ - Created to collect 1% insurance premium to fund the Green Insurance initiative. This expands opportunities to promote use of wood to replace non-renewable fuels and reduce the carbon footprint from vehicles benefits²⁴ - Increase forest plantations from 1.3 million hectares to 2 million hectares by 2030, which entails expanding forested areas by 62,000 hectares per year.²⁵

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COUNTRY FACT SHEET

ARGENTINA

SECTOR OVERVIEW

Since the 1990s, Argentina's GHG emissions have steadily increased each year, and is expected to increase faster until 2030, attributed to the growth in agriculture and energy sectors.^{32,33} The country is taking important steps in the agriculture, forestry and other land use sector (AFOLU) by establishing minimum budgets for the enrichment, restoration, conservation, harvesting and sustainable management of native forests.³⁴ Buildings and transportation account for a small portion of GHG emissions compared to AFOLU sector but Argentina has taken steps to modernize and increase efficiency of the rail public transport system including a transition towards electric road transport/e-buses.³⁵ Overall, Argentina is taking action to reduce energy consumption in different sectors, and has developed policies focused on diversification of the energy matrix (i.e., use of non-conventional renewable sources, hydroelectricity, nuclear power, and replacement of fossil fuels by biofuels), and promotion of energy efficiency.³⁶

POLICY OVERVIEW

Argentina's goal is to reduce its GHG emissions, specifically its Nationally Determined Contribution is a net emission of 483 (unconditional) million tCO₂eq by the year 2030; however, there are no quantifiable targets found in its laws and policies.³⁷ Argentina has been at the forefront of climate policy-making: ratified the UNFCCC in 1993 and the Kyoto Protocol in 2001, created an office for the Direction for Climate Change as well as subgroups of academic and industry experts, government organs and other actors to introduce and coordinate policies and actions relating to climate change, and produced educational materials and curricula for schools and public education campaigns on pollution and energy efficiency.³⁸ Nevertheless, political will and capacity to implement programs and policies are lacking due to the government's prioritizing economic recovery and growth given the country's financial crisis situation.³⁹ Investments are diverted to health, education and poverty reduction instead of funding mitigation and adaptation initiatives.⁴⁰ Furthermore, Argentina does not have sufficient and predictable public and private international financing, nor adequate support for transfer, innovation, technology development and capacity building.⁴¹ Infrastructure gaps also exist, particularly in the transportation and energy sectors, and there is lack of incentive for installing new technology for increased energy efficiency.⁴²

COUNTRY FACT SHEET

ARGENTINA

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COUNTRY FACT SHEET

AUSTRALIA

BY THE NUMBERS: CRITERIA

814.78
Total GHG Emissions
(million tonnes)

1.37
Annual Population
Growth (%)

2
Climate Action
Tracker Rank

0.939
Human Development
Index Score

=

12
Overall Rank



SECTORS & EMISSIONS



#1: Energy
(357.12 million
tonnes CO₂e)



#2: AFOLU
(325.45 million
tonnes CO₂e)



#3: Transport
(80.60 million tonnes
CO₂e)



#4: Industry
(29.03 million
tonnes CO₂e)



**#5: Residential &
Commercial**
(22.58 million
tonnes CO₂e)



COUNTRY DATA

Demographics: Population - 24,450,561 (2017)⁵; Literacy Rate - no data available.⁶

Economic Statistics: \$53,799 USD - GDP per capita (2017)⁷; Main Industries: agriculture, mining, industry, and services.⁸

Government / Political Stability: In October 2018, the Australian government turned its back on global climate action by dismissing the findings of the IPCC Special Report on Global Warming of 1.5° C and announcing it will no longer provide funds to the UNFCCC Green Climate Fund (GCF).⁹ The Deputy Prime Minister Michael McCormack suggested that Australia should continue to use its coal reserves and that it is important because it provides 60% of Australia's electricity, 50,000 jobs, and was Australia's largest export.¹⁰ The Prime Minister Scott Morrison claims that Australia will meet its Paris Agreement targets, however, this is contradicted by the environment department figures that show emissions continue to rise.¹¹ In the last year, the government also focused on further expanding the coal industry, abandoning all policy efforts to achieve emissions reductions in the energy and transport sectors.¹² The Australian government continues to emphasize the importance of coal for energy security, although the economics on-the-ground favor renewable energy.¹³

COUNTRY OVERVIEW

Australia has one of the highest overall shares in fossil fuels among the G20 countries, and the government continues to develop subsidies for coal power generation.¹⁸ The country is a leading exporter of coal, uranium, and natural gas, much of which is transported to Asia's growing markets.¹⁹ Australia is the only developed country in the world with a deforestation hotspot, with 40% of its forests gone and estimates that three to six million hectares of forest could be lost by 2030 in Eastern Australia.^{20,21} About 395,000 hectares of native vegetation were cleared there in 2015-16, 33% more compared with the previous year, and notifications of planned land clearing in Queensland have jumped a further 30%, suggesting woodlands could be bulldozed even faster in coming years.²² Climate change is projected to bring an increased frequency of droughts to Southern Australia, which will affect agricultural yields.²³

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COUNTRY FACT SHEET

AUSTRALIA

CLIMATE CHANGE POLICIES

Existing Policy A: <i>Emissions Reduction Fund (2014)</i>	Key Issues: GHG emissions reduction (over 400 projects contracted) across all sectors, clean air targets, allows landowners to earn carbon credits for changing land use or management practices to store carbon or reduce GHG's, and requires the largest emitters to measure, report, and manage their emissions. ¹⁵
Existing Policy B: <i>National Energy Guarantee (2017)</i>	Key Issues: Affordable electricity, emissions reductions, encourages renewables. ¹⁶
Policy Proposed by the Government: <i>Climate Solutions Fund (2019)</i> (additional funding for Emissions Reduction Fund)	Key Issues: Allocates an additional \$2 billion to contribute to Australia's 2030 emissions reduction target. ¹⁷

COUNTRY FACT SHEET

AUSTRALIA

SECTOR OVERVIEW

Australia's greatest emissions stem from the energy sector, which is primarily fossil fuel based; in 2015-16, 37% of the country's energy resources came from oil, followed by 32% coal, 25% gas, and 6% renewable.²⁴ Among the G20 countries, Australia has the second-highest emission intensity in the power sector and lacks concrete actions to phase out coal.²⁵ AFOLU is the second-highest emitting sector. Agriculture-related emissions are projected to increase by 8% above 2020 levels by 2030, with beef cattle projected to continue to be the biggest contributor, with an increase in grain-fed beef cattle and growth in exports.²⁶ Transportation is the third-largest emitting sector, with no government agreement on emission standards for light motor vehicles.²⁷

POLICY OVERVIEW

The *Emissions Reduction Fund* of 2014 is managed by the Department of Environment and Energy and the Clean Energy Regulator for a set of programs that aim to reduce emissions across all sectors. However, the policy does not invest significant emissions reductions efforts into the energy sector, which is critical to make any drastic changes.²⁸ Figure 2 shows Australia's domestic carbon offsets by sector. Although carbon offsets have doubled since the introduction of the Fund in 2014, there have been little to no carbon offsets used in the energy sector. Even if carbon offsets were to be used by the energy sector, carbon offsets alone are not enough to significantly reduce emissions given that by nature they do not result in tangible decreases in emissions. Therefore, the country needs a plan to phase-out fossil fuels and shift to renewable energy in order to make any progress in staying within the 1.5°C limit. The *National Energy Guarantee* of 2017 focuses on emissions reductions and providing more affordable energy to Australians, but the country still lacks policies that aim to transition to clean energy and away from fossil fuels, therefore there is a gap in the potential efficacy of this policy.²⁹

Australia's current policies fall far short of the emissions reductions required to meet the 2030 target put forward in its Nationally Determined Contribution (NDC).³⁰ Based on total greenhouse gas emissions per sector, the Australian government must focus on emissions reduction in the energy and AFOLU sectors, as each of these emits more than transportation, industry, and buildings combined. To do this, there must be an implementation of a coal phase-out plan and more stringent policies that favor renewable energy. However, the federal government intends to introduce several policies that will protect the coal industry and maintain the growth of coal-based generation, anticipated to be implemented beginning July 2019.³¹ Similarly, it is clear that more policies are needed in the AFOLU sector to meet emissions reductions targets and make any significant contribution.

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COUNTRY FACT SHEET

AUSTRALIA

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Authors: Julia Koppman Norton, Ashley Stein

COUNTRY FACT SHEET

BRAZIL

BY THE NUMBERS: CRITERIA	2,351.11 Total GHG Emissions (million tonnes)	0.89 Annual Population Growth (%)	2 Climate Action Tracker Rank	0.759 Human Development Index Score	=	7 Overall Rank
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SECTORS & EMISSIONS



#1: AFOLU
(1,837.09 million tonnes CO₂e)



#2: Energy
(244.04 million tonnes CO₂e)



#3: Transport
(169.80 million tonnes CO₂e)



#4: Industry
(55.96 million tonnes CO₂e)



#5: Residential & Commercial
(44.22 million tonnes CO₂e)



COUNTRY DATA

Demographics: Population - 209,288,278 (2017)³; 92.05% total adult literacy rate (2015)⁴

Economic Statistics: \$9,821 USD - GDP per capita (2017)⁵; main industries: agriculture, cattle, banking, hydroelectric, heavy industrial, service industry⁶

Government / Political Stability: Far-right Jair Bolsonaro won the 2018 presidential election, making it unlikely that Brazil will meet its existing climate goals or pass new climate-related policies.⁷ Specifically, Bolsonaro indicated a desire to open up the Amazon to mining and agriculture and eliminate penalties for illegal deforestation.⁸ Additionally, budgets for deforestation monitoring authorities have been cut, and the administration has expressed an intent to combine the Ministry of the Environment with the Agriculture Ministry, which is historically pro-deforestation.⁹

COUNTRY OVERVIEW

Brazil ranks 13th in terms of overall global emissions. Despite the fact that Brazil is the world's 2nd largest producer of hydropower and accounts for a large percentage of global biofuel production, it is also home to major offshore oil reserves, and emissions in most sectors are projected to increase through 2030.¹¹ Emission increases are projected for a number of reasons: policies that have been instituted, such as vehicle incentives, the drive for economic productivity through the country's main industries, which include high-emitting activities, and a political context in which environmental policies are discredited by the current administration. Prior to the most recent elections, Brazil passed numerous policies pertaining to energy, transportation, and forestry, perhaps due to projections that the country will continue to be particularly affected by the impacts of climate change.¹² In 2016, Brazil submitted a National Adaptation Plan to the UNFCCC.¹³

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COUNTRY FACT SHEET

BRAZIL

CLIMATE CHANGE POLICIES

<i>National Policy on Climate Change (2009)</i>	Key Issues: Emissions reductions, strengthening of GHG sinks, adaptation, preservation, conservation, and a recommended Brazilian Emissions Reduction Market (MBRE). However, the current administration is driving reversals in positive changes in the agriculture, forestry, and land use sectors.
<i>PROINFA - Alternative Electricity Sources Incentive Program (2002)</i>	Key Issues: Incentivizing wind, small hydroelectric, and biomass. Initial target was set for 2007; therefore, new incentives and targets should be developed.
<i>Management of Public Forests, Brazilian Forest Service & National Fund for Forest Development (2006)</i>	Key Issues: Protection, access, and use of forests in line with sustainable forest targets. Current administration is acting against sustainable forestry.
<i>National Policy on Farming-Livestock-Forest Integration (2013)</i>	Key Issues: Mitigating deforestation and promoting the best sustainable practices. Current administration is acting against sustainable forestry.
<i>National Biofuels Policy (2017)</i>	Key Issues: Biofuel certification, reducing GHG emissions in the fuel matrix, and trading decarbonization credits. Despite this, Brazil holds vast oil reserves, limiting the ability of the country to limit GHG emissions.

COUNTRY FACT SHEET

BRAZIL

SECTOR OVERVIEW

Agriculture, Forestry, and Land Use is the sector in Brazil with the largest quantity of GHG emissions by far. This sector's large emissions stem from both illegal and legal deforestation due to the need for open land for cattle ranching, soy production, and logging.¹⁴ Although forestry emissions dropped from 2005, and despite a target for net zero deforestation by 2015, emissions have begun increasing again, and the target has now changed to zero illegal deforestation in the Amazon by 2030.¹⁵

Emissions in the AFOLU sector is followed by energy, transportation, industry, and lastly the building sector. The AFOLU emissions are roughly three-times as large as the country's energy emissions. While Brazil is within the G20 countries with the highest percentage of new renewable energy, it also has active plans to expand the fossil fuel industry, does not have a plan for phasing-out coal, and passed a new subsidy for diesel consumption in 2018.¹⁶

POLICY OVERVIEW

In total, Brazil has 11 climate laws and 6 climate policies. The country's 1965 *Forest Code Law* requires landowners to leave a percentage of their land native, but in practice this has been difficult to monitor.¹⁷ Other key legislation includes the *PROINFA* law - *Alternative Electricity Sources Incentive Program* (2002), *Management of Public Forests, Brazilian Forest Service and National Fund for Forest Development* (2006), *National Policy on Climate Change* (2009), *National Policy on Farming-Livestock-Forest Integration* (2013), and the *National Biofuels Policy* (2017).

While a policy infrastructure is currently in place, the current political administration is driving reversals in emissions reductions, particularly within the AFOLU sector. This includes modifying emissions reductions goals, modifying policies pertaining to the legality of deforestation, and altering budgets needed to make a tangible impact. Efforts should focus on monitoring, enforcing, and implementing policies to limit emissions in the AFOLU sector.

Authors: Julia Koppman Norton, Ashley Stein

COUNTRY FACT SHEET

BRAZIL

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COUNTRY FACT SHEET

CANADA

BY THE NUMBERS: CRITERIA

971.16
Total GHG Emissions
(million tonnes)

1.06
Annual Population
Growth (%)

6
Climate Action
Tracker Rank

0.926
Human Development
Index Score

=

10
Overall Rank



SECTORS & EMISSIONS



#1: AFOLU
(338.02 million
tonnes CO₂e)



#2: Energy
(309.59 million
tonnes CO₂e)



#3: Transport
(174.90 million
tonnes CO₂e)



#4: Residential & Commercial
(90.04 million
tonnes CO₂e)



#5: Industry
(58.61 million
tonnes CO₂e)



COUNTRY DATA

Demographics: Population - 36,624,199 (2017)⁵; Adult total literacy rate - data not available.

Economic Statistics: \$45,032 USD - GDP per capita (2017)⁶; main industries: agriculture, industry (transportation equipment, chemicals, processed and unprocessed minerals, food products, wood and paper products, fish products, petroleum, natural gas), services (retail, business, education, health).⁷

Government / Political Stability: Under Prime Minister Justin Trudeau, the Canadian government has made progress regarding climate change. In 2018, Trudeau implemented the *Pan-Canadian Framework on Clean Growth and Climate Change*, which serves as a comprehensive strategy for emissions reductions. However, in the same year, Trudeau and the federal government approved the extension of the Trans Mountain pipeline to transport oil from Alberta's oil sands to export ports on the Pacific coast.⁸

COUNTRY OVERVIEW

Canada ranks 10th in terms of overall emissions. Due to a high share of hydroelectric and nuclear power, Canada has one of the least carbon-intensive power sectors globally, however, fossil fuels still dominate the country's total primary energy supply.⁹ The mandatory federal carbon pricing system is one of the measures outlined in Canada's *Pan-Canadian Framework on Clean Growth and Climate Change*.¹⁰ However, based on the implemented policies under this framework, Canada is likely to miss its Paris Agreement (NDC) target to reduce economy-wide GHG emissions by 30% below 2005 levels by 2030.¹¹ The recent repeal of the cap-and-trade system in Ontario, which is responsible for almost a quarter of Canada's GHG emissions, and the subsequent cancellation of the province's Electric and Hydrogen Vehicle Incentive Program are steps in the wrong direction.¹²

While full implementation of planned policies under the *Pan-Canadian Framework* would result in some improvement, Canada's current policies are still rated "Highly insufficient."¹³ Canada must significantly enhance both its NDC and its proposed level of climate action to get onto an emissions pathway compatible with the Paris Agreement.¹⁴ Emissions are projected to increase in light of opposition among several provinces to move forward with policies such as carbon pricing.

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COUNTRY FACT SHEET

CANADA

CLIMATE CHANGE POLICIES

Existing Policy A: <i>Pan-Canadian Framework on Clean Growth and Climate (2016)</i>	Key Issues: GHG emissions reduction, coal phase-out, low-carbon industrial activity, sustainable energy development, net-zero energy buildings, electric vehicles, carbon sinks, enhancing carbon storage in forests and agricultural land, reforestation, bioenergy and bioproducts, mitigation, adaptation, food security and sustainability, flood and drought protection, wetland restoration
Existing Policy B: <i>Transportation 2030</i>	Key Issues: Low-carbon transportation system, adaptation, reduce congestion, protect the environment, GHG regulations, electric vehicles/clean fuel, carbon pricing
Existing Policy C: <i>Forestry Act (1985)</i>	Key Issues: Timber regulations, permits
Existing Policy D: <i>National Parks Act (2000)</i>	Key Issues: Protection of natural areas and resources, conservation

COUNTRY FACT SHEET

CANADA

SECTOR OVERVIEW

The agriculture, forestry and land use sources are responsible for contributing the most greenhouse gas emissions, followed by energy, then transportation, buildings, and industry. Canada's forests cover more land area and store more carbon than the forests of almost any other country. Managed forests in Canada total approximately 226 million hectares or 65% of Canada's total forest area, which includes all forests under human influence, forests managed for harvesting, forests subject to fire or insect management, and protected forests, such as in national and provincial parks.¹⁵ In 2015, despite the establishment of a performance standard for new coal-fired power plants limiting emissions intensity to 420 tCO₂/GWh, there was no significant reduction in emissions in the power sector.¹⁶

POLICY OVERVIEW

The Cap and Trade Cancellation Act of Ontario repealed the Climate Change Mitigation and Low-Carbon Economy Act of 2016, canceling cap and trade instruments, which are an essential environmental and economic tool.¹⁷ Ontario is responsible for almost ¼ of Canada's GHG emissions, which suggests this was a step in the opposite direction of what Canada needs in terms of climate policy.¹⁸ Canada's Kyoto Protocol target for the first commitment period 2008–2012 was a reduction of 6% below 1990 levels, however, in December 2011, Canada withdrew from the Kyoto Protocol.¹⁹

The *Pan-Canadian Framework on Clean Growth and Climate Change* contains a set of programs and policies to further reduce emissions across the economy and also suggests measures to build climate resilience, accelerate innovation, and support clean technology in power, transport, and building sectors. Based on the policies from the Framework implemented as of September 2017, the Climate Action Tracker estimates that Canada's GHG emissions (excluding (land use, land-use change and forestry)) will increase to 15–19% above 1990 levels by 2020.²⁰ Forests, wetlands, and agricultural lands across Canada will play an important natural role in a low-carbon economy by absorbing and storing carbon.²¹ Actions taken by jurisdictions and woodlot owners to accelerate reforestation, to continuously improve sustainable management practices, and to plant new forests where they do not currently exist will enhance stored carbon.²² The Pan-Canadian Framework is a helpful guide for outlining the programs required to achieve significant emissions reductions, but real policies in specifically the energy and AFOLU sectors must be improved and enforced.

COUNTRY FACT SHEET

CANADA

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COUNTRY FACT SHEET

CHINA

BY THE NUMBERS: CRITERIA	10,233.35 Total GHG Emissions (million tonnes)	0.44 Annual Population Growth (%)	6 Climate Action Tracker Rank	0.752 Human Development Index Score	=	1 Overall Rank
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SECTORS & EMISSIONS



#1: Energy
(7,492.56 million tonnes CO₂e)



#2: Industry
(1,234.59 million tonnes CO₂e)



#3: Residential & Commercial
(671.11 million tonnes CO₂e)



#4: Transport
(520.60 million tonnes CO₂e)



#5: AFOLU
(314.51 million tonnes CO₂e)



COUNTRY DATA

Population (2017): 1,386,400,000⁷

Population density (2017): 147.7 people/sq km⁸

Literacy rate (2015): 96.36% (men: 98.16%; women: 94.47%)⁹

Poverty incidence (2016): 4.5%¹⁰

GDP per capita (2017): \$8,826.99 USD¹¹

Main industries: Manufacturing (46.8% of GDP), mining (largest coal producer in the world), energy, agriculture¹²

Government / political instability (2017, The World Bank):

- **Government Effectiveness Index** (-2.5 weak; 2.5 strong): 0.42
- **Political Stability Index** (-2.5 weak; 2.5 strong): -0.25

COUNTRY OVERVIEW

In 2017, China accounted for 27% of the world's greenhouse gas emissions (9,839 MtCO₂), which is more than the US and EU emissions combined. The Climate Action Tracker rated China's climate policies as "highly insufficient" due to its increase in coal consumption and CO₂ emissions in 2017. China's emissions are expected to rise. The country has put in place several policies to attempt to address this. The Five-Year Plan (2016-2020) lays out promising plans and targets to address climate goals, but recent government actions to reduce subsidies for solar projects and lift the two-year ban on new coal-fired power plant construction indicate a lack of commitment by the government to follow through on the Plan.

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COUNTRY FACT SHEET

CHINA

CLIMATE CHANGE POLICIES

Existing Policy A: <i>13th Five-Year Plan (2016-2020)</i> (<i>Mitigation Framework</i>)	Key Issues: Underdeveloped systems for implementation and enforcement, lack of resources for monitoring compliance, biases in reporting, exclusion of other pollutants, inconsistent policies (i.e., synthetic natural gas (SNG), and overseas coal-fired power plants
Existing Policy B: <i>Energy Conservation Law</i> (2007)	Key Issues: Weak enforcement, unreliable monitoring and reporting systems, inconsistent policies (i.e., reduced subsidies for solar projects)
Existing Policy C: <i>Law on the Prevention and Control of Atmospheric Pollution</i>	Key Issues: Insufficient policies addressing non-CO ₂ GHG emissions

COUNTRY FACT SHEET

CHINA

SECTOR OVERVIEW

In 2014, more than half of China's GHG emissions came from the energy sector. Industries (mainly manufacturing) generate about a third of the country's emissions. China's energy is consistently fossil fuel-based, with coal as the leading source. Recently, synthetic natural gas (SNG) - which is coal converted to gas - became an alternative to directly producing energy from coal burning. SNG is being piped into households for heating and cooking, and aims to reduce air pollution.

POLICY OVERVIEW

The Center on Global Energy Policy at Columbia University noted that the Chinese government is taking significant steps to address climate change. The Five Year plan outlines key actions to increase energy efficiency and shift to low-carbon alternatives. So far these efforts have been successful in decoupling economic growth and CO₂ emissions.¹⁵ In 2017, the Chinese government launched a nationwide carbon pricing and emissions trading program for the power sector, and is working to extend this to other sectors. China also adopted other policies to reduce emissions of heat-trapping gases, including policies to improve energy efficiency.¹⁶

China's goal is to reach peak CO₂ emissions by 2030. This is an ambitious timeframe that is beyond goals set by other governments. While some forecasts indicate potential to reach this goal even earlier than 2030, achievement of targets depends largely on continued implementation of existing policies. The government has not yet fully developed systems for implementation and enforcement. Localization is needed to translate national policies to concrete actions at the city or municipal level. Monitoring compliance with environmental regulations is a challenge due to lack of resources. Biases in reporting may exist since statistical systems are still developing, creating uncertainty regarding the reliability of reports and projections on CO₂ emissions.¹⁷

COUNTRY FACT SHEET

CHINA

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COUNTRY FACT SHEET

EUROPEAN UNION

BY THE NUMBERS: CRITERIA

444.61
Total GHG Emissions
(million tonnes)

0.28
Annual Population
Growth (%)

2
Climate Action
Tracker Rank

0.884
Human Development
Index Score

=

5
Overall Rank



SECTORS & EMISSIONS



#1: Energy
(2,180.84 million
tonnes CO₂e)



#2: Transport
(944.90 million
tonnes CO₂e)



**#3: Residential &
Commercial**
(742.21 million
tonnes CO₂e)



#4: Industry
(424.23 million
tonnes CO₂e)



#5: AFOLU
(150.43 million
tonnes CO₂e)



COUNTRY DATA

Demographics

- **Population:** 512.6710 million (2018)⁶
- **Literacy rate:** 99% adult literacy rate (2010)⁷

Economic Statistics

- **GDP per capita:** 33,723.3 USD⁸

COUNTRY OVERVIEW

With 28 member states, the European Union is the second largest economy in the world in terms of purchasing power parity (after China) and in nominal terms (after the United States).¹¹ The EU is a wealthy region and as such most of the countries in the union are considered to have very high human development.¹²

As a whole, the EU accounts for approximately 8% of global GHG emissions. However, as a diverse region, there are wide differences between the 28 EU countries, not only in terms of levels of emissions, but also in terms of efforts to reduce GHG emissions. The EU's work on combating climate change is evaluated in the Climate Change Performance Index, where the supranational entity is ranked under high performing countries at 16th place out of 57 countries in the 2019 report.¹³

Author: Eva Iveroth

COUNTRY FACT SHEET

EUROPEAN UNION

CLIMATE CHANGE POLICIES

<i>Paris Climate Agreement</i>	Goal: At least 40% below 1990 CO ₂ levels by 2030 (unconditional)
<i>Copenhagen Accords</i>	Goal: 20-30% below 1990 CO ₂ levels by 2020 and to source 10% of electricity from renewables by 2023 Conditions: Developed countries commit to comparable efforts and developing countries contribute according to capabilities
<i>Long-term goals</i>	Goal: 80-95% below 1990 CO ₂ levels by 2050
<i>The EU Emissions Trading System (EU ETS)</i>	Goal: To reduce EU ETS emissions by 43% compared to 2005. To be used as a cost-effective tool combating emissions within the EU

COUNTRY FACT SHEET

EUROPEAN UNION

SECTOR OVERVIEW

The main GHG emitting sector in EU is the energy sector. The combustion of fuels in particular (excluding transport), account for as much as 54% of union's total GHG emissions. The second most important sector is fuel combustion for transport (including international aviation), responsible for 24% of the overall GHG emissions.¹⁴

According to Climate Transparency, the EU's sectoral policies are still not compatible with the Paris Agreement goals, especially when it comes to the energy sector. Although the EU's energy use per capita decreased by 4% between 2012 and 2017, its energy use still remains 30% above G20 average.¹⁵ CCPI rates the EU's energy use performance as "medium" both for Renewable Energy and Energy Use.¹⁶

POLICY OVERVIEW

The EU ratified the Paris Agreement, with an original Nationally Determined Contribution (NDC) of a 40% reduction in GHG by 2030 (compared to 1990 levels). However, in February 2019 EU decided to raise its minimum 2030 targets for renewable energy deployment and energy efficiency from 30% to 32% and 32.5%, respectively. This means that the EU will be aiming to reduce its GHG emissions by 45% in 2030 (compared to 1990 levels). Furthermore, the EU recently adopted a long-term strategy with a goal of climate neutrality by 2050. Even though the EU's NDC is still inconsistent with the Paris Agreement's temperature limit of 1.5°C, its change in goals is seen as important, not only for progress within member states, but also for the Union's role in international climate diplomacy. After the US indicating its intent to withdrawal from the Paris Agreement, experts believe the EU has the resources and capacity required to take a proactive role and lead the world in improved GHG targets.¹⁷

Another important policy is the EU Emissions Trading System (EU ETS) which is a 'cap-and-trade' system that is intended to give companies the flexibility to cut their emissions in the most cost-effective way. 28 EU member states plus Iceland, Liechtenstein and Norway are part of the EU ETS, which covers 11,000 power stations and manufacturing plants as well as aviation activities. In total, around 45% of total EU GHG emissions are regulated by the EU ETS.¹⁸ Even though the EU Emissions Trading Scheme is the largest carbon market in operation, it has until recently been accused of being significantly insufficient due to its low carbon prices.¹⁹ However, due to a recent reform of the EU ETS (adopted in February 2018), according to experts the decrease of the EU ETS emissions cap from 1.74% to 2.2% after 2020 provides reason to believe that the trading system will become more efficient.²⁰

As a supranational entity built on interstate cooperation and relatively ambitious abatement goals, the EU is an actor who could make a significant change on the global climate policy arena, showing that agreements between nation states can be both feasible and effective. Exporting the "EU climate model" could become relevant particularly if the EU ETS becomes an efficient tool in reducing the region's emissions.

COUNTRY FACT SHEET

EUROPEAN UNION

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COUNTRY FACT SHEET

INDIA

BY THE NUMBERS: CRITERIA

2,398.78
Total GHG Emissions
(million tonnes)

1.26
Annual Population
Growth (%)

1
Climate Action
Tracker Rank

0.840
Human Development
Index Score

=

3
Overall Rank



SECTORS & EMISSIONS



#1: Energy
(1,379.79 million
tonnes CO₂e)



#2: AFOLU
(498.55 million
tonnes CO₂e)



**#3: Residential &
Commercial**
(223.67 million
tonnes CO₂e)



#4: Transport
(151.90 million
tonnes CO₂e)



#5: Industry
(144.86 million
tonnes CO₂e)



COUNTRY DATA

Population (2017): 1,339,180,000⁷

Population density (2017): 450.42 people/sq km⁸

Literacy rate (2015): 71.96% (men: 80.94%; women: 62.98%)⁹

Poverty incidence: 21.9%¹⁰

GDP per capita (2017, in US\$): 1,942.10¹¹

Main industries: Services sector (62.6% of GDP); agriculture (17% of GDP); industry (18% of GDP) including textiles (the largest industry in terms of employment), chemicals, food processing, steel, transportation equipment, cement, mining, petroleum, machinery, software and pharmaceuticals.¹²

Government/Political Stability (2017, The World Bank):

- **Government Effectiveness Index** (-2.5 weak; 2.5 strong): 0.09
- **Political Stability Index** (-2.5 weak; 2.5 strong): -0.83

COUNTRY OVERVIEW

In 2017, India generated 2,467 MtCO₂, and ranked third in the Global Emissions Rank. The Climate Action Tracker rated India's implemented climate policies as "2°C compatible". The country is on track to meet part of its NDC goals, and reach 40% non-fossil fuel based power capacity by 2030. It could even have 1.5°C compatibility if it cancels plans to build new coal-fired power plants. In 2017, renewable energy investment was significant, and exceeded fossil-fuel based power investments. Solar power costs decreased by half in 2 years.

Authors: Elaine Angeles, Emma Gosliner, Neha Walani

COUNTRY FACT SHEET

INDIA

CLIMATE CHANGE POLICIES

Existing Policy A (<u>Energy</u>): <i>The Finance Bill 2010-11 and the Clean Energy Cess Rules, 2010</i>	Key Issues: Invest in entrepreneurial ventures and research in the field of clean energy technologies
Existing Policy B: (<u>Cross sectoral</u>) - <i>Three Year Action Agenda 2017-18 to 2019-2020</i>	Key Issues: de-carbonization, productivity and efficiency increases in the economy and renewable energy production, energy efficiency, cost-effective technologies for production, emphasizing energy security and energy efficiency, sustainable growth. Specific goals include: ➤ 100 GW Renewable energy capacity by 2019-20, 175 GW by 2022 ➤ Off-grid solar energy capacity of 20 GW by 2019-20, 40 GW by 2022 Implementation of Renewable Purchase Obligations (RPOs) by 2019-2020
Existing Policy C (<u>Transport</u>): <i>The Auto Fuel Vision and Policy 2025 (2014)</i>	Key Issues: roadmap for auto fuel quality up to the year 2025, promoting greater fuel economy, lower greenhouse gas emissions and limiting human health impacts by targeting toxic tailpipe emissions
Existing Policy D (<u>Buildings</u>): <i>Energy Conservation Building Code (ECBC) (2016)</i>	Key Issues: minimum energy standard for buildings having a connected load of 100kW or contract demand of 120 KVA
Existing Policy E (<u>Industry</u>): <i>Perform, Achieve, Trade (PAT) Scheme (2012)</i>	Key Issues: market-based trading scheme that aims to improve energy efficiency in industries by trading in energy efficiency certificates in the country's most energy-intensive sectors

COUNTRY FACT SHEET

INDIA

SECTOR OVERVIEW

More than half of India's GHG emissions come from the energy sector (52.25%). Industries (mainly manufacturing) generate 26.4% of the country's emissions, transportation sector generates 11.5%, and buildings and other sectors generate about 8.5% of emissions.

India's final National Electricity Plan included more than 90 GW of coal-fired capacity. Policy signals around electric vehicles are mixed, but the energy sector has more positive potential with the Perform, Achieve and Trade (PAT) scheme for energy efficiency that resulted in savings of 5.6 GW and 31 MtCO₂ between 2012 and 2015. India is also planning to pilot a carbon market mechanism for MSMEs and waste sector in early 2019.

POLICY OVERVIEW

India's CO₂ emissions almost tripled in the last two decades. Energy sector constantly generated the largest amount of emissions through the years, and caused the dramatic increase of total emissions. There is a strong push back against shift to renewable energy sources, and many coal plants continue to operate. The Ministry of Power has been actively pushing back against implementation of emission standards for thermal power plants for years before being pulled up by the Supreme Court. In 2015, over 300 coal thermal power plants continued to violate emission standards set by the Ministry of Environment, Forests and Climate Change (MOEF&CC).¹⁴ However, the scenario for solar is growing at a steady rate and breakthrough innovations are happening.

Under the Foreign Contribution Regulation Act (FCRA), the government cancelled licenses of nearly 15,000 charities, resulting in weakened legal institutions and climate action organizations.¹⁵ Industrial, transportation and building development projects that cause environmental degradation are also being given green signal because of heavy industry lobbying. The conduct of the National Green Tribunal (NGT) is another troubling aspect in environmental protection, which has allowed opening of several factories despite evidence of environmental pollution.¹⁶

India is developing at a fast rate and lacks effective measures for prevention of deforestation being done for economic development purposes. In fact, The Project Monitoring Group is working with the Ministry of Environment, Forests and Climate Change (MoEF&CC) to expedite approvals particularly forest approvals and clearing implementation bottlenecks for projects with an anticipated investment of INR 10 billion. Several of these projects involve coal. Mumbai Metro Rail Corporation has gone ahead and cut down many trees. Another example of disregard towards forests is that despite an old Supreme Court order to define Aarey, a green region in Mumbai, as forest, it was not done. Between 1969, when Aarey consisted of 2,076 hectares and was transferred to the State Forest Department, and today, where it has 1,280. In addition, some policies run counter to the goal of reducing GHG emissions. While there is a clear commitment to move away from coal domestically, China has also invested heavily in overseas coal-fired power plants. In 30 years, with continued operation, these coal-fired power plants would have generated about half of 2017 global emissions.¹⁸

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COUNTRY FACT SHEET

INDIA

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COUNTRY FACT SHEET

INDONESIA

BY THE NUMBERS: CRITERIA	2,364.33 Total GHG Emissions (million tonnes)	1.18 Annual Population Growth (%)	6 Climate Action Tracker Rank	0.694 Human Development Index Score	=	4 Overall Rank
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COUNTRY DATA

Population (2017): 263,990,000⁷

Population density (2017): 145.73 people/sq km⁸

Literacy rate (2016): 95.38% (men: 97.17%; women: 93.59%)⁹

Poverty incidence (2016): 10.6%¹⁰

GDP per capita (2017): \$3846.86 USD¹¹

Main industries: Industry (47.1% of GDP) including petroleum and natural gas, textiles (1.2% of GDP), apparel, footwear, mining, cement, chemical fertilizers, plywood, rubber, food and tourism (3% of GDP); agriculture (14.4% of GDP).¹²

Government/Political Stability:

- **Government Effectiveness Index** (2017; -2.5 weak; 2.5 strong): 0.04
- **Political Stability Index** (2017; -2.5 weak; 2.5 strong): -0.51

COUNTRY OVERVIEW

In 2017, Indonesia generated 487 MtCO₂, and ranked 12th in the Global Emissions Rank. The Climate Action Tracker rated Indonesia's climate policies as "highly insufficient" because its emissions rate increased dramatically, and its traditional energy policies are still coal-dominated. Indonesia's updated energy plan adds 27 GW of coal-fired power, and only 15 GW of renewables in the next ten years.

SECTORS & EMISSIONS



#1: AFOLU

(1,844.17 million tonnes CO₂e)



#2: Energy

(365.19 million tonnes CO₂e)



#3: Transport

(89.70 million tonnes CO₂e)



#4: Residential & Commercial

(34.84 million tonnes CO₂e)



#5: Industry

(30.45 million tonnes CO₂e)



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COUNTRY FACT SHEET

INDONESIA

CLIMATE CHANGE POLICIES

Existing Policy A: (<u>Cross sectoral</u>) - <i>Presidential Decree 61/2011, National Action Plan to reduce GHG emissions (RAN-GRK)</i>	Key Issues: Addressed by the policy- Emission reduction covering 70 programmes in Forestry, Agriculture, Energy and Transportation, Industry and Waste Management sectors.
Existing Policy B: <i>PROINFA (AFOLU)</i> - <i>Reducing Emissions from Deforestation and Forest Degradations (REDD+) Scheme</i>	Key Issues: Addressed by the policy- Zero burning policy, moratorium on forest and peatland conversion
Existing Policy C: (<u>Energy</u>) – <i>Law Regarding Energy (2007)</i>	Key Issues: Addressed by the policy- Environmental preservation, energy resilience, renewable energy development, energy efficiency, improving the quality of storage and transmission, and provision of energy for under-developed, remote and rural areas
Existing Policy D: (<u>Transport</u>) - <i>Transport Ministerial Regulation No. 201/2013</i>	Key Issues: Fuel substitution from oil to gas, car-free days on weekends, transit-oriented development (TOD) planning, and encouragement of the use of non-motorized vehicles, road pricing and parking management
Existing Policy D: (<u>Buildings</u>) - <i>Mandatory Energy Conservation of Government Office Buildings (No. 10/2005)</i>	Key Issues: Government buildings to implement best-practice energy saving measures

COUNTRY FACT SHEET

INDONESIA

SECTOR OVERVIEW

A large percentage of Indonesia's carbon dioxide emissions are generated by the AFOLU (Agriculture, Forestry and Other Land Use) sector (76.08%), followed by energy (15.07%) and the transportation sector (3.7%). Industry generates 1.26% of emissions, and buildings 1.4%.

Indonesia is the biggest land, land-use change and forestry (LULUCF) emitter in the world. Forestry-related emissions have increased and are projected to increase even though the government has been working on improving its forest and peatland governance and management since 2005.

Indonesia has ambitious goals, but 60% of its committed emissions reduction target are intended to come from the forestry sector. This means other sectors are not required to abate as much.

POLICY OVERVIEW

As mentioned above, Indonesia has developed several policies addressing climate change, yet these efforts lack strong implementation and enforcement.¹⁸ The government has set renewable energy generation targets of at least 23% by 2025, and 31% by 2050, but coal remains a dominant energy source.

The *Reducing Emissions from Deforestation and Forest Degradations (REDD+)* program started in Indonesia in 2009 was a significant step towards reducing carbon emissions, since more than half of emissions come from the AFOLU sector. A moratorium was released banning new forest logging projects, but this had loopholes. Existing concessions, mining, electricity and agricultural development projects were exempted from the moratorium.¹⁹

In 2015, the new government announced a plan that includes energy sector reform, climate policy, and environmental management, but there continues to be a strong focus on oil and coal. Changes in government structure resulted in the dismantling of the National Climate Change Council (NCCC), and closing of the REDD+ agency. Both initiatives were subsumed under the Climate Change Oversight Directorate-General within a new department, which means a lack of independence or influence to fulfill the initially-set mandates and targets.

Despite its global climate positioning and targets, Indonesia has been unable to develop and enforce effective climate policies. It lacks the political will to reform its systems towards a lower-carbon economy.

GHG emissions from almost all sectors have increased in recent years (land use, land use change and forestry increased from 51% in 2000 to 65.5% in 2013, and is projected to exceed 50% by 2027).¹⁷ While some policies encourage less coal use, enforcement is weak, coal remains the main source of energy in Indonesia, and moreover coal is predicted to grow from 24% in 2014 to 60% in 2019. Furthermore, the government is simultaneously encouraging increased exploration and exploitation of fossil fuel resources. Economic growth drivers in Indonesia are land and energy-intensive. Palm oil production is expected to increase to 42 million tons (twice that of the 2012 level) by 2020 (Indonesian Palm Oil Producers Association (GAPKI) announced this plan in September 2017). Further, Indonesia's moratorium only includes primary natural forests and peatlands, rather than limiting harvesting of secondary forests which account for more than a half of Indonesia's forest area (potential failure to protect a total forest area of 46.7 million hectares with high carbon stock and biodiversity). Mitigation efforts do not consider social dimensions. For example, REDD+ creates disputes particularly among poor indigenous and forest-dependent communities.¹⁷

Authors: Elaine Angeles, Emma Gosliner, Neha Walani

COUNTRY FACT SHEET

INDONESIA

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COUNTRY FACT SHEET

IRAN

BY THE NUMBERS: CRITERIA

501.40
Total GHG Emissions
(million tonnes)

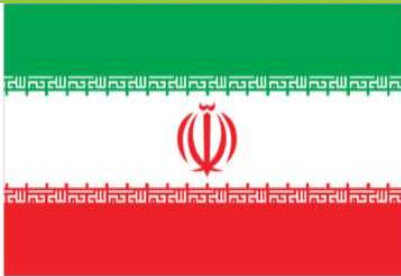
1.04
Annual Population
Growth (%)

13
Climate Action
Tracker Rank

0.798
Human Development
Index Score

=

16
Overall Rank



SECTORS & EMISSIONS



#1: Energy
(287.24 million
tonnes CO₂e)



**#2: Residential &
Commercial**
(136.98 million
tonnes CO₂e)



#3: Industry
(42.25 million tonnes
CO₂e)



#4: AFOLU
(32.63 million
tonnes CO₂e)



#5: Transport
(2.3 million tonnes
CO₂e)



COUNTRY DATA

Demographics:⁴

- **Population:** 83,024,745
- **Literacy rate:** 85.5%
- **Life expectancy at birth:** 74.2 years

Economic Statistics:⁵

- **GDP:** \$1.64 trillion PPP
- **GDP per capita:** \$20,100
- **Main industries:** petroleum, petrochemicals, gas, fertilizer, caustic soda, textiles, cement and other construction materials, food processing (particularly sugar refining and vegetable oil production), ferrous and nonferrous metal fabrication, armaments

Government:⁶ (Climate policy and governance)

- Chief of state is the Supreme Leader; lifetime position
- President (head of government) is democratically elected every 4 years.
- Unicameral legislature
- Party to UNFCCC, Paris Accord, and other international agreements.

GOVERNMENT OVERVIEW

Iran is a theocratic democracy. Elections determine the President and the legislature, but the Supreme Leader and other powerful positions are unelected. Iran has been subject to stiff international sanctions, although many sanctions related to nuclear development were lifted in 2016 following the Joint Comprehensive Plan of Action, a multi-national agreement to prevent Iran from possessing enriched uranium.

Author: Anna Liebowitz

COUNTRY FACT SHEET

IRAN

CLIMATE CHANGE POLICIES

Paris Climate Accord Nationally Determined Contribution	Iran commits to reducing GHGs by 4% compared to business as usual level by 2030. Conditional on international cooperation, could reduce by a further 8%.⁸
Existing Policy National Strategic Plan (2017)	Multi-sectoral, national plan to reduce GHG emissions over 15 years, in accordance with NDC, focusing on efficiency improvements in the energy sector, public transit, and increasing share of low- and no-carbon energy production.^{9,10}
Proposed Policy Energy policy	Over 90% of Iran's GHG emissions come from energy production; however, sanctions and other restrictions may make it difficult for Iran to rapidly improve in this area.¹¹

COUNTRY FACT SHEET

IRAN

CLIMATE OVERVIEW

Iran is party to numerous international agreements, including the UN Framework Convention on Climate Change and the Paris Agreement.¹² Iran's average temperature has risen 1.8. However, its major industry is petroleum. 90% of its internal emissions come from the power sector, and it is a major oil exporter as well.

SECTOR OVERVIEW

Iran is a major oil and gas exporter. Its economy is suffering in part from renewed US sanctions, leading to high inflation and political unrest.¹³

POLICY OVERVIEW

Iran has a National Strategic Plan to reduce its greenhouse gas emissions across numerous sectors by 2030. The plan focuses on emission reductions through energy efficiency measures (especially in the power sector), improvements and expansion to rail and subway systems, increasing low- and no-carbon energy production (including biogas, nuclear, and natural gas), and market mechanisms to support these changes.¹⁴

Despite Iran's enormous oil and gas reserves, there is high interest and potential for renewable energy development within the country. Iran's government has signalled willingness to work with foreign investors to build wind and solar plants. In 2016, the Iranian Power Generation, Transmission, Distribution and Management Company (Tanavir) predicted that 10% of Iranian electricity production would come from renewables within 5 years, up from under 2% at the time.¹⁵ It is rapidly expanding solar photovoltaic and other renewable energy installations.¹⁶

Despite significant government interest in reducing dependence on fossil fuels, lack of political freedom may complicate efforts to push for change. Currently, a set of five environmentalists are on death row in Iran, accused of espionage for using camera traps to track the rare Asiatic cheetah.¹⁷

COUNTRY FACT SHEET

IRAN

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COUNTRY FACT SHEET

JAPAN

BY THE NUMBERS: CRITERIA	1,175.57 Total GHG Emissions (million tonnes)	-0.14 Annual Population Growth (%)	6 Climate Action Tracker Rank	0.909 Human Development Index Score	=	9 Overall Rank
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SECTORS & EMISSIONS



#1: Energy
(770.84 million tonnes CO₂e)



#2: Transport
(218.50 million tonnes CO₂e)



#3: Residential & Commercial
(163.07 million tonnes CO₂e)



#4: Industry
(142.33 million tonnes CO₂e)



#5: AFOLU
(-119.18 million tonnes CO₂e)



COUNTRY DATA

Population (2017): 126,790,000⁷

Population density (2017): 347.78 people/sq km⁸

Literacy rate (2014): 99%⁹

Poverty incidence (2016): 15.7%¹⁰

GDP per capita (2017, in US\$): 38,428.1¹¹

Main industries: Industry (27.5% of GDP) including motor vehicles, electronic equipment, machine tools, steel and nonferrous metals, ships, chemicals, textiles, and processed foods; services (71.4% of GDP) including banking, insurance, retailing, transportation and telecommunications; agriculture (1.2% of GDP)¹²

Government/Political Stability:

- **Government Effectiveness Index** (2017; -2.5 weak; 2.5 strong): 1.62
- **Political Stability Index** (2017; -2.5 weak; 2.5 strong): 1.12¹³

COUNTRY OVERVIEW

In 2017, Japan accounted for 1,205 MtCO₂ greenhouse gas emissions, and ranked fifth in the Global Emissions Rank. The Climate Action Tracker rated Japan's climate policies as "highly insufficient" due mainly to Japan's coal plant construction plans, which could add another 18 GW of coal power, and plan to continue to supply one-third of Japan's electricity through 2030.

Japan's total population in 2017 was 126.79 million, with a negative annual projected growth rate of -0.14%. Poverty incidence is 15.7%, and GDP per capita is \$38,400. The country has a very high literacy rate of 99%. Japan's economy thrives on industry, including motor vehicles, electronic equipment, machine tools, steel and nonferrous metals, ships, chemicals, textiles, and processed foods (27.5% of GDP), services, including banking, insurance, retailing, transportation and telecommunications, and agriculture (1.2% of GDP).

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COUNTRY FACT SHEET

JAPAN

CLIMATE CHANGE POLICIES

Existing Policy A: <i>Climate Change Adaptation Act (2018)</i> ¹³	Key Issues: Unambitious goal to curb CO ₂ emissions, ¹⁴ plans and actions of the government run counter to and demonstrate a lack of priority for climate change relative to other issues (i.e., stagnating economy and a declining population) ¹⁵
Existing Policy B: <i>Act on Promoting Generation of Electricity from Renewable Energy Sources Harmonized with Sound Development of Agriculture, Forestry and Fisheries (2015)</i>	Key Issues: Limited supply of natural resources for generating renewable energy, ¹⁶ actions and plans are inconsistent with policy (i.e., dependence on imported fossil fuels, increase in use of coal). ¹⁷ Weak implementation of policies not supported by strong plans and programs to reach GHG emissions reduction target. ¹⁸
Existing Policy C: <i>Act on the Improvement of Energy Consumption Performance of Buildings (2015)</i>	Key Issues: Ineffective policy that is slow to reduce infrastructure emissions ¹⁹ and lacks a provision for retrofitting existing buildings. ²⁰

COUNTRY FACT SHEET

JAPAN

SECTOR OVERVIEW

In 2014, more than half of Japan's GHG emissions came from the energy sector (53.1%). Industries and transportation generated 19.2% and 17.5% of the country's emissions, respectively. Buildings generated 10% of emissions, and only 0.2% came from other sources.

National campaigns including "Cool Choice", "Cool Biz", and "Warm Biz" encourage consumers to either use less energy or buy energy efficient products, which helped to slightly reduce energy consumption in the last five years. In Tokyo, emissions have fallen even as population increased. Measures to reduce energy consumption in the transportation and building infrastructure sectors were established by the government, including removing unnecessary lights and reducing air conditioning in train cars. In buildings, government policies resulted in turning off heated toilet seats, installing more efficient heating systems, removing unnecessary lights, and using LED light bulbs in Tokyo's public buildings.

Many large corporations in Japan are also looking towards a low-carbon future. Sixty four companies have set emissions reduction targets in line with the Paris Agreement, and 11 have committed to source 100% renewable energy.

POLICY OVERVIEW

Japan demonstrates a commitment to contributing to global climate change goals, and was at the forefront of climate action with the creation of the Kyoto Protocol in 1997. However, its current climate target to reduce emissions by 26% by 2030 is not sufficient nor ambitious.²¹ On the contrary, Japan is falling short of its GHG emissions reduction target for 2030 (25%) with only 1.6% lower than baseline levels as of 2016. Japan is still heavily dependent on fossil fuels (coal and natural gas). Fossil fuels will make up more than half (56%) of Japan's energy mix through 2030. In addition to one hundred coal-fired power plants that are currently operating, the government plans to build approximately 40 new plants and finance coal plants abroad.

Japan has put several climate-focused policies in place, but needs to follow through by ensuring that all emissions sectors are on-board. The measures Japan has instituted have been slow to induce emissions reductions. The disaster caused by the Fukushima incident has made the government less enthusiastic about nuclear power sources, but this has not resulted in a radical change to increase the share of other renewables in the energy mix.

COUNTRY FACT SHEET

JAPAN

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COUNTRY FACT SHEET

MEXICO

BY THE NUMBERS: CRITERIA

638.93
Total GHG Emissions
(million tonnes)

1.35
Annual Population
Growth (%)

2
Climate Action
Tracker Rank

0.774
Human Development
Index Score

=

11
Overall Rank



SECTORS & EMISSIONS



#1: Energy
(294.53 million
tonnes CO₂e)



#2: Transport
(145.30 million
tonnes CO₂e)



#3: AFOLU
(106.65 million
tonnes CO₂e)



#4: Industry
(57.59 million
tonnes CO₂e)



**#5: Residential &
Commercial**
(34.86 million
tonnes CO₂e)



COUNTRY DATA

Demographics: 129,163,276 (2017);³ 94.86% total adult literacy rate (2016)⁴

Economic Statistics: \$8,910 USD - GDP per capita (2017);⁵ main industries: agriculture, automotive, electronics, oil⁶

Government/Political Stability: Mexico is a federative government, with leftist President Andres Manuel Lopez Obrador elected to office in July 2018.⁷ In the last two decades, democratization and the regulatory environment have improved, with generally well-trained and highly qualified policymakers. Despite this, Mexico still has structural distributional issues including striking income disparity and inequality.⁸

COUNTRY OVERVIEW

Mexico was the first developing country and one of the first in the world to pass a general climate change law.¹⁵ It ranks 11th in terms of overall global GHG emissions, with national policies solely focusing on energy and forestry. Mexico has a decreasing trend of CO₂ emissions per capita and has made strides to expand the scope of its environmental policies. However, there is no movement to phase-out coal, and despite a plan to increase the use of nuclear power, there is no allocated schedule or funding.¹⁶

Authors: Julia Koppman Norton, Ashley Stein

COUNTRY FACT SHEET

MEXICO

CLIMATE CHANGE POLICIES

Existing Policy A: <i>General Law on Climate Change (2012)</i>: creates institutions, legal frameworks, and financing for a low carbon economy. Emphasizes adaptation, gradual implementation of a mitigation policy, creates a climate change fund, establishes a voluntary market for emissions trading, and sets a goal of reducing emissions from 2000 levels by 50% by 2050. Amendments include Paris Agreement commitments, a fossil fuel tax, and laying the foundations for a national emissions market.¹⁰	Key Issues: The focus of this general climate change policy focuses on energy, given the high quantity of emissions stemming from this sector in the country. Concerns may include the speed of the established actions and actual implementation of the frameworks that are established through the law.
Existing Policy B: <i>Energy Transition Law (2015)</i>: promotes sustainable and efficient use of energy, regulates obligations of power companies, encourages reductions in emissions from the electric power industry, establishes a minimum share of clean energy in power generation that increases every three years through 2024, establishes mandatory clean energy certificates, establishes a National Commission for the Efficient Use of Energy, and mandates external costs be included in the electricity industry's cost evaluation.¹¹	Key Issues: The government plans to add gas-based capacity through 2030 and 590 MW of new coal power by 2020, which delays the retirement of old capacity until after 2028, reversing and limiting plans to reduce coal-based electricity and deploy renewables.¹²
Existing Policy C: <i>Energy Reform Package (2013)</i>: introduces greater competitiveness and efficiency to the hydrocarbon sector and supports a shift to low-carbon electricity generation through laws on hydrocarbons, the electricity industry, Petroleos Mexicanos, the Federal Electricity Commission, Geothermal, the Petrol Fund, and more.	Key issues: Total energy demand and electricity consumption have grown since 2000, and the energy mix is dominated by oil and gas, with lags in the deployment of both wind and solar.¹³
Existing Policy D: <i>General Law for Sustainable Forest Development (2018)</i>: replaces a 2003 Forestry Law, promotes sustainable forest management and presents strategies for a “zero percent carbon loss rate” by creating a positive balance of forest carbon sinks by 2030.¹⁴	Key issues: Targets the third-biggest emissions sector, AFOLU.
Existing Policy G: <i>Conservation and Restoration of Forest Ecosystems Program</i>	Key issues: Providing financial support for sustainable forestry initiatives
Proposed Policy A: <i>Transportation-focused</i>	Key issues: Transportation is the sector with the second-largest quantity of emissions, yet there is no legislation on vehicle emissions reductions.

COUNTRY FACT SHEET

MEXICO

SECTOR OVERVIEW

The energy sector in Mexico produces the highest emissions, followed by transportation, agriculture, forestry, and land use sector (AFOLU), industry, and lastly buildings. The energy sector has roughly three times the emissions of the transportation sector. These emissions are driven by the country's main industries: oil, automobiles, electronics, and agriculture. In recent years, Mexico has committed to adding new gas-based capacity, resulting in an increase in total energy demand and consumption. The majority of the country's environmental policies are focused on the energy sector, with a more recent focus on forestry. No national policies are in place for transportation, industry, or the buildings sectors.

POLICY OVERVIEW

Mexico's primary environmental policies focus on the energy sector, which produces the largest quantity of emissions. Concerns about the *General Climate Change Law* include the speed of the established actions and the actual implementation of the frameworks that are established through the law. Additionally, the legitimacy of Mexico's policies to reduce emissions are in question given the expansion of gas-based capacity. New policies should be developed for 1) the transportation sector and 2) to increase the deployment of wind and solar energy.

COUNTRY FACT SHEET

MEXICO

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COUNTRY FACT SHEET

NIGERIA

BY THE NUMBERS: CRITERIA	520.67 Total GHG Emissions (million tonnes)	2.73 Annual Population Groth (%)	13 Climate Action Tracker Rank	28 Human Development Index Score	=	8 Overall Rank
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SECTORS & EMISSIONS



#1: AFOLU
(413.75 million tonnes CO₂e)



#2: Energy
(77.33 million tonnes CO₂e)



#3: Transport
(17.20 million tonnes CO₂e)



#4: Residential & Commercial
(8.33 million tonnes CO₂e)



#5: Industry
(4.06 million tonnes CO₂e)



COUNTRY DATA

Demographics:

- **Population:** 203 million ⁵
- **Literacy rate:** 59.6% ⁶

Economic Statistics: ⁷

- **GDP per capita:** \$5,900
- **Main industry** – and main foreign exchange and government revenue - is oil. Also:
 - Agriculture
 - Telecommunications
 - Services

Government/Political Stability: (Climate policy and governance)

- Party to Paris Climate Accord and other international environmental agreements⁸

COUNTRY OVERVIEW

Nigeria is a large developing country with a rapidly growing population and tremendous fossil fuel resources. A majority of the government's revenue comes from oil exports.¹³ It has a democratically elected government, although concerns about corruption and weak institutions abound.¹⁴ There is also significant civil unrest due to Boko Haram, an Islamist militant group, and to other ethnic tensions.¹⁵

Author: Anna Liebowitz

COUNTRY FACT SHEET

NIGERIA

CLIMATE CHANGE POLICIES

Nigeria NDCs¹⁰	Focus includes: • Reduce gas flaring • Rural solar microgrids • “Climate smart agriculture and reforestation”
National Renewable Energy and Energy efficiency Policy for Nigeria (2015)¹¹	Descriptive policy to support clean energy and energy efficiency goals.
Nigeria Vision 2020¹² (from 2009)	Economic planning document that emphasizes growth, agricultural improvement, and diversifying the economy away from oil-dependence. Includes focus on low-carbon fuels and renewable energy.

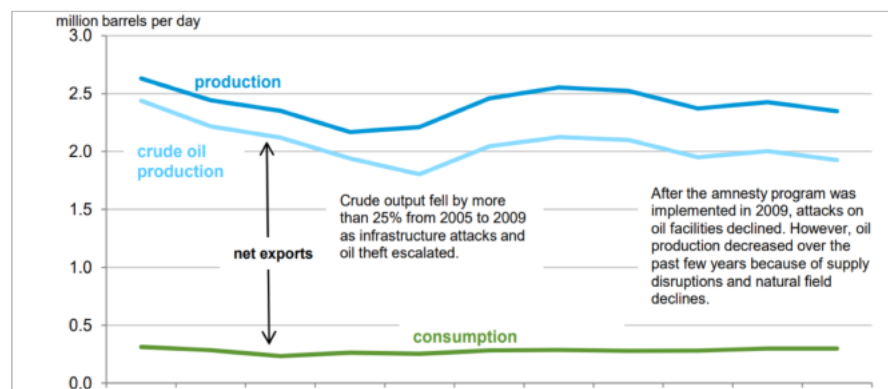
COUNTRY FACT SHEET

NIGERIA

SECTOR OVERVIEW

Nigeria, an OPEC member, is a major exporter of oil, and oil revenues are the largest source of government revenue and the vast majority of foreign exchange currency. Nigeria exports most of its oil and gas, which complicates efforts to quantify the country's GHG emission responsibilities.

Figure 1. Petroleum and other liquids production and consumption in Nigeria¹⁶



POLICY OVERVIEW

Nigeria is an example of “resource curse,” the phenomenon by which oil-rich countries often experience deep levels of poverty.¹⁸ Most of the revenue from oil exploitation does not go to the pockets of Nigerians; moreover, the governmental budget and the entire economy is deeply vulnerable to changes in the global price of oil.¹⁹ Nigeria has a sovereign wealth fund based on its oil revenues.²⁰

Nigeria has some climate-related policies, but also many policies to prop up its oil-based economy. It significantly subsidizes fuel, a politically popular policy.²¹ The fuel subsidy also results in higher costs to the government when global oil prices rise.²²

Nigeria's climate policy priorities should be to shift its economy away from oil and gas extraction and export and to reign in AFOLU emissions. Additionally, Nigeria should focus on developing sustainably, investing in public transit rather than car infrastructure and renewable energy rather than fossil-fueled plants as it continues to strengthen basic infrastructure.

COUNTRY FACT SHEET

NIGERIA

ENDNOTES

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COUNTRY FACT SHEET

RUSSIA

BY THE NUMBERS: CRITERIA

2,179.27
Total GHG Emissions
(million tonnes)

0.09
Annual Population
Growth (%)

13
Climate Action
Tracker Rank

0.816
Human Development
Index Score

=

6
Overall Rank



SECTORS & EMISSIONS



#1: Energy
(1,614.17 million
tonnes CO₂e)



#2: Transport
(238.20 million
tonnes CO₂e)



**#3: Residential &
Commercial**
(196.72 million
tonnes CO₂e)



#4: Industry
(159.20 million
tonnes CO₂e)



#5: AFOLU
(-29.01 million
tonnes CO₂e)



COUNTRY DATA

Demographics: (Population, Literacy Rate)⁶

- Population – 142.1 million (2018)
- Literacy Rate – 99.7%

Economic Statistics: (GDP per capita, main industries)⁷

- GDP per capita – \$27,900 USD
- GDP by sector – agriculture – 4.7%; industry – 32.4%; services – 62.3%
- Major Industries: mining and extractive industries (incl. fossil fuels), chemicals and metals, machine building, defense industry, ships, transportation equipment, electric power generation, medical instruments, textiles, foodstuffs

Government/Political Stability: (Climate policy and governance)

- Vladimir Putin has been the strongest political presence in Russia since 2000. He is currently serving his 4th presidential term, having also served a term as prime minister. He governs with an authoritarian, “strong man” style, and is supported by powerful state-owned companies, including the three top television stations, which are the primary source of news. He has taken a strong nationalist stance, in particular against western powers.⁸
- Russia ranks poorly across many indicators of government quality and stability, including 148th in Rule of Law, 93rd in Government Effectiveness, 158th in Control of Corruption, 129th in Regulatory Quality, 157th in Voice Accountability, 150th in Political Stability, 132nd in Corruption Perception, has the lowest possible score in Political Rights, and the second lowest score possible in Civil Liberties.⁹
- There are very few climate policies, and the level of ambition for the goals is low.

COUNTRY OVERVIEW

While Russia’s human development index score of 0.816 rates it as a highly developed country, its level of development has stagnated over the past few years according to this metric.¹² Some of the industries that have helped it attain this level of development, such as fossil fuels, mining, and metals, have simultaneously caused it to be the fourth largest global emitter of CO₂. This ranking is partially due to its massive size. However, its economy has the 10th highest carbon intensity in terms of emissions per unit GDP, and its emissions are ranked 23rd per capita.¹³ Despite the findings of its own environmental agency that it is significantly threatened by climate change, Russia has done little to address these threats.¹⁴

Author: Tavo True-Alcalá

COUNTRY FACT SHEET

RUSSIA

CLIMATE CHANGE POLICIES

<i>Paris Agreement</i>	Signed, not ratified, target 25-30% reduction vs. 1990 base by 2030
<i>Presidential Decree No. 2344/2016</i>	Requires studies of the impacts of ratifying the Paris Agreement
<i>Presidential Decree No.752/2013 on Greenhouse Gas Emission Reduction</i>	Sets a target of 25% reduction vs. 1990 base by 2020

COUNTRY FACT SHEET

RUSSIA

SECTOR OVERVIEW

Russia consistently ranks towards the top in global emissions across all sectors, with the third highest emissions from non-combustion sources, sixth highest emissions from buildings, and fourth highest emissions from power, transportation, and industry.¹⁵ Some of this is likely due to its geography – a large country with a large population needs lots of power, and must transport goods and people across large distances – but much of it is due to the nature of the economy itself. The heart of Russia's economy consists of energy and emissions-heavy industries such as extractive industries for minerals and fossil fuels, chemical and metals processing, and manufacturing of heavy-duty equipment. Fossil fuels dominate within the power sector, with natural gas and coal accounting for nearly two thirds of generation. The remainder of Russia's power generation is largely nuclear and hydro, with non-hydro renewables accounting for less than 0.5% of electric generation in 2016.¹⁶

POLICY OVERVIEW

Russia has signed but not yet ratified the Paris Agreement, meaning it has not made its pledges binding. The eventual ratification has been delayed until at least 2019, although studies commissioned to examine the potential impact of the pledges on the country suggest to some that ratification will be pushed out even further.¹⁷ Regardless of the timeline, the pledges are very weak. Russia's emissions declined significantly following the collapse of the Soviet Union in the early 1990s, so by using 1990 as a baseline, Russia is on track to continue increasing its emissions and still be close to compliance with their goals. Due to a decrease in emissions following the collapse of the Soviet Union in the early 1990s, Russia's emissions are already nearly in compliance with their pledge. This is not due to good policy, but to the fact that if every country had a pledge as low as Russia, the planet would be on track for greater than four degrees of warming.¹⁸

Russia's national policies are in line with its Paris pledge. Using a baseline of 1990 means that without any effort they are on track to meet the goal of 75% of 1990s emissions by 2020. Furthermore, Russia continues to subsidize fossil fuels, has no plans to phase out coal-fired generation or fossil-fuel powered light-duty vehicles, and its energy ambitions include promotion of greater fossil fuel usage.¹⁹

COUNTRY FACT SHEET

RUSSIA

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Author: Tavo True-Alcalá

COUNTRY FACT SHEET

SOUTH KOREA

BY THE NUMBERS: CRITERIA

579.66
Total GHG Emissions
(million tonnes)

0.52
Annual Population
Growth (%)

6
Climate Action
Tracker Rank

0.903
Human Development
Index Score

= 14
Overall Rank



SECTORS & EMISSIONS



#1: Energy
(426.13 million
tonnes CO₂e)



#2: Transport
(87.00 million tonnes
CO₂e)



**#3: Residential &
Commercial**
(62.08 million tonnes
CO₂e)



#4: Industry
(36.69 million
tonnes CO₂e)



#5: AFOLU
(-32.24 million
tonnes CO₂e)



COUNTRY DATA

Population (2017): 51,470,000⁷

Population density (2017): 512.6 people/sq km⁸

Literacy rate (2013): 97.9% (men: 99.2%; women: 96.6%)⁹

Poverty incidence (2016): 17.9%¹⁰

GDP per capita (2017, in US\$): 29,742.84¹¹

Main industries: Industry (39.4% of GDP) including electronics, automobiles, telecommunication and shipbuilding; services (57.6% of GDP); agriculture (3% of GDP)¹²

Government/ political instability (2017, The World Bank):

- **Government Effectiveness Index** (-2.5 weak; 2.5 strong): 1.08
- **Political Stability Index** (-2.5 weak; 2.5 strong): 0.29

COUNTRY OVERVIEW

In 2017, South Korea accounted for 616 MtCO₂ greenhouse gas emissions, and ranked ninth in the Global Emissions Rank. The Climate Action Tracker rated South Korea's actions as "highly insufficient" due to current and planned policy projections being far off the Paris targets, specifically for what is needed to limit warming to 1.5°C. More stringent policies are required, even for South Korea's current weak target as per Paris climate agreement. South Korea's Nationally Determined Contribution (NDC) includes a target of reducing GHG emissions excluding land use, land use change and forestry (LULUCF) by 37% below business-as-usual emissions (or only 18% below 2010 level) by 2030.²⁵

Authors: Elaine Angeles, Emma Gosliner, Neha Walani

COUNTRY FACT SHEET

SOUTH KOREA

CLIMATE CHANGE POLICIES

Existing Policy A: <i>Framework Act on Low Carbon, Green Growth (2010)</i> ¹⁴	Key Issues: Climate change policy excludes a carbon tax, but includes both a target management scheme and emissions-trading scheme. ¹⁵ Policy design flaw excludes labor and environmental groups, ¹⁶ has weak criteria for labeling projects as green growth, ¹⁷ and does not address social and intergenerational environmental justice. ¹⁸
Existing Policy B: <i>Sustainable Transportation Logistics Development Act (2009)</i>	Key Issues: Lack of enabling environment to implement the policy (natural conditions, etc.)
Existing Policy C: <i>Energy Act (2006)</i>	Key Issues: Inconsistent policies and plans (i.e., new plants proposed, old ones not closed), ²³ transformation of energy supply systems needed. ²⁴
Existing Policy D: <i>Act on the Allocation and Trading of Greenhouse Gas Emissions Rights regulated by Enforcement Decree of Allocation and Trading of Greenhouse Gas Emissions Rights Act (2012)</i>	Key Issues: Lack of specific guidelines for emissions reduction in some sectors, particularly AFOLU

COUNTRY FACT SHEET

SOUTH KOREA

SECTOR OVERVIEW

In 2014, 60.5% of South Korea's GHG emissions came from the energy sector. Transportation and industries combined generated 30% of emissions, and buildings and other sectors make up the remaining 9.5% of emissions. South Korea's energy mix is fossil fuel-based, with coal as the leading source. Energy is responsible for the largest sectoral emissions and is the biggest concern for South Korea given its high dependence on fossil fuel imports, having imported 97% of its energy in 2008. As a result, the country's climate change policy is driven by the need to be energy secure and to have high economic growth.²⁶

POLICY OVERVIEW

In 2016, South Korea released a National Roadmap for Greenhouse Gas Reductions by 2030. The goal of the roadmap is to reduce GHG emissions by at least 200 million tons (or 19% of emissions) by 2030.²⁷

South Korea's climate change policy lacks coherence and consistency. It excluded a carbon tax, yet adopted a GHG and Energy Target Management Scheme (TMS) and an emissions-trading scheme. Energy technology projects can be labelled as "green growth" even if only one of the three important criteria is satisfied (low carbon emissions, energy efficiency, and pro-environmentalism).

Key stakeholders were excluded in formulating the policies, including labor and environmental groups. Policies failed to consider social and intergenerational environmental justice, such as who benefits from growth, who pays for the costs of environmental protection, and who is responsible for environmental protection. Strong industry lobbying is present, which influences the decisions of the government.

COUNTRY FACT SHEET

SOUTH KOREA

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COUNTRY FACT SHEET

TANZANIA

BY THE NUMBERS: CRITERIA	469.26 Total GHG Emissions (million tonnes)	2.93 Annual Population Growth (%)	13 Climate Action Tracker Rank	0.538 Human Development Index Score	=	13 Overall Rank
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SECTORS & EMISSIONS



#1: AFOLU
(450.98 million tonnes CO₂e)



#2: Energy
(6.09 million tonnes CO₂e)



#3: Residential & Commercial
(3.24 million tonnes CO₂e)



#4: Transport
(2.91 million tonnes CO₂e)



#5: Industry
(834,147 tonnes CO₂e)



COUNTRY DATA

Population (2018): 55,451,343⁷

Literacy rate (2015): 77.9% (men: 83.2%; women: 73.1%)⁸

Poverty incidence: 22.8%⁹

GDP per capita (2017, in US\$): 3,200¹⁰

Main industries (2017): Agriculture (23.4%), Industry (28.6%), Service (47.6%)¹¹

Government/Political Stability (2017, The World Bank)¹²:

- **Government Effectiveness Index** (-2.5 weak; 2.5 strong): -0.63
- **Political Stability Index** (-2.5 weak; 2.5 strong): -0.58

COUNTRY OVERVIEW

Tanzania is located in Sub-Saharan Africa with a fast-growing population as well as a rising economy. Its total greenhouse gas emissions rank 13th globally, which is a majority as a result of agriculture and deforestation. This has particular importance as the country contains vast areas of protected natural reserves and forests, including the Serengeti National Park. In recent years, the government has passed several legislations to address the growing impact of climate change on its economy, primarily the agricultural and forestry sector, and to address the transition to renewable energy technologies. Furthermore, the government has looked to increase international cooperation and partnership in global efforts to limit greenhouse gas emissions and climate change. However, the country faces challenges in its legislative efforts to limit greenhouse gas emissions. These are primarily the result of a lack of funding sources. Many of the policies in place explicitly state a need for foreign funds to support local monies and efforts.

Author: William Hsu

COUNTRY FACT SHEET

TANZANIA

CLIMATE CHANGE POLICIES

Existing Policy A (<u>Cross Sectoral</u>) - <i>National Five Year Development Plan 2016/17 - 2020/21</i>	Key Issues: Five year development plan that focuses on the vision for future development as well as identifying climate change as a key challenge. Mitigation and adaptation are explicit policy goals and includes promotion and adoption of renewable energy technologies.
Existing Policy B: (<u>Energy</u>) - <i>National Energy Policy, 2015</i>	Key Issues: Focuses on provision of reliable and sustainable energy. Aims on the scaling up of the utilization of renewable energy resources and diversification of energy mix. Calls for limitations of use of new petroleum discoveries in the country.
Existing Policy C (<u>Agriculture</u>) - <i>Tanzania Agriculture Climate Resilience Plan, 2014</i>	Key Issues: Risk analysis of the agricultural sector identifying water stress, decreased crop yield, and vulnerability of small farmers as priorities. Outlines plans to address these priorities and estimates an implementation timeframe of five years and cost of \$25 million USD (80% of which needs to come from foreign sources).
Existing Policy D (<u>Forestry</u>) - <i>National Strategy For Reduced Emissions from Deforestation and Forest Degradation (REDD), 2013</i>	Key Issues: Nine specific goals on the reduction of emissions from deforestation and forest degradation. This includes the establishment of financial and incentive schemes, better government regulations and public education, and enhancement of research on deforestation issues.
Existing Policy E (<u>Cross Sectoral</u>) - <i>2012 National Climate Change Strategy</i>	Key Issues: Outlines general strategies for Tanzania to adapt to climate change and participate in global efforts. Estimates financial support to be around \$750 million USD. The adaptation strategies outlines cut across sectors, ranging from industry, agriculture, to education and research.

Author: William Hsu

COUNTRY FACT SHEET

TANZANIA

SECTOR OVERVIEW

Agriculture continues to be the major component of Tanzania's economy. This is followed by industry, construction, and tourism. The major sources of greenhouse gas emission in the country is from agriculture, forestry, and other land use changes. The total emissions (450 million tonnes) from these sources is a couple magnitudes higher than all other sources combined. The second largest emission source is from energy, which only accounts for around 6 million tonnes of carbon dioxide equivalents. These two sectors, AFOLU and energy, account for the majority of the climate change legislation in Tanzania as the government attempt to shift towards renewable energy and improve regulations and incentives relating to the forestry and agricultural sectors.

POLICY OVERVIEW

Based on the data compiled by the Grantham Research Institute on Climate Change and the Environment, Tanzania currently has one climate change law and ten climate change policies in effect. Of these, the most comprehensive is the National Five Year Development Plan 2016/17 - 2020/21, which should be up for review in two years. This plan is part of the government's strategy to develop a national vision for development while addressing issues related to climate change. Of particular note is the plans explicit goals to mitigate and adapt to climate change and to research and promote the utilization of renewable energy technologies. Though a little older, there are two policies in place to address agriculture and forestry and related emissions and climate change issues in Tanzania.

These policies are not necessarily innovative, however, they highlight the awareness that Tanzania has in relation to climate change and related challenges. They signify efforts by the government to identify priorities and to implement strategies that provide a pathway to increase resiliency and to reduce emissions.

COUNTRY FACT SHEET

TANZANIA

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COUNTRY FACT SHEET

UNITED STATES

BY THE NUMBERS: CRITERIA

5,971.35
Total GHG Emissions
(million tonnes)

0.95
Annual Population
Growth (%)

13
Climate Action
Tracker Rank

0.924
Human Development
Index Score

=

2
Overall Rank



SECTORS & EMISSIONS



#1: Energy
(3,139.61 million
tonnes CO₂e)



#2: Transport
(1,786.22 million
tonnes CO₂e)



**#3: Residential &
Commercial**
(529.37 million
tonnes CO₂e)



#4: Industry
(362.06 million
tonnes CO₂e)



#5: AFOLU
(-154.09 million
tonnes CO₂e)



COUNTRY DATA

Demographics: Population - 324,459,463 (2017)⁵

Economic Statistics: \$59,531 GDP per capita (2017).⁶

Main industries: Services (79.7%); Industrial (19.1%); Agriculture (1.2%)⁷
(2012)

Government/Political Stability: According to the USA Political Stability Index (range -2.5~2.5, a higher value indicates higher stability) of the World Bank, the average value for the USA from 1996 to 2017 was 0.48 points with a minimum of -0.23 points in 2004 and a maximum of 1.08 points in 2000. In 2017, the value was 0.3, ranking #74.⁸

COUNTRY OVERVIEW

In 2017, the U.S. was the second largest contributor to global GHG emissions. The energy sector accounted for the highest emissions, contributing 2.56 billion tons CO₂e in 2014.¹⁴ The U.S. annual GDP growth was 1.49% per year in 2016. Its total investment rate was 20.59% of GDP in 2017.¹⁵ GDP per capita was \$59,531.66 in 2017. While the Obama era prioritized energy transition as a means for the reduction of carbon emissions, the Trump administration has sought to roll back a dozen more environmental rules to relieve burdens from the fossil fuel industry and increase fossil fuel use.¹⁶

Author: Yu (Cindy) Yen

COUNTRY FACT SHEET

UNITED STATES

CLIMATE CHANGE POLICIES

Existing Policy: <i>Clean Power Plan</i> (2015) (On March 28, 2017, President Trump signed an executive order directing the Environmental Protection Agency (EPA) to consider formally repealing the plan.)	Key Issues: Cutting carbon emissions from power plants, cutting emissions from the electricity sector, energy transition.¹⁰
Existing Policy: <i>U.S. Climate Action Plan</i> (2013)	Key Issues: Help guide state and local governments to cut carbon pollution, lead international efforts to combat global climate change.¹¹
Existing Policy: <i>Green New Deal</i> (2016) (A broad and ambitious package of new policies and investments in communities, infrastructure, and technology to help the United States achieve environmental sustainability and economic stability.)	Key Issues: Transform to a low-carbon economy, fulfill the right to clean water and air, restore the American landscape, strengthen urban sustainability and resilience, put a generation to work, ensure a just transition.¹²
Existing Policy: <i>Energy Policy Act</i> (2005)	Key Issues: Addresses energy production including: (1) energy efficiency; (2) renewable energy; (3) oil and gas; (4) coal; (5) Tribal energy; (6) nuclear matters and security; (7) vehicles and motor fuels, including ethanol; (8) hydrogen; (9) electricity; (10) energy tax incentives; (11) hydropower and geothermal energy; and (12) climate change technology.¹³ Seeks to increase coal as an energy source, while addressing air pollution, use of clean coal.

COUNTRY FACT SHEET

UNITED STATES

SECTOR OVERVIEW

The U.S. has the highest transport emissions per capita and the highest motorization rate within the G20.¹⁷ Total transportation emissions from passenger cars and light-duty trucks have grown as the demand for travel has increased.¹⁸ Three major fossil fuels including petroleum, natural gas, and coal, accounted for ~77.6% of the primary energy production in the U.S.¹⁹ The emissions intensity of electricity generation in the US has been generally decreasing over the past 15 years while renewables shares have been increasing over the same time period.²⁰ In 2016, direct industrial GHG emissions accounted for ~22% of total U.S. GHG emissions. Since 1990, industrial GHG emissions have declined by nearly 14%, while emissions from other sectors have increased.²¹ Total residential and commercial GHG emissions have increased by ~7%, indirect emissions from electricity use by homes and businesses have risen by 14% due to the increase in electricity consumption for lighting, heating, air conditioning, and appliances.²² The agriculture economic sector offset ~9% of total U.S. GHG emissions, and has increased by ~17% since 1990. One main reason for the increase has been a 68% growth in livestock manure management systems that combined methane (CH₄) and nitrous oxide (N₂O) emissions. Other agricultural emission sources have not had significant changes.²³

POLICY OVERVIEW

The U.S. Nationally Determined Contribution (NDC) target under the terms of the Paris Agreement is to reduce net GHG emissions by 26–28% below 2005 levels by 2025. Although the Trump Administration intends to withdraw the current NDC and has already stopped implementation, the target will remain in place through 2019. To meet this target, the U.S. would have had to implement the Clean Power Plan as well as the complete Climate Action Plans of the Obama Administration, or other equivalent plans. The current U.S. policies are predicted to reduce emissions only by 11 to 13% below 2005 levels by 2025. Furthermore, the U.S. NDC would fall into the “insufficient” category on the CAT rating scale, indicating the target is still inconsistent with limiting global warming to below 2° C or the stronger 1.5° C limit of the Paris Agreement.²⁵

COUNTRY FACT SHEET

UNITES STATES

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Country Case Study

BRAZIL

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Country Profile Overview

Brazil ranks 13th in terms of overall global GHG emissions.¹ Brazil's natural conditions are unique, with the Amazon River, the Amazon rainforest's rich biodiversity, arable land contributing to its thriving agricultural sector, and its role as the world's second largest producer of hydropower.^{2,3} The majority of the Amazon lies in Brazil, and as the world's largest rainforest it serves as a carbon sink in counteracting climate change.⁴ Annually, the Amazon's three billion trees are responsible for sequestering approximately a quarter of all the CO₂ absorbed by land on earth.⁵ Given these conditions, Brazil is essential for climate negotiations on the international stage. Despite the fact that Brazil accounts for a large percentage of global biofuel production, the country is also home to major offshore oil reserves, and emissions in most sectors are projected to increase through 2030.⁶

Far-right candidate Jair Bolsonaro, who indicated a desire to open the Amazon to mining and agriculture and to eliminate penalties for illegal deforestation, won the presidential election in 2018, making it unlikely that Brazil will meet its existing climate goals or pass new climate-related policies while under this administration.^{11,12} Additionally, budgets for deforestation monitoring authorities were cut, and the administration has expressed an intent to combine the Ministry of the Environment with the historically pro-deforestation Agriculture Ministry.¹³ Further, Bolsonaro has expressed a belief that foreign governments are conspiring to take control over the Amazon by working in tandem with indigenous peoples and convincing them to declare independence.¹⁴ Without a written guarantee that this will not occur, Bolsonaro has stated his intent to withdraw Brazil from the *Paris Agreement*.¹⁵

Over time, the Brazilian government's position in UN climate negotiations and climate policy in general has changed in response to changing priorities of political administrations.⁷ Brazil ratified the 2015 *Paris Agreement*, agreeing to a number of targets and goals through its Nationally Determined Contributions (NDCs).⁸ The *Climate Action Tracker* rates Brazil's NDCs pledged as part of the *Paris Agreement* as "insufficient," indicating that the country's targets are not consistent with limiting warming to below 2° C, and instead are likely to result in warming between 2° C and 3° C.⁹ These NDCs include: a reduction of 1.3Gt CO₂e including emissions from the Agriculture, Forestry, and Other Land Use (AFOLU) sector by 2025 (or, 2% below 2010 levels by 2025), zero illegal deforestation in the Brazilian Amazon by 2030, restoration and reforestation of 12 million hectares of trees by 2030, and enhancement of sustainable forest management.¹⁰ However, given the nature of the current political situation and the mechanism by which the *Paris Agreement* was implemented, these national targets and NDCs are unlikely to be met.

Developed by an international team of researchers led by Johan Rockström, the "Carbon Law" states that emissions must be cut in half by 2030, which is estimated to give the world a 75% chance of

keeping global temperature below 2°C.¹⁶ Through the 2009 *National Policy on Climate Change*, Brazil set a target to reduce between 36.1% and 38.9% of the country's projected emissions by 2020 against a 2010 baseline.¹⁷ Additionally, the 2013 *National Policy on Farming-Livestock-Forest Integration* has a target to reduce 160 million tonnes CO₂e of emissions every year leading up to 2020.¹⁸ Despite these targets, Brazil currently does not have emissions reduction goals that are sufficient to meet the target of the “Carbon Law” and is moving in the opposite direction of both the “Carbon Law” and its national targets.

In considering how Greenpeace International can influence emissions reductions in Brazil, Greenpeace offices currently exist in São Paulo, Manaus, and Brasília.

Sectors and Emissions

In 2010, Brazil's overall GHG emissions totaled 1.24 billion tonnes CO₂e.¹⁹ The sector with the highest GHG emissions is AFOLU, at 666.6 million tonnes CO₂e annually.²⁰ The AFOLU sector emits more GHGs than the energy, transport, industry, and building sectors combined.²¹ The energy sector emits 419.1 million tonnes CO₂e annually.²² The AFOLU sector's large emissions stem from both illegal and legal deforestation due to the need for open land for cattle ranching, soy production, and logging.²³ Although forestry emissions dropped from 2005, and despite a target for net zero deforestation by 2015, total deforestation increased almost 30% between 2015 and 2016, with more than 50% of that increase occurring in the Amazon region, adding approximately 130 MtCO₂ to total net emissions in 2016.²⁴

In order to meet the “Carbon Law,” overall emissions need to be reduced to 618.35 million tonnes CO₂e. To get to that reduction level, the AFOLU sector must reduce emissions by 75%, or avoid exceeding 166.65 million tonnes CO₂e and the energy sector must reduce emissions by 25%, or avoid exceeding 314.32 million tonnes CO₂e. The country should enforce targets to stop deforestation and actively reforest deforested land. Brazil's national pledge to reduce deforestation by 80% in the Amazon by 2020 would allow a maximum of 3,907 km² deforested land per year. However, in the 12 months prior to July 2017, 6,947 km² were lost, which is almost double the allowance.²⁵ This increase in deforestation and thus increase in emissions moves the country in the opposite direction of its national policies and commitments under the *Paris Agreement*, both of which are at risk under the current administration.²⁶

Policy Overview and Analysis

The 2006 *Management of Public Forests, Brazilian Forest Service, and National Fund for Forest Development* aims to protect and allow access and use of forests in line with sustainable forest targets.²⁷ Specifically, public forest management entails the protection of ecosystems, land, and water, promotion of research on forestry related to conservation, restoration, and sustainable use of

forests, and long-term investment in forest conservation and recovery.²⁸ This law set a target that by 2026, only 20% of the total area of its public forests may be cleared for agriculture use or natural resource extraction, except for lands located in national forests created pursuant to Art. 17 of Law 9.985 from July 18, 2000.²⁹ In order to meet necessary emissions reductions, this policy needs a new, earlier target to limit forest concessions to 20% by 2022. The policy should also set more stringent targets for the quantity of land areas to be reforested, which should begin immediately in order to meet the 1.5°C limit. It is important that reforestation take place while simultaneously reducing deforestation.

The 2009 *National Policy on Climate Change* set a target to reduce between 36.1% and 38.9% of the country's projected emissions by 2020 against a 2010 baseline.³⁰ This policy should be reevaluated as Brazil is nowhere near achieving this percentage of emissions reductions by next year. It should include overall emissions reduction targets for 2025 and 2030 and a target of 75% reduction in AFOLU sector emissions by 2030 to meet "Carbon Law" standards.

The *National Policy on Farming-Livestock-Forest Integration* of 2013 aims to mitigate deforestation caused by farming, livestock, and forestry, and promote best sustainable practices and recovery of these areas.³¹ This policy includes the *Low Carbon Emission Agriculture Programme* which provides low-interest loans to farmers who want to implement sustainable agricultural practices including no-till agriculture, restoration of degraded pastures, planting of commercial forests, biological nitrogen fixation, and animal waste treatment.³² While this is in theory an attractive program for farmers, recent data shows that there has been an increase in deforestation.³³

As part of the 2013 *National Policy on Farming-Livestock-Forest Integration*, the 2010 *Low Carbon Emission Agriculture Programme (ABC Programme)* has a target to reduce 160 million tonnes CO₂e of emissions every year leading up to 2020.³⁴ Created in 2010, the *ABC Programme* is a multi-billion Reais credit line dedicated specifically to finance sustainable agricultural practices with high productivity and low GHG emissions.³⁵ Brazil makes these loans available to producers and agribusinesses under the National Rural Credit System (SNCR) to finance agricultural outputs and machinery as well as operating costs and product marketing.³⁶ However, using credit to promote sustainable agriculture often meets barriers to successful implementation, including: producers are unfamiliar with sustainable agricultural practices, bank and extension service technicians are unprepared to assist producers in implementing sustainable practices, credit lines do not provide sufficient capital, sustainability-related credit is less attractive than traditional credit, and there may be outreach restrictions to different regions of Brazil.³⁷ Furthermore, similar to the *National Policy on Climate Change*, this policy has no chance of meeting this target by 2020, as GHG emissions have in fact been increasing from the AFOLU sector.³⁸

Between August 2017 and July 2018, previous President Michel Temer upheld major changes to the *Brazilian Forest Code*, which increased deforestation on lands that were supposed to be restored, and permitted a program allowing for illegal deforestation on "small properties."³⁹ In February 2018,

the *Brazilian Forest Code* was further modified, reducing the quantity of previously deforested land required to be restored (per previous rules) by 112,000 square miles (290,000 square km).⁴⁰ As a result, approximately 8,000 sq km were deforested in Brazil during this time, a 13.7% increase from the previous year and the largest area of forest cleared since 2008.⁴¹ This policy change will have a direct negative impact on AFOLU emissions.

Beyond the AFOLU sector, the *National Biofuels Policy* of 2017 provides biofuels certification, aims to reduce GHG emissions in the fuel matrix, and issues tradable decarbonisation credits.⁴² As mentioned above, despite this, Brazil holds vast oil reserves, limiting the ability of the country to limit GHG emissions.

Based on the actions of the previous administration under Temer allowing illegal deforestation and the current administration's stance, Brazil's forests are under severe risk.⁴³ It is likely that the current administration under President Bolsonaro will adhere to its inclination to disrupt the Amazonian ecosystem and open it up to mining for oil reserves, deforestation for large-scale agriculture, and elimination of penalties for illegal deforestation.⁴⁴ Recent amendments to the *Brazilian Forest Code* to better align with the interests of the administration shed doubt on the power of the policies mentioned above.

The next presidential campaign in Brazil is set to begin in approximately two years, prior to the next presidential and national congressional elections, which will be held in October 2022. Given the upcoming elections, this is a crucial opportunity for Greenpeace to become further involved in social campaigns within the country.

Policy Windows

2019: Brazil's *National Biofuels Policy (Renova)* had a target for a 10% increase of biodiesel blends from 2018 by 2019.⁴⁵ Having achieved this target, Greenpeace could now advocate for a new biofuels policy with more substantial targets for upcoming years.

2020: The *Low Carbon Emission Agriculture Programme's* target is to reduce 160 million tonnes of CO₂e annually every year through 2020.⁴⁶ Greenpeace could track progress on this and support R&D innovation to find solutions on how to further reduce emissions from the AFOLU sector.

2022: Leading up to the next presidential and congressional elections, Greenpeace could advocate for candidates who support environmental action and policy.

2026: Per Law 11.284, 2026 is the target year by which time the total area of forest concessions should not exceed 20% of the total area of the country's public forests.⁴⁷ Greenpeace could advocate

for this target to continue to be pursued, as the current administration is seeking reversals in this arena.

2030: During COP21 in 2015, Brazil committed to expand its share of non-hydropower renewable resources between 28-33% and to expand domestic use of renewables to at least 23%, both by 2030.⁴⁸ Additionally, Brazil's *National Climate Change Plan* has a target of more than 80% renewables by 2030, and its *National Policy on Energy Efficiency*, a subset of the *National Climate Change Plan*, has a target of energy savings of up to 106 TWh/yr by 2030.⁴⁹ Greenpeace could monitor progress, work with key stakeholders including utility companies and local renewable energy providers, and develop feasibility studies for where and which types of renewables would be best suited for the region.

Policy Recommendations

According to the U.S. News “Best Countries” ranking published in collaboration with the BAV Group and Wharton School of Business, Brazil’s political influence scores 0.9/10, economic influence scores 1.9/10, strong international alliances metric scores 1.6/10, leader metric scores 0.9/10, and in terms of caring about the environment scores 0.5/10.⁵⁰ Based on this index, Brazil isn’t particularly influential on the international political sphere and does not rate highly in terms of caring about the environment. However, the country holds slightly higher influence economically and has some international alliances. These international alliances could be used as leverage by working to reduce emissions in allied countries with greater political influence and to inspire Brazil’s stance and efforts to change.

Brazil’s top trade partners are China (26.8% of total exports), the United States (12.1% of total exports), and Argentina (6.2% of total exports).⁵¹ The country’s top exports include: oil seeds, mineral fuels including oil, ores, slag, and ash, machinery including computers, meat, vehicles, iron and steel, wood pulp, food industry waste and animal fodder, and sugar.⁵² The most valuable export product produced by Brazil in 2018 was soybeans, although China imports large quantities of meat and grain in addition to soybeans from Brazil.⁵³ The country’s biggest export companies tied to goods produced in the AFOLU sector are José Batista Sobrinho (JBS) and Brazil Foods (BRF), both involved in food processing.⁵⁴ As discussed further below, emissions reductions were previously achieved in Brazil as a result of a soybean moratorium for lands in the Amazon, and the strategic recommendations below discuss how to similarly use these export products and build relationships with the country’s food industry as a way to drive changes in land use practices and emissions.⁵⁵

Brazil encompasses 1.5 million square miles of the Amazon rainforest as well as the Cerrado, South America’s largest savannah, areas that are severely at-risk given the combination of the influences within the AFOLU sector and the political position and alliances of the federal government.⁵⁶ While carbon sequestration rates are dependent on the age of a tree and tree growth characteristics

including the tree species and wood density, on average one tropical tree at full maturity can sequester 50 pounds of CO₂ annually.⁵⁷ Based on calculations by Greenpeace, in total the Amazon stores 100 metric tonnes of carbon, and the Cerrado also sequesters a large quantity of carbon.⁵⁸

According to the Brazilian government, 17% of the original Amazonian land area has already been lost, and deforestation in the Cerrado is occurring at four times the speed of Amazonian deforestation.⁵⁹ Globally, the AFOLU sector is responsible for approximately 25% of emissions, and declines in deforestation in the 2000's resulted in noticeable drops in global emissions.⁶⁰ Specifically, estimates indicate that deforestation decreased by 76% between 2003-2013.⁶¹ However, as discussed in the section above, these gains in emissions-cutting have already begun to be reversed given the aims of the federal government to open the Amazon up to logging and to reverse policies on deforestation. Therefore, Brazil's AFOLU sector is critical for Greenpeace to impact in terms of working towards holding global temperature below 1.5° C.

The AFOLU sector's large emissions stem from both illegal and legal deforestation due to the need for open land for cattle ranching, soy production, and logging, which are important to the country's economy.⁶² Reducing deforestation in the early 2000's was assisted by a combination of factors: stricter federal enforcement of the forest code, the Greenpeace-driven soy moratorium, expansion of protected lands, penalties for illegal deforestation, and forest monitoring and remote sensing.⁶³ In the next few years, given the current Bolsonaro administration, Greenpeace can take the following actions to reduce emissions stemming primarily from the AFOLU sector in Brazil:

- Get involved in the next round of political campaigns, to back candidates that support environmental efforts and more stringent protections of the Amazon, Cerrado, and other natural forested lands in Brazil. If environmentally-oriented candidates are brought into office, Greenpeace could then develop partnerships and serve in an advisory capacity. Brazil's political situation has similarities to the current political situation in the US, and it is possible that significant efforts to reduce emissions by the US could influence the stance of the Brazilian government.
- Work on a state-by-state basis, focusing on states with the largest quantity of forested areas and/or the fastest rates of deforestation (for the Amazon: Amazonas, Roraima, Acre, Rondonia, Mato Grosso, Para, and Amapa, and for the Cerrado: Maranhao, Tocantins, Mato Grosso, Mato Grosso Do Sul, Goias, Minas Gerais, & Bahia). While governors in many of these states pledged support for Bolsonaro during his campaign, Greenpeace could attempt to coordinate with these state and local governments to propose state and local-level regulations preventing deforestation.⁶⁴ As a starting point for Greenpeace's work on this level, further research is needed to determine which of these forested states historically hold the greatest political sway both in terms of environmental stances and on the national stage.

- Work with the local communities within the states that encompass the Amazon and the Cerrado. Launch a massive information campaign to provide communities with information about the *Forest Code* and other relevant policies, information about the benefits of forests, and impacts of deforestation. Motivate communities to self-regulate and to take ownership over protection of the forest. Provide information about the federal *Low Carbon Emission Agriculture Programme* for low-interest loans that are available for farmers to develop and implement sustainable agriculture practices.
- Build off of the previous success of the Soybean Moratorium - with more deforestation driven by the Bolsonaro administration, it is likely that a larger quantity of products from the deforested lands are intended to be sold on the international market. Work with Brazil's primary trade partners to impose a Meat and Grain Moratorium to demand that purchased products are not causing further deforestation.
- Extend the Soybean Moratorium to include the land in the Cerrado, to which soybean production has shifted as a result of limits on soybean cultivation in the Amazon.⁶⁵ Between 2005 and 2014, deforestation reductions spurred by the Soybean Moratorium resulted in reductions of approximately 3.2 Gt of carbon emissions (0.36 Gt/year), or 360 million tonnes of annual emissions reductions.⁶⁶ This scale of reductions could be possible in the Cerrado in addition to what is currently achieved through the moratorium in the Amazon, and would accomplish approximately 30% of the emissions reductions needed to meet the "Carbon Law."
- Support the project sponsored by Conservation International to plant 73 million new trees in the Amazon by 2023.⁶⁷ Assuming each tree can intake 50 pounds of CO₂ at full maturity annually, this would result in carbon sequestration of 3,650 million pounds of CO₂, or 1.6 million tonnes of CO₂, and would accomplish 0.13% of what is needed to meet the "Carbon Law."⁶⁸
- Work directly with JBS & BRF, the major food processing exporters in Brazil, to demand limiting deforestation by requiring suppliers' products do not come from newly deforested lands, institute reforestation on a large-scale as an offsetting mechanism, and develop innovative cultivation methods for the agriculture sector that limit the quantity of new land needed.
- In combination with limiting deforestation as a means of increasing carbon sequestration through trees, soil carbon sequestration holds potential for limiting Brazil's emissions.⁶⁹ Through instituting and guiding land restoration efforts including replanting deforested areas and improving pasture management processes, Brazil's soil can likely store large quantities of carbon.⁷⁰

Conclusion

Brazil's emissions stem primarily from Agriculture, Forestry, and Other Land Use, and as such Greenpeace will have the biggest impact in meeting the climate action gap by focusing efforts on this sector. Although the Brazilian Federal Government's stance is a direct threat to this sector specifically, suggesting policies and reversals of policies that would increase emissions, Greenpeace's involvement in Brazil is critical in order to cut global emissions, increase natural carbon sinks, and preserve the natural resources that have such vast global value. Assuming expansion of the Soybean Moratorium to the Cerrado would result in a similar reduction in emissions as the original moratorium in the Amazon, this action would account for 30% of the reductions needed to get Brazil to 1.5° C. Further extrapolating this assumption to assume successful implementation of a meat and grain moratorium, it is possible another 30% of reductions could be accomplished. Further, local knowledge about the negative impacts of deforestation, state and regional support for curbing deforestation, reforestation campaigns, and working directly with major food exporters on limiting deforestation and increasing accountability for their products not causing land degradation together (in effect, zero deforestation supply chains) could likely account for the remaining 40% of emissions reductions that are necessary in Brazil.

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Country Case Study

CHINA

Author: Emma Gosliner



Country Profile Overview

Greenpeace International currently has an office in Beijing under its East Asia regional offices, where priorities include climate change, pushing for China to phase out coal, and catalyzing a renewable energy revolution in China.¹

- Politically influential score = 93
- Economically influential score = 100
- Strong international alliances = 76
- A leader score = 91
- Cares about the environment score = 4

Using data above from the BAV Group and The Wharton School of the University of Pennsylvania, it is clear that China is a global leader. Based on these scores, China is a highly influential country both politically and economically. This indicates that China will play an important role moving forward in influencing other developing countries especially when it comes to economic growth and development. However, China ranked extremely poorly in terms of the importance of caring about the environment. If China were to focus on developing sustainably, it can leverage its strategic economic position to pave the way for other developing countries to follow suit.

China is the largest global exporting country, and the second largest importing country. It is a global leader in trade and manufacturing, which is responsible for a large portion of global emissions. Aside from the United States, its key trading partners are other Asian countries including Japan, South Korea, and India.² Although China has the highest global emissions rates due to manufacturing and production that include electrical machinery, computers, furniture, plastics and vehicles, a lot of those emissions are eventually consumed in the form of exports to other countries.³ It may be necessary to impose stricter trade measures, focused on taxing export countries that incorporate a price for sharing a role in the emissions process. Currently, emissions are measured by production and not consumption. This means the current measuring process places the primary “blame” of emissions on the producer, while the consumer pays no price for emissions.

Sectors and Emissions

China plays a key role in manufacturing and exporting globally. Its industries use fossil fuel-based energy, with coal as the leading source. The energy sector generates the highest CO₂ emissions (52%) with industry following close behind with 32%, residential and commercial, and transportation. However, it is important to consider all sectors in emissions reduction.

While China leads the world in clean energy investment, it continues to fund foreign coal-fired power plants despite its goal to curb coal use domestically.⁴ China’s leadership in renewables is evidenced

by the largest expansion of global solar cell production, its installation of one-third of the world's total wind capacity, and its role as housing the largest electric vehicle market in the world (making up half of all sales).⁵⁶ Recent developments in the energy sector in China have made renewable energy generation costs lower than coal production costs. Further progress in this area could potentially create a domino effect on other countries. However, it is worth noting that in May 2018, the Chinese government ended subsidies for solar PVs.⁷ There needs to be a way to incentivize a big shift towards solar that will substantially curb emissions.

The country's primary NDCs include peaking CO₂ emissions before 2030, increasing the share of non-fossil-fuel energy sources in the total primary energy supply to 20% by 2030, increasing the share of natural gas in the total primary energy supply to 10% by 2020, and increasing forest stock volume by 4.5 billion cubic meters by 2030 compared to 2005.⁸ Currently, China is on track to meet its national 2020 pledge and NDC targets but more work must be done to reach 1.5° C. China reported that it has cut carbon intensity by 45.8% in 2018 (based on 2005 levels), exceeding the country's target to lower carbon intensity 45% by 2020. However, Chinese environmental policy expert, Qi Ye, Professor at the Hong Kong University of Science and Technology and current senior fellow and director of the Brookings-Tsinghua Center for Public Policy believes the current NDCs will lead to 3-3.2° C of warming, falling short of the 1.5° C target.⁹ In order to close the gap between the expected 3.2° C and the desired 1.5° C of warming, China would need to shift from coal-fired power plants to a greater quantity of solar or other renewable energy production.

In 2010, China's total emissions reached 10.233 Gt CO₂e/yr (using emissions datasheet from Our World in Data 2010), and current projections from Climate Action Tracker show that China is on track to meet its target of between 14.4 to 16.6 Gt CO₂e/yr of emissions in 2030.¹⁰ More optimistic projections show between 10.8 and 12.2 Gt CO₂/yr total emissions.¹¹ These projections make it abundantly clear that China will not come close to meeting the "Carbon Law", which requires a halving emissions by 2030, instead reaching emissions levels 4-6% above 2015 levels by 2020 and 14-25% above 2015 levels by 2030.¹²

In 2017, China's carbon emissions (excluding forestry) totaled 13.039 GtCO₂e. Using this value as a proxy for 2020 emissions, China must reduce emissions by 6.57 GtCO₂e by 2030, and 3.25 Gt by 2025.¹³ This 2025 target should be incorporated into the 14th five-year plan discussed below. China's carbon emissions increased in 2018, with coal making up 59% of its total energy consumption and 70% of CO₂ emissions related to energy.¹⁴ The cause of this growth is due to an increase in electricity production that low carbon sources could not keep up with.

Policy Overview and Analysis

China National Emissions Trading Scheme (ETS) Program (2020)

At the end of March 2019, China's Vice Director of the Ministry of Ecology and Environment's Climate Change Department publicly issued draft rules announcing that the first trade will begin in 2020. The first industry the program targets is coal-fired power, which is anticipated to reduce greenhouse gas emissions by 3 billion tonnes. The current plan is designed to be the largest carbon market in the world by covering 8 billion tonnes of CO₂ emissions annually, targeting China's highest emitting sectors (accounting for more than 26,000 tonnes of CO₂/year).¹⁵ According to Greenpeace Beijing's Laura Myllyvirta, the current intensity-based allocation (limited amount of CO₂ allowed per unit of output) will not encourage a cleaner fuel mix.¹⁶ Public consultation of the plan is open through May 8, 2019.¹⁷

Five Year Plans

China lays out its policy goals and strategies in the form of five-year plans. These plans guide the development of specific policies and shape the behavior of provinces. Development of the five-year plans includes working with outside experts such as University-level academic expertise and think tanks (e.g. Energy Research Institute).¹⁸ Direct recommendations also come from State Councils and provincial-level Bureaus.¹⁹ This could be a gateway for Greenpeace to advocate and influence climate commitments on a more localized level.

- The *12th Five Year Plan* (2011-2015) was the first to include a chapter addressing climate change. China is currently in its 13th Five Year Plan (2016-2020).²⁰
- *14th Five Year Plan* (2021-2025): Development of this plan began December 2018 and will serve as a crucial period for development of decarbonization commitments.²¹ This is an opportunity for Greenpeace to participate in the process as an expert, though the policy window for 2020 is rapidly closing.
- The *13th Five Year Plan* (2016-2020) sets its current emissions goals to reduce CO₂ emissions per unit of GDP by 18% from 2015 levels by 2020.²² Current emissions goals in the 13th five year plan are not enough to reduce half of China's emissions by 2030, and need to reduce emissions by 3.25Gt by 2025.

Looking forward to the 14th Five Year Plan there is room for improvement. First, China must get rid of inconsistent policies and align China's environmental goals. For example, promoting synthetic natural gas and overseas development of coal-fired power plants greatly increase emissions while China strives to decrease its dependence on coal at a national level.²³ For example, the 2018-2020 Pollution Action Plan requires Beijing, Tianjin, Hebei, Shandong and Henan to decrease coal consumption by 10 percent over between 2016 to 2020.²⁴ Following the alignment of climate change goals and policies, China must improve its transparency in terms of monitoring compliance and enforcement to ensure its goals are met.

Green Belt and Road Initiative (2013)

The Green Belt and Road Initiative is a project that aims to finance and build infrastructure abroad with the primary goal of connecting countries across the continent through increasing development and economic growth.²⁵ The Global Environment Institute of China found that China was involved in the development of 240 coal-fired power plant projects by the end of 2016, validating concerns that China will influence neighboring developing countries to follow a similar rapid-emission development path.²⁶ However, this can instead serve as an opportunity to lead developing nations in economic growth through using low-carbon technologies.

The Official Guidance Promoting Green Belt and Road was jointly issued by the Chinese Ministry of Environmental Protection, the Ministry of Foreign Affairs, the National Development and Reform Commission, and the Ministry of Commerce in 2017. The Guidance lays out progressive language in green development, and offers opportunities for Greenpeace International to play a role in the rollout and implementation of the initiative, including:

- “Directly supporting environmental protection NGOs to build partnerships with institutions in countries along the route,” and
- “Supporting NGOs to carry out environmental protection projects to serve the Initiative”.²⁷

Policy Recommendations

China sees itself as a leader of the G-77, and has an opportunity to lead developing nations to clean and sustainable development through its Belt and Road Initiatives. Greenpeace International can use the 2017 Guidance as a starting point to become involved in the policymaking process through on-the-ground action and implementation as well as by working with local nongovernmental organizations.

Curbing coal may cause a domino effect. The extent to which China will shift from coal-fired power plants to solar or renewable energy production will make a huge difference in its emissions. To do this, China must: build up its capacity for solar, build more transmission, improve energy storage, ensure financing is available, and shift its current spending to promote solar and low carbon development. China has provided \$36 billion of funding for foreign coal plants, responsible for financing 25% of all coal plants outside of China in 2018.²⁸ Foreign investments will shape the future of the southeast Asian market, stressing the importance of pivoting to renewable energy.

Another option is for Greenpeace International to seek to influence the 14th Five Year Plan planning process that is beginning. In an interview with the ESP Workshop Team, David Sandalow, Inaugural Fellow at the Center of Global Energy Policy (CGEP) and former senior official at the White House, State Department and U.S. Department of Energy, noted that while Chinese officials generally do not like foreigners telling them what to do, Chinese officials are generally open to foreign advice on how to achieve their announced goals or implement their existing policies. The 14th Five Year Plan

process may allow Greenpeace International an opportunity to advise the Chinese government on how to achieve its current policy goals and continue low carbon development such as expanding solar power capacity and improving energy efficiency in energy intensive industries using its own policy expertise.²⁹

In the short term, many national action plans end in 2020 that lend Greenpeace the opportunity to become involved.

- For example, China's current Energy Development Strategy Action Plan covers 2014-2020. This provides an opportunity for an update that will set new targets to promote efficient, self-sufficient and green energy.³⁰
- Action Plan on Efficient Use of Coal spanning 2015-2020 creates a window in 2019 to advocate in support of a coal moratorium, or more stringent deadlines to phase out coal completely. It is also worth noting that China met their targets early in 2017.³¹
- Action Plan for Forestry to Adapt to Climate Change that spans 2016-2020 presents an opportunity for Greenpeace to review and influence development of an updated version.³²
- With the National People's Congress extension of the electric vehicles subsidies, Greenpeace can help update and participate in the planning process for the Development of Energy-Saving and New Energy Automobile Industry Plan that ends in 2020, as well as updating the guidelines for the Development of Electric Vehicle Charging Infrastructure.³³
- National Strategy for Climate Change Adaptation (2013-2020) will rely on newly developed targets in 2020 for an update that should focus on LULUCF and AFOLU targets.³⁴
- Greenpeace should advocate for an increase in deployment of renewable solar in the update to the Solar Energy Development 5-Year Plan that ends in 2020.³⁵
- New China National Action Plan on Climate Change based on new 2020 targets. An ambitious recommendation is to encourage the limit of HFCs through ratification of the Kigali Amendment.³⁶
- In the longer term, becoming involved in the planning of the 15th Five Year Plan that would span 2025-2030.

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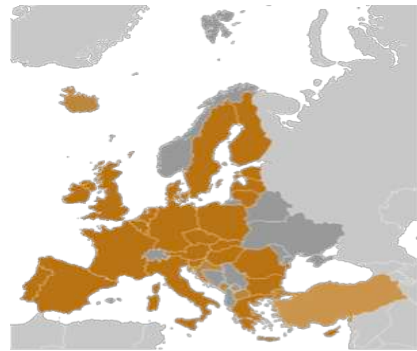
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Country Case Study

EUROPEAN UNION

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Country Profile Overview

As a political and economic union rather than a nation, the European Union often achieves policy goals through directives, rather than regulation.¹ This means it sets a target to be met, but allows member state to implement their own solutions. This relationship can create challenges and opportunities. The challenge arises because there is a great diversity among the EU member states, and a directive must be specific enough to accomplish its goal, but flexible enough that each country can find its own unique path for implementation. The opportunities arise because while many of the EU countries have individually minor emissions levels on the global scale, if the whole union is considered, it is the third largest emitter in the world.² As a whole, the EU has reduced its emissions by 22% since 1990, putting it ahead of schedule for its goal of 20% reduction by 2020.³ However this only represents a reduction of 10% since 2010, leaving it with lots more to do to meet the target of 45% by 2030 relative to a 2010 baseline as suggested by the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5° C.^{4,5} Based on 2010 emissions levels, the EU would need to reduce its emissions by just over 2,000 million tons of carbon dioxide equivalent (MtCO₂e) by 2030 to reach a total emissions level of 2,446.7MtCO₂e.⁶

The EU and its member state have also been at the forefront of emissions reduction policy, most prominently with its Emissions Trading System (ETS). This program was the world's first international cap and trade program when started in 2005, and it is currently in its third phase, which goes until 2020.⁷ Individual member state are also seen as leaders in emissions reduction policy, especially in the energy sector. For example, the feed-in tariffs that were introduced in Germany in the 1990s helped it to become a leader in solar electricity generation despite having relatively poor solar resources, and have been imitated in countries around the world.⁸ Conversely though, Germany has been slowed down by the prominence of the coal and automobile sectors. Germany is the EU's major producer of coal, and still generates around 1/3 of its electricity from that source.⁹ Similarly, the major German auto manufacturers, and the many German citizens that they employ, have resisted regulation like diesel vehicle bans in city centers that they view as detrimental to their operations and livelihoods.¹⁰

Peoples' movements regarding environmental policy have featured prominently in the news recently, and these also highlight the challenges in crafting an EU-wide environmental policy. Beginning August 2018 Greta Thunberg, a young Swedish student, launched a worldwide Youth Climate Strike movement, accusing her government of not taking sufficient action to address climate change, and

this in a country that has set the highest emissions reduction targets in all the EU.¹¹ On the other side, since November of 2018 protesters in France have been taking to the streets in a movement that was precipitated by a fuel tax that was meant to lower France's reliance on fossil fuels.¹² While these protests, as well as the divergent attitudes in Germany on renewable energy and auto regulation, are based on factors beyond climate impact, complex complicating factors exist in every country, and must be considered as the EU shapes its climate policies. Making matters harder is the growing influence of far-right populist parties within EU member states. These parties are frequently Euro- and climate change skeptics, and so they are likely to be doubly resentful of increased climate regulation from the EU. Their rise in prominence has threatened continued progress and ambition of climate policy within the EU. To move forward, climate policy must not only be comprehensive and cross-sectoral, it must also change the narrative to one that is more positive and inspiring.¹³

Sectors and Emissions

Within the EU, energy generation is the sector that leads to the most greenhouse gas emissions, accounting for 47.10% of overall emissions in 2010, followed by transportation in a distant second at 20.41%. More recent data show that while emissions in the energy sector have been reduced since 2010, the energy sector still accounts for the majority of emissions.¹⁴

Policy Overview and Analysis

Policies Affecting the Energy Sector

The EU has a binding legislative package known as “Clean Energy for All” to ensure that it is a leader in the energy transition, and that it is prepared to meet all its energy goals. The package builds on the EU's existing 20-20-20 goals (20% reduction of greenhouse gases relative to 1990, 20% of energy from renewables, and a 20% improvement in energy efficiency) by setting new targets for 2030.¹⁵ The new targets are 32% of generation from renewable sources, 32.5% improvement in energy efficiency, and 15% interconnection, meaning that 15% electricity generated in one country can be transmitted across its borders to meet the needs of neighboring countries. Relative to a 1990 baseline, these goals are expected to lead to 45% lower emissions in 2030, but this represents only a 33% reduction relative to 2030, 12% short of the goal recommended by the IPCC's Special Report.^{16,17} To support these policy goals, the Clean Energy for All package has 8 legislative acts, including 4 directives (on Energy Efficiency

in Buildings, Renewable Energy, Energy Efficiency, and Electricity) and 4 regulations (on Electricity, Governance, Risk-Preparedness, and Regulation for the Agency of Electricity Regulators).¹⁸ The Renewable Energy and Energy Efficiency directives state the 32% and 32.5% targets mentioned previously while the Energy Efficiency in Buildings directive focuses on the transition to smarter buildings and a zero-emissions building stock.¹⁹ The remaining directives and regulations address the goals and governance of the Energy Union, a more interconnected, trans-national electric system that allows for greater integration of renewable energy.²⁰

These policies are supported by a number of tools, including the ETS, binding national reductions targets for sectors not covered by the ETS, and National Energy and Climate Plans. Created in 2005, the ETS is a cap and trade system that covers roughly 45% of emissions within the EU. Entities covered by the program include power generators, heavy emitting industries, and civil aviation.²¹ A cap and trade program sets an overall limit that cannot be exceeded by the aggregate emissions of the covered entities. Emissions allowances up to the cap are issued or auctioned to participants, who are then allowed to trade them amongst themselves. Such a system is meant to keep emissions below a certain amount while allowing the abatement to be done in the most cost effective manner. The ETS program is divided into 4 phases. During the first phase (2005-2007) the cap was set at 2,058 MtCO₂e, which decreased to 1,856 MtCO₂e during the second phase (2007-2012). At the beginning of the current phase, which began in 2013, the cap was lifted to 2,084 MtCO₂e, with 210 MtCO₂e allocated to aviation, which was not previously covered, and a slight increase among other sectors due to the inclusion of additional gases.²² Beginning in 2013 the cap will decrease by 38 MtCO₂e (1.74%) each year, which will lead to reduction of at least 21% of covered emissions by 2020. The fourth phase will span from 2021 to 2030, during which time the cap will be reduced 2.2% per year, resulting in 43% reductions relative to 2005 levels by 2030.²³ If accomplished this would represent 1,257 MtCO₂e of emissions reductions, or roughly 47% of the total emissions reductions required by 2030. The ETS also considers the issue of “carbon leakage” which occurs when the cost of reducing emissions forces emitting activities to occur elsewhere, negating the benefits of the program. Sectors that are particularly susceptible to carbon leakage are carefully monitored and given a certain level of special treatment. Overall the sectors covered account for about 45% of the EU’s total emissions.²⁴

For the 55% of emissions not covered by the ETS, the EU has Effort Sharing legislation, under which each member state must set legally binding emissions reductions targets. Each

member state has its own target level, but collectively the targets will lead to EU-wide reductions of 10% by 2020 and 30% by 2030.²⁵ Member states are given broad leeway in regards to the type of policy that they implement to achieve these reductions, and also flexibility in terms of when these emissions are achieved. Each year the member states must submit a plan to meet its annual emission allocations (AEA), which are based on the straight line reductions needed to achieve the ultimate emissions goal based on the starting point. However, in the interest of cost-effectiveness, overachieving reductions may be carried over from year to year, no more than 5% of under-reduction may be made up in a subsequent year, and countries are also allowed to transfer part of their AEA to another country under certain conditions.²⁶

Finally, to further the EU's effort to create an interconnected Energy Union, each member state is required to submit a National Energy and Climate Plan (NECP) that addresses the 5 dimensions of the energy union: security, solidarity and trust; a fully integrated internal energy market; energy efficiency; climate action - decarbonizing the economy; and research, innovation, and competitiveness.²⁷ While all countries have submitted draft plans, the final plans are not required until the end of 2019. The reports must all be based on the same template, and include the following components: a national plan, with a discussion of the current policy situation, national objectives, and proposed policies and measures; and an analytics section detailing the impact of the existing and proposed policies.²⁸

Policy Window / Timeline

The legislative framework for the ETS, renewables, and efficiency targets were all revised in 2018, and the new policy framework that implemented these updates set 2023 as the year to potentially revise these goals, so there may not be the political will to revise them further before then.²⁹ However, the EU is holding parliamentary elections in 2019, so there will be a new batch of Members of European Parliament (MEPs) who might bring a different perspective or a different mandate with them. These MEPs are elected to five year terms, so pushing policy recommendations early could help set the direction for the next five years at least. Much of the actual planning and implementation of policies to meet the broad goals set by the EU is done at the national level. There may be more opportunities to strengthen policy at this level, including the revision of each country's NECP or in the AEA plan. This would require advocacy in each of the national governments, or with just a few influential members,

either of which would require greater personnel resources than focusing on issues that can be addressed at the EU level.

While not focused exclusively on EU policies, the annual Conference of the Parties provides an opportunity to take stock of current policies and compare progress to modeled scenarios. Since the EU takes pride in being viewed as a leader on the climate transition, these are opportunities to push for the adoption of aggressive policies in line with 1.5 degrees of warming that would also make the EU stand out to the global community.

Policy Recommendations

The EU has a well-established process by which it has set goals, and it has a date at which point these goals will be reviewed and revised as appropriate. Member state are given flexibility to design and implement policies at the national level that are consistent with the goals set by the European government. While the EU's current goals are not compatible with limiting warming to 1.5° C, they are still substantial, calling for 33% reduction relative to 2010. However, because of how the policy is implemented, revising these goals upward or accelerating the timeline would require advocacy at both the EU and at the national level. A better strategy is to focus on developing policies that the EU can actually implement independent of the national governments that can push it further in line with the 1.5° C goal.

The European Network of Transmission System Operators for Electricity (ENTSO-E) is positioned to drive this change. ENTSO-E members share the objective of setting up the internal energy market and ensuring its optimal functioning, and of supporting the ambitious European energy and climate agenda.³⁰ More importantly, the network transcends national boundaries, and has the power to draft rules to meet its goals. ENTSO-E is therefore in the position to draft rules that would facilitate an energy transition that is more ambitious than current EU goals and would have an impact in all member state.

ENTSO-E can facilitate the transition in a number of ways, primarily centered around renewable energy. Transmission is key to a reliable, renewable-heavy grid. Renewable resources are intermittent and they are not always located nearest to the largest electric load centers. Transmission can help solve both those problems.³¹ For example in a grid with high solar generation, a transmission connection could allow eastern countries like Romania or Finland to continue to receive solar power from Spain and France even after night has fallen, or it would allow wind power

generated on a windy winter day to be used in the air conditioned rooms of Greece. In addition to simply making a highly renewable grid more feasible, system operators can also incentivize the development of more renewable energy. Streamlining, or even prioritizing interconnection of renewable generating assets can help lower the cost of renewable electricity, helping reach or improve upon its price competitiveness with fossil fuels. Cost-effective, high renewable futures rely on building out the EU's transmission system, with studies estimating ranges from 240% to 400% increases in transmission capacity.^{32, 33} Not only will the transmission capacity need to increase, but it must lead the way to the high renewable future. It is difficult for renewable projects to get built without the transmission to get the electricity to where it is needed, which is why the majority of new transmission capacity must be built by 2025 to enable a 100% renewable electricity system by 2050.³⁴ Greenpeace should make it a priority to ensure ENTSO-E is acting on this imperative and implementing policies that will lead to the rapid deployment of new transmission capacity.

By building out transmission in this manner, the EU will be able to impact emissions beyond the energy sector through electrification. The EU's Energy Roadmap 2050 found that despite energy efficiency measures reducing overall energy demand by 41%, electricity demand will increase due primarily to electrification in the transportation and heating/cooling sectors.³⁵ While it is possible to electrify heating and transportation and to develop a high renewables grid without transmission, the costs are significantly higher. Accomplishing each of these goals without transmission would be 33% higher than if transmission is optimized.³⁶ A 95% reduction of CO₂ through the implementation of these three measures (renewable generation, electrification of transportation and heating) is possible by 2030, and would result in a reduction of 1,359 MtCO₂e.³⁷ This represents 68% of the overall reductions needed by 2030, leaving only 32% to come from other sectors. The transmissions expansion needed to meet this scenario would cost approximately €50 billion per year.³⁸ Under the EU ETS, at least 50% of revenues from the sale of allowances must be put back into environmental efforts. Changing this requirement to specify that revenues should be spent on expanding transmission systems would direct approximately €4 billion per year towards that effort.

Trade is another powerful tool for spreading the EU's climate agenda internationally. In 2017, the EU ranked second in the world in terms of merchandise imports and exports, and first in terms of commercial services.³⁹ The EU could potentially use its importance as a trade partner as a lever to incentivize other countries to improve their environmental performance. This strategy has already been considered, as a July 2018 European Parliamentary Resolution calling for the European Commission "to make ratification and implementation of the Paris Agreement a condition for future trade agreements."⁴⁰ Furthermore, the World Trade Organization (WTO) allows for the assessment

of higher import duties to compensate for unfair trade practices. If it were possible to classify a lack of strong environmental regulation, or a high carbon-intensity manufacturing sector as an unfair trade practice, the EU could impose higher tariffs on countries with weaker environmental laws. This could be a particularly useful tool for driving action among the world's other largest emitters. The EU represents one of the largest trade partners for China, the United States, and Russia, which are all top greenhouse gas emitters that are lagging behind the EU in terms of greenhouse gas reductions. This type of change could potentially be more difficult to implement as it would be contingent upon a favorable interpretation of what is an "unfair" trade practice under WTO rules, would require some means of measurement and verification of the environmental standards under which products from another country were manufactured, and would create the risk that any tariffs imposed would be retaliated against, thereby damaging the EU.

Conclusion

The structure of the EU means that it is possible to influence the emissions of 28 countries by implementing policy in one legislative body. In practice, climate regulation has been done by setting goals at an EU level and leaving implementation to the discretion of the member states. With this in mind, Greenpeace International could be most effective at effecting change by: (1) identifying which MEPs have been elected with an environmental mandate and pushing them to advocate for stronger emissions goals; (2) identifying means through which the EU can implement specific strategies for emissions reductions, potentially including lower caps in the ETS system or new codes under ENTSO-E that promote renewable energy deployment and electrification of transportation and heating; and (3) targeting influential individual member states to craft strong climate regulations that have the potential to be imitated by other member states.

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Country Case Study

INDIA

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Quick Facts

In 2017, India generated 2,467 MtCO₂, and ranked third in the Global Emissions Rank. The Climate Action Tracker rated India's implemented climate policies as "2°C compatible". More than half of India's GHG emissions come from the energy sector (52.25%). Industries (mainly manufacturing) generate 26.4% of the country's emissions, the transportation sector generates 11.5%, and buildings and other sectors generate about 8.5% of emissions.¹

As a developing country, India faces the challenge of balancing its rapid economic growth and the need to tackle climate change. The urban population of India is expected to grow to 600 million by 2030. A large proportion of the population of the country depends on climate-sensitive sectors such as agriculture, fisheries and forestry. With climate change, the country faces dire consequences in terms of increasing flood and drought frequency and less groundwater recharge and so development is needed in the country even for climate adaptation.

India's political influence and weight are as below.²

- Politically influential score = **22**
- Economically influential score = **40**
- Strong international alliances = **24**
- A leader score = **13**
- Cares about the environment score = **3**

India's trade statistics.³

- Exporter rank - 18
- Importer rank - 11
- Top 5 export partners - United States, United Arab Emirates, Hong Kong, China and Singapore.
- Top 5 import partner countries - China, United States, United Arab Emirates, Saudi Arabia, Switzerland.
- Top export goods - Precious Stones & Metals, Oil & Mineral Fuels, Industrial Machinery, Motor Vehicles & Parts and Organic Chemicals.
- Top import goods are - Oil & Mineral Fuels, Precious Stones & Metals, Electrical Machinery, Industrial Machinery and Organic Chemicals.

Greenpeace India has offices in Delhi, Mumbai, Bangalore, Kolkata, Pune, Hyderabad and Chennai.

Sectors and Emissions

The existing inventory of greenhouse gas emissions in India has not been updated, and the data and methodology used for measuring these are unclear. The most recent year with reliable data on emissions is 2013. From 2005 to 2013, India emitted 20.54 billion tons of carbon dioxide equivalent (CO₂e) with 2.8 gigatons in 2013. The emissions have grown at 5.57% annually over this time, and emissions per capita has grown at 4.07% annually, faster than the population growth rate. However, overall and per capita emissions are still much lower compared to countries such as China and USA.⁴

Table 1: India's emissions by sector in 2005-2013⁵

Sector	Contribution to GHG emissions	Trend (2005-2013)	Highest contributing factor within the sector
Energy	68.13%	↑ 5.96% annually	• Generation of electricity (77%) • ↑ emissions from coal and lignite based power plants but ↓ emissions from power plants using furnace oil, diesel, naphtha and gas.
Industry	19.90%	↑ 8.89% annually	• Coal consumption (80%) • Manufacturing of iron and steel has largest share of emissions (38%), followed by non-metallic minerals (mainly cement) (29%)
AFOLU	8.71%	↓ 1.97% annually (mainly due to stagnation in livestock population and improvements in forestry)	• Livestock and rice cultivation (80%) • Direct and indirect N₂O emissions from agriculture are increasing primarily due to use of fertilizers
Waste	3.26%	↑ 4% annually	

In the energy sector, Uttar Pradesh, Maharashtra, Andhra Pradesh, Madhya Pradesh and Chhattisgarh are the highest emitting states in that order. Meanwhile, in the industry sector, the highest emitting states are - Gujarat (14%), Odisha (13%), Chhattisgarh (10%), Jharkhand (9%) and Karnataka (8%).

Projected Emissions of India

Five climate modelling studies supported by the Ministry of Environment & Forests project that India's CO₂e emissions per capita will range from 2.77 tonnes to 5 tonnes in 2030-31. Four of these five studies estimate emissions to remain below 4 tonnes. In terms of total emissions, the studies project 4 billion tonnes to 7.3 billion tonnes of emissions with four out of five projecting below 6 billion tonnes of emissions in 2030-31. All of the models show a decline in India's energy intensity and CO₂ intensity. The studies use varying assumptions for GDP growth rate, inclusion of clean energy and energy efficiency, etc.⁶

Policy Analysis and Timeline

India has made a commitment to reduce its total GHG emissions by 20-25% by 2020 as part of the International Mitigation Pledge under the United Nations Framework Convention on Climate Change. As part of its 2015 Nationally Determined Contribution (NDC) for the Paris Agreement, India has committed to reduce emissions intensity of its GDP by 33-35% from its 2005 levels, increase non-fossil-fuel-based installed electric capacity to 40% of the total mix and create an additional carbon sink of 2.5 billion to 3 billion tons of carbon dioxide through additional tree cover by 2030.⁷

In February 2018, India's total power capacity was 334 GW of which approximately 15% was renewable energy, after excluding electricity generated from hydropower. The share of thermal power plants, mostly coal-based plants, has continued to grow at a rate of 16% from 2011 to 2017. In 2017, however, for the first time, the capacity addition of renewable energy was more than the conventional energy sources, as 12.5 GW of renewable energy was added whereas only 10.2 GW of conventional energy power was added. India has immense solar potential up to 5500 trillion kWh/year.

National Action Plan on Climate Change (NAPCC)

India has implemented a National Action Plan on Climate Change (NAPCC) that has eight missions including energy efficiency and solar energy. The eight missions are - National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat,

National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a Green India, National Mission for Sustainable Agriculture and National Mission on Strategic Knowledge for Climate Change. NAPCC aims to address both development and GHG reduction targets together without any tradeoffs.⁸

Not all missions are specifically targeted towards emissions reduction, but two of the missions - Jawaharlal Nehru National Solar Emission (JNNSM) and National Mission for Enhanced Energy Efficiency are. Some of the missions such as the National Solar Mission have clearly defined targets, measures and action plans, while others such as National Mission on Sustainable Habitat don't have a clear implementation plan. The Government of India has estimated that \$37 billion will be required to meet the objectives of the NAPCC.

Energy Policies

Under the Tax on Coal to Fund Clean Energy, the Indian Government imposes a tax of INR 50 (0.72 USD) on each tonne of domestic and imported coal. The proceeds of the tax go to the National Clean Energy Fund that invests in research and entrepreneurship ideas on clean energy technologies. Other energy supply policies include the National Tariff Policy and the National Electricity Policy, which both focus on promoting an increase in renewable energy sources such as solar and hydropower. Under JNNSM, India has committed to deploy 100 GigaWatts (GW) of grid connected solar power, an off-grid solar power target of 2000 MW, and a renewable energy target of 175 GW by 2022. These supply policies work through Renewable Purchase Obligations (RPOs) that mandate power utilities to source a share of their energy from renewables or solar respectively. JNNSM also operates through generation based incentives and capital subsidies. The Indian Renewable Energy Development Agency (IREDA) provides generation based incentives to State power utilities for purchasing solar energy from developers. The Government also provides a capital subsidy of 30% for the deployment of solar projects and/ or soft loans with a 5% interest rate. The Sustainable Rooftop Implementation for Solar Transfiguration of India (SRISTI) programme reduces complexities involved in setting solar rooftop systems.⁹ Trading of Renewable Energy Certificates (RECs) has also been introduced.

Energy Efficiency Policies include the Energy Conservation Act of 2001 that mandate energy efficiency measures through the Bureau of Energy Efficiency (BEE), and the National Mission for Enhanced Energy Efficiency. The National Mission on Enhanced Energy Efficiency employs strategies such as Market Transformation for Energy Efficiency by reducing manufacturing costs of energy efficient appliances through market incentives. Bachat Lamp Yojna policy under this strategy has resulted in distribution of compact fluorescent lamps (CFLs) to more than 20 million households by 2014. UJALA policy has reduced prices of LED lighting. Another key policy in energy

efficiency is the Energy Conservation Building Code (ECBC) that sets minimum energy efficiency standards for buildings.¹⁰

Key policies in other sectors

Perform, Achieve, and Trade (PAT) Mechanism for Energy Efficiency is a plan under the National Mission for Enhanced Energy Efficiency under which eight of the fifteen most energy intensive industries are covered to reduce their energy consumption. More stringent emission standards for particulate matter, SO₂, NO_x and mercury from coal based thermal power plants have been introduced. National Policy on Biofuels aims to promote biofuels (bioethanol, biodiesel, ethanol, and municipal Solid Waste (MSW) bio-CNG in the transportation sector. The Auto Fuel Vision and Policy 2025 promotes fuel economy, stringent fuel quality and emission standards (Bharat Stage (BS) IV fuels to BS V by 2020 and to BS VI fuel by 2024). National Electric Mobility Mission Plan (NEMMP) 2020 aims to introduce 6-7 million electric/hybrid vehicles in India by 2020. The NEMMP works by providing demand and supply side incentives, and promoting research and charging infrastructure.¹¹ The Agricultural Demand-Side Management is aimed to improve energy and cost savings by installing efficient pump sets. The National Mission on Sustainable Agriculture focuses on energy efficient irrigation systems and other equipment. It tries to devise climate change adaptation measures for a largely rainfed agriculture system. The National Mission for a Green India is designed to improve forest cover, forest based livelihoods and carbon capture.¹²

Measurement of progress towards NDCs

India has published two sets of Biennial Update Reports (BUR) to the UNFCCC, most recently in 2018. The report claims that the emission intensity of India's GDP has reduced by 21% over the period of 2005-2014, solar installed capacity in India has increased from 2.63 Gigawatt (GW) to 23.28 GW between March 2014 and August 2018, the share of non-fossil sources in electricity has increased from 30.5% in March 2015 to 35.5% in June 2018, and forest and tree cover increased from 24.01% of the total geographical area to 24.39% making forestry and other land uses a net carbon sink.¹³

Policy windows

Industry: Perform Achieve Trade (PAT) V, VI and VII for Industries (2019-2021)¹⁴

Energy:

- Solar parks and ultra-mega solar power projects to be implemented by 2020.
- National Solar Mission (2017-2022)
- 20 million solar lights by 2022

Transport:

- 6-7 million electric vehicles under National Electric Mobility Mission Plan
- Bharat Stage (BS) VI Norms are to be implemented in 2020. BS standards are instituted by the government to regulate emission of air pollutants from motor vehicles. They are similar to Euro 6 standards. The BS VI standards can bring down PM in diesel cars by 80% from current BS IV standards. BS V standards are skipped considering current pollution levels in India

General: Phase out single use plastics by 2022

Recommendations

It is expected that India will meet or even exceed its NDC targets. But, significant uncertainties and challenges remain in implementation. Key recommendations to ensure India meets and exceeds its climate targets are as below:

- Transparency and accountability: Greater transparency is needed in terms of available information, data, methodologies and accounting to measure progress accurately towards targets from the base year of 2005. Information required for measuring India's progress towards targets is not publicly available. The BUR underreports the assumptions and methodologies such as how AFOLU sector emissions are included in calculating progress towards targets. There are also discrepancies between base year and current years of measurement such as what gas emissions are included. India's latest emissions data submitted to the UNFCCC are from 2010 and need to be updated.
- Raise NDC targets: A critique of India's NDCs is that India has promised to increase non-fossil-fuel-based installed electric capacity to 40 percent of the total mix which is a very broad commitment that can include sources such as hydropower and nuclear energy as well. In October 2015, at the time of the NDC commitment, India's non fossil-fuel electricity

generation was already at 30% and exceeded 34% by 2017. Thus, India's commitments are much lower than what the country has the potential to achieve. Moreover, the clean energy targets of India are conditional on help from Green Climate Fund for low cost finance and technology transfer. India's emissions intensity already declined by 31% between 2005 and 2011.¹⁵

- Financial robustness: Although policies such as the Jawaharlal Nehru National Solar Mission have been successful, significant challenges in availability of land, low-cost finance, domestic manufacturing capacity, supporting infrastructure and skilled manpower still remain. The REC market has seen low participation due to the financially distressed nature of distribution companies. The chance that REC will recover is low - distribution companies are the biggest roadblock. Demand from distribution companies is low.
- Proper implementation: There is lack of implementation of the Renewable Purchase Obligations (RPOs) and of ECBC. The National Clean Energy Fund is also underutilized. However, if India effectively implements policies such as a Perform, Achieve, and Trade (PAT) scheme, a clean environment tax, renewable power by 2022 and Energy Conservation Building Code (ECBC), the 2030 emission reduction target is possible to reach.
- Enabling environment and institutional capacity: By providing innovative fiscal incentives and new financial schemes, the Government of India can provide an enabling environment for the adoption of clean and renewable energy by improving grid integration and building domestic manufacturing capacity. Energy storage technologies are particularly crucial for rapid scaling up of renewable energy. However, barriers such as intellectual property and costs of deployment still exist in developing countries and thus low-cost finance is needed.
- Better coordination: National, state and local governments must improve coordination, and need to ensure alignment among different ministries and departments in order to meet India's GHG mitigation targets.¹⁶

Energy Specific Recommendations

(developed through consultation with Mandvi Singh, Deputy Programme Manager, Global Energy Programme, Centre for Science and Environment (CSE)):

- Keep markets competitive: Out of the 100 GW grid connected solar power committed by India by 2022, 60 GW is for large scale installations, of which 25 GW has been achieved. 35 GW remains to be installed in the next four years. The Solar Energy Corporation of India (SECI) comes out with tenders for solar projects. Lately, the Government of India has been putting ceilings on the tender prices in the auction and bids are cancelled if the price is too

high. The market was competitive earlier but now is under pressure from the Government. Demand and supply side distortions, and meddling from Government can be reduced. Price ceilings are not needed and the Government can rely on competitive bidding for efficient outcomes. Growth in large scale renewable in India has already been remarkable without interventions, but policy gaps can slow the momentum.

- Allow open access to different markets: Government efforts to increase manufacturing capacity are actually raising prices because there are import restrictions and custom duties. Domestic capacity will never be enough to meet demand and targets. So, custom duty on imported materials and focus only on domestic manufacturing are impeding growth. Allow corporate consumers open access so that they can explore alternative markets and procure from any markets. Focus less on solely domestic manufacturing.
- Rooftop solar: Out of the 100 GW, 40 GW is the target for rooftop installations of which only 1.4 GW has been installed so far. Rooftop installations of solar are especially suffering because there is resistance and lobbying from distribution companies. These companies worry that if consumers generate electricity by himself/herself then they will lose market share. Distribution companies are already struggling financially which explains their disdain in seeking new solar projects. Programs such as Kisan Urja Suraksha evam Utthan Mahabhiyan (KUSUM) that give incentives to power distribution companies (DISCOMs) are not sustainable and what is needed is innovative business models. Rooftop solar has a lot of potential and if distribution companies become more financially stable, it is more likely that they will accept newer solar energy sources.
- Coal usage reduction: Despite promises to phase out coal completely, India has built three new coal plants, when the closed ones are already stressed assets. NITI Aayog, the Planning Commission of India, reported installing more than 243 GW of coal capacity by 2040 via construction of new plants between 2027 and 2040. So, India may meet or surpass its first NDCs but second NDCs post-2030 are in jeopardy. To put this in perspective, this will result in 83Gt of CO₂ emissions by India's currently operating and future coal plants between 2015 and 2065, with 2.3 Gt in 2040. This would form 24% of the remaining carbon budget for the rest of the world apart from EU, US and China for a 2° C pathway, if allocations of emissions between regions follow the current distribution pattern. In order to meet the 1.5° C scenario, India's energy consumption from coal should be 170 of oil equivalent in 2030 and 47 Million tonnes in 2050. However, current plans for coal expansion will lead to 517 Mt 2022 and 1000 Mt in 2040.¹⁷
- Grid integration: The Government's point of view is that solar and wind energy are variable so grid integration is difficult. International Energy Agency (IEA) studies say that up until 5% renewable component in the energy mix, the grid isn't affected and easy integration is possible. With growth in the renewable content, more sophisticated grid integration

technologies are required. In order to integrate 175 GW of renewable energy committed by India by 2022, thermal capability will need to be backed down and made flexible so that the variability in renewables can be effectively integrated along with meeting demand. However, thermal energy is not designed to be backed down so other options such as pump hydro, gas based power plants, and battery system can be explored. Battery prices are drastically decreasing in India. They have already dropped to 2 Rs/unit or to one fifth of the initial prices. European countries such as Ireland have been able to achieve 33% renewable grid integration. India has a much larger grid so it is definitely feasible for the country to achieve the committed level of integration.

- Wind energy: Wind energy is completely stalled right now and needs special attention for revival.
- Focus on demand side as well: Government needs to provide individual focus on both supply and demand. Demand from distribution companies, or corporate consumers, needs to be increased via incentives. It also needs to not only align RPOs to national targets but also to strengthen them via imposition or penalty.

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Country Case Study

INDONESIA

Author: Elaine Angeles



Country Profile

Indonesia has a population of 260 million which makes it the fourth most populous country in the world. Indonesia's economy has grown steadily since the Asian financial crisis in the late 1990s.¹ Today it is Southeast Asia's top economy, and the world's 10th largest (in terms of purchasing power parity).² Indonesia is a member of the G20 along with other industrialized and developing economies.³

Indonesia has the third largest tropical forest in the world.⁴ It's seagrasses and mangroves are a carbon sink, and account for 17% of the world's blue carbon reservoir.⁵ Due to rainforest and peatland degradation and loss, Indonesia's carbon sinks have now become its greatest source of emissions, accounting for 85% of emissions.⁶

Indonesia plays an important role in international climate change dialogues, and is a member of five important negotiating blocs: Like-Minded Developing Countries (LMDCs); G77 and China; Coalition for Rainforest Nations; Organisation of the Petroleum Exporting Countries (OPEC); and the Cartagena Dialogue.⁷ It has extensive trade relations with countries in Southeast Asia and the Middle East - with maritime networks dating as far back as 1000 to 1500.⁸ These strong commercial connections, along with their shared religious and cultural background, put Indonesia in an important economic position in these regions.

The following scores were taken from the 2019 Best Countries report and rankings developed by BAV Group and The Wharton School of the University of Pennsylvania.⁹ The survey looked at global perceptions of 80 countries in terms of 65 attributes. Below are Indonesia's scores on selected power/influence indicators:

- Politically influential score = 6/100
- Economically influential score = 8/100
- Strong international alliances = 5/100
- A leader score = 5/100
- Cares about the environment score = 7/100

While the low scores may indicate that Indonesia does not hold strong world power or influence, it is important to note Indonesia may still have significant influence within specific regions, particularly in Southeast Asia and Middle East.

Sectors and Emissions

In 2017, Indonesia was the world's 12th largest emitter of greenhouse gases.¹⁰ The highest source of emissions comes from deforestation and land use change, including peatland degradation and forest fires.¹¹ In 2006, megafires caused a spike in emissions.¹² In addition, Indonesia is the fifth largest producer of coal, and the world's largest exporter of thermal coal.¹³ It has plans to close the electricity gap by expanding its domestic coal-fired power generation that would further increase its emissions.¹⁴ In 2017, emissions from the agriculture, forestry and other land use (AFOLU) sector is 1,844.17 million tons CO₂e.¹⁵

The country's main source of energy is fossil fuels (approximately 95%) - 48% of this is oil, and the rest are coal and natural gas. Only 5% comes from renewable sources such as geothermal power and biofuels. The government aims to increase the share of renewables to 15% by 2025. These targets are contained in the 2007 Energy Law.¹⁶ The Indonesian government also signed the Paris Agreement, and committed to cutting its greenhouse gas emissions by 29% unconditionally, and conditionally by 41% by 2030.¹⁷ The Climate Action Tracker notes this is "highly insufficient."¹⁸ A concrete example of this is in the AFOLU sector. Despite its moratorium on new forest and peatland concessions and restoration, reforestation and other related initiatives on forestry and land use, a study by the World Resources Institute states that the 2030 projected emissions is approximately 2.3 Gigatons of CO₂, while the 2030 target is 2.0 Gigatons of CO₂.¹⁹

Emissions from the AFOLU sector need to be reduced by 60% to enable Indonesia to meet a large share of its climate commitments. This shifts attention from other sectors, and requires no significant effort on other sectors.²⁰

Policy Overview and Analysis

Indonesian government's climate policies are focused on addressing emissions from the AFOLU sector:

- In 2015, the government issued a nationwide moratorium on draining of peatlands.²¹ A Peatlands Restoration Agency was formed to restore 2 million hectares of tropical peatlands by 2020.²² The following two years saw a sharp decline of forest loss (60%).²³ In 2018, a moratorium on new permits for palm plantations was put in place for three years.²⁴ The moratorium created a problem since about 25% of protected peatlands have previously been auctioned off to palm oil and timber companies.²⁵ The government then offered companies'

access to unprotected lands through a land swap scheme, which increases the risk of deforestation.²⁶ On the other hand, the European Union set stricter criteria for palm oil imports to reduce deforestation caused by the palm oil industry which Indonesian ministers strongly opposed.²⁷

- Presidential Instruction No. 4/2005 codifies and reinforces the commitment to fight forest crime, and directs 18 agencies to cooperate in controlling illegal logging and the prosecution of forest crimes.²⁸ Grants of logging concessions at the district level were prohibited, and officials from the Police and Prosecutors Offices were stationed at the Ministry of Forestry, but there are no detailed plans, budgets, information sharing arrangements, or standard protocols.²⁹

Geothermal energy development is another area of focus for the Indonesian government.³⁰ The country's geothermal resources constitute 40% of the world's total geothermal reserve, however production is slow.³¹ A new geothermal law was passed in 2014, and the implementing regulation was issued in 2017. Yet, there are significant barriers to development:³²

- Location: Prospective geothermal projects (considered as mining) are located in conservation forest areas, where the Indonesian forest law prohibits mining operations.
- Data and funding: Exploration activities require data and funding, which national geothermal developers do not have.
- Energy pricing: Geothermal electricity cost is higher than coal-fired power. Concerns on just and fair value of geothermal were raised, and an appropriate geothermal pricing policy needs to be put in place.

Despite its global climate positioning and targets, Indonesia has been unable to develop and enforce effective climate policies. It lacks the political will to reform its systems towards a low carbon economy, and may be attributed to the fact that the main drivers of its economic growth are land and energy intensive.³³

The government's previous five-year plan (2015-2019) committed to a "green economy" and specifically targeted emissions reduction in five priority sectors: forestry and peatlands, agriculture, energy and transportation, industrial and waste.³⁴ In March 2019, the government released a report that looks into strategies to incorporate climate action in the new five-year plan.³⁵ Low carbon development is perceived to drive a 6% annual GDP growth rate until 2045, which is better than a "business-as-usual" strategy.³⁶ This new five-year plan currently under development will cover the period 2020-2025.³⁷ This year (2019) is an important policy window for Greenpeace International to

ensure that critical information reach policy makers, and appropriate strategies/programs, funding, structures and enforcement mechanisms are put in place.

Policy Recommendations

Policy recommendations:

- **Decrease coal investments and shift to renewable energy.** Indonesia's 2018 energy plan includes 27 GW of coal-fired power in the next decade while adding only 15 GW of renewables within the same period.³⁸ On the other hand, only 5% of the country's electricity mix comes from renewable sources even though the government committed to 23% renewable sources by 2025, and 31% by 2050.³⁹ The renewable energy capacity of Indonesia is untapped - it has 40% of the world's geothermal reserves but is using barely 7% for power generation.⁴⁰
- **Improve governance of forests and peatlands, advocate for stricter implementation** of moratorium for new permits (from 2015) and the National Strategy for Forest Law Enforcement (from 2005), and support the One Map Policy that creates a transparent monitoring system of forest areas.⁴¹
- **Push for more ambitious Nationally Determined Contribution (NDC) targets.** NDC targets are not sufficient. Under current policies, Indonesia is unlikely to meet its New Energy Policy (NEP) target, while AFOLU emissions are projected to increase by 300 MtCO₂e between 2020 and 2030.⁴²
- **Require emissions reduction in all sectors.** While significant emissions reduction in the AFOLU sector would enable Indonesia to meet a large share of its climate commitments, this does not mean other sectors should increase or maintain their level of emissions.⁴³

Program recommendations:

- **Strengthen partnerships with national and sub-national government agencies** in Indonesia, and participate actively in consultative meetings or technical working groups to develop policies, programs or strategies and assist the government in fully implementing its key land-use policies.
- **Mobilize civil society and private sector** to advocate for transparency and good governance, and promote a multidimensional, cross-sectoral approach to climate change issues. This should involve discussions with palm oil stakeholders given that Indonesia is the largest

producer and exporter of palm oil worldwide, producing 61% (36 million metric tons) of the world production.⁴⁴

- Since 72% of Indonesian products are exported to Asian countries, and 11.3% and 10.6% are exported to North America and Europe, respectively, it is important to **foster policy advocacy work in parallel in these regions**. If more countries would follow the EU in imposing stricter criteria for biofuels imports, Indonesia would be forced to set and adhere to standards to keep its market.⁴⁵

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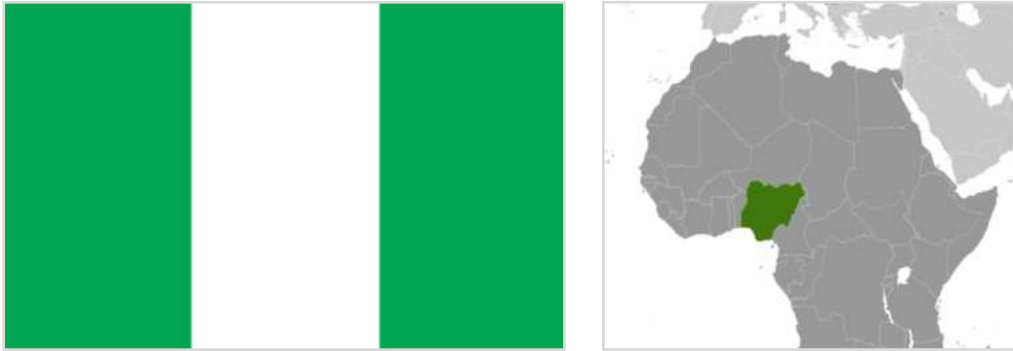
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Country Case Study

NIGERIA

Author: Anna Liebowitz



Country Profile Overview

Nigeria is Africa's most populous country, with 203 million people and a rapidly growing population.¹ The nation is working to shore up democratic institutions in place since 1999, address widespread poverty, and improve living standards and calm ethnic and religious tensions.² It sits atop Africa's second largest petroleum reserves, most of which it exports to the world market; it is the largest oil and gas exporter on the continent.³ Internally, Nigeria's per capita emissions are fairly low, and overwhelmingly from agriculture and forestry.⁴ However, since it exports the large majority of its petroleum production, the country's largest climate impact is likely in the fuel it exports.

Nigeria is a party to the Paris Climate Accord and other international climate change agreements. Greenpeace Africa is the Greenpeace branch operating on the continent. It does not have an office in Nigeria but the organization is pushing corporations and governments to “accelerate the just phase-out of fossil fuels and embrace cheaper more sustainable renewable energy.”^{5,6}

- Nigeria's government is over-exposed to oil and gas volatility and wants to reduce its dependence on the industry.⁷
- Oil theft, corruption, and deals with foreign oil and gas companies mean that the government loses much of the oil revenue it is due and that most Nigerians do not reap the benefits of the oil and gas industry.⁸
- Extensive environmental damage from extractive industries has created local resistance to oil and gas industries.^{9,10}
- Nigeria has a Sovereign Wealth Fund from extraction revenues;¹¹ this could be directed toward developing away from oil and gas dependence.
- **Greenpeace should focus on the message that *the oil and gas industry is not working for Nigerian people*, and is driving internal conflict and lining the pockets of global elites.**

Sectors and Emissions

Oil and gas revenue makes up a majority of the federal government's revenue and nearly all of the foreign exchange, making the government both highly dependent on the industry and also very vulnerable to changes in global oil and gas prices.¹² Further, Nigeria significantly subsidizes fuel for citizens – in part as an antipoverty measure – and must import refined products into the country. Thus, when oil prices are high, the governments revenues increase but its spending also increases substantially.¹³

Policy Overview and Analysis

Nigeria has some policies proposed or in place to reduce emissions from the oil and gas sector, but no evident plans to reduce extraction. Select policies include:

Existing Policies

- National Renewable Energy and Energy Efficiency Policy (NREEEP) passed into law in 2015 and sets a direction (without specific targets) for renewable energy deployment in Nigeria.¹⁴
- National Renewable Energy Action Plans (NREAP) (2015-2030)¹⁵
 - Calls for a major ramp-up of grid-connected renewable energy production from 916 MW in 2016 to 13800 MW in 2030.
 - Aims to increase energy security, create new jobs, and combat climate change
 - Targets on-grid and off-grid electricity production, cookstoves, solar water heaters, and biogas and other alternative fuels.
 - Although the energy action plan is ambitious, it also includes a major increase in total electrical production to 30 GW by 2030, with 30% of that being renewable energy, so may in fact plan for an increase in total electricity-related emissions.
- In 2015 INDC and in NREAP, government calls for end to gas flaring by 2030.¹⁶
- 2015 INDC includes efforts to reduce agricultural emissions and reforest land.¹⁷

Policy Action Ideas and Challenges

- Greenpeace should help hold the Nigerian government accountable for its own stated renewable energy goals, and should push for a moratorium on new fossil-fuel based power plants.
- Nigeria should focus on using petroleum revenue to build up non-fossil fuel industries. They could maintain their position as an energy-exporting economy by investing in manufacture of solar panels, batteries, and other key renewable energy technology.
- Nigeria should phase out its fuel subsidy and replace it with subsidies for renewable energy installations and climate-sensitive agriculture. The government has faced fierce opposition on earlier attempts to end the subsidy, so it will be important to build popular support for this solution and ensure a just transition.¹⁸ The government is moving in this direction and Greenpeace may be able to assist and ensure that the removal translates into lower emissions and protects vulnerable citizens.¹⁹

Policy Window

In December 2009, the government passed Nigeria Vision 20:2020, a ten-year plan to develop the economy, improve lives of everyday people, and safeguard the environment.²⁰ It is likely that the government is currently developing a similar ten-year planning vision for the next decade; this may be a key chance to influence the direction of their climate-related policies.

Strategic Insights and Recommendations

For the world to stay under 1.5° C, it is crucial that major oil and gas producing countries keep fossil fuels in the ground and rapidly ramp down extraction. Nigeria is in a particular bind as a developing country that is highly dependent on oil exports. To transition away from the fossil fuel industry, Nigerian people and government must decide that the oil and gas industry works against their interests, *and envision viable alternative development pathways*. Greenpeace can help build the case that costs of the oil industry outweigh the benefits. Key arguments include:

- Decades of oil extraction have not led to major improvements in the lives of most Nigerian people, as 62% still live in extreme poverty.²¹
- Severe local environmental and health impacts of the fossil fuel industry from flaring, oil spills, and other polluting activities.^{22,23}
- Widespread theft of oil and oil profits through siphoning from pipelines, piracy, and other acts decreases the government's benefits further.²⁴
- Exposure of Nigerian governmental revenue stream to oil price volatility.²⁵
- Dependence of Nigeria on oil in a world that may transition away from fossil fuels in coming decades.

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Country Case Study

RUSSIA

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Country Profile Overview

Russia is the fourth largest emitter of greenhouse gases globally after China, the United States and India¹ and its efforts to reduce its emissions are according to the Climate Action Tracker highly insufficient. This means that Russia's efforts are not at all consistent with holding global warming below 2° C let alone with the Paris Agreement's stronger 1.5° C limit. If all countries had similar goals the global warming would instead exceed 4° C warming.² Furthermore, Russia and Turkey, are the only two G20 countries that have not ratified the Paris Agreement, of which Russia has only submitted an "Intended Nationally Determined Contribution" (INDC), without any promises of actually committing to its set goals.³

Russia is unique in the sense that it is the world's largest country by land mass, and second largest nation in the world, and stretches over all of northern Asia and much of Eastern Europe. Moreover, Russia has one of the strongest economies in the world, which is primarily based on its vast natural resources. The production of oil and natural gas particularly contributes to the country's economy, which has major implications for how Russia addresses climate change.⁴

However, perhaps the most unique aspect of Russia in regard to climate change is its lack of incentives to contribute to the global efforts of reducing global warming. As one of the world's main exporters of coal, oil and natural gas, Russia would suffer from major economic losses due to a global transformation towards a low carbon emitting world. Secondly, Russia is one of the few countries expecting to benefit from short term consequences of global warming. This is likely another reason Russia does not adopt more ambitious climate change policies. Lastly, Russia is known for its hesitancy in becoming too involved in global multilateral agreements as they see them as "western" ideas. Again, this is another reason Russia shows little initiative to step up its climate goals.

Russia contains 19% of world's forest reserves by surface area, and could be used as a global carbon sink. However, these forest reserves are generally given less attention in mitigation strategies because they are boreal, and not tropical forests. Boreal forests do not sequester as much carbon. However, Russian forests sequester approximately 300 to 600 million tonnes of CO₂ annually, an amount according to climate scientists at Moscow's Higher School of Economics, could be increased by improving forests management and regulation in Russia. Some Russian climate scientists argue that not investing more in the vast boreal forests is a missed opportunity in combating climate change.⁵ Advocating for improved forest management in Russia to enhance Russian forests ability to absorb greenhouse gases could be an area of focus for Greenpeace International and Greenpeace Russia to focus their efforts.

Developed by an international team of researchers led by Johan Rockström, the Carbon Law states that emissions must be cut in half by 2030, and would give the world a 75% chance of keeping Earth below 2°C.⁶ Currently, Russia does not have emissions reduction goals that are sufficient to meet this target and is moving in the opposite direction of both the Carbon Law and its national targets to limit global temperatures to 1.5°C.

Sectors and Emissions

Russia ranks consistently towards the top emitters across all sectors, with the third highest emissions from non-combustion sources, sixth highest emissions from buildings, and fourth highest emissions from power, transportation, and industry.⁷ However, the energy sector is the highest emitter in Russia generating 1,614.17 million tonnes CO₂e annually.⁸ Within the power sector, generation is dominated by fossil fuels, with natural gas and coal accounting for nearly two thirds of generation. The remainder is largely nuclear and hydropower, with non-hydropower renewables accounting for less than 0.5% of electric generation in 2016.⁹ The heart of Russia's economy consists of energy and emissions-heavy industries such as extractive industries for minerals and fossil fuels, chemical and metals processing, and manufacturing of heavy-duty equipment. The combustion carried out for Russia's fuel manufacture and industrial processes alone would rank as the 25th highest emitting country in the world.

Policy Overview and Analysis

Russia's national policies are similar to its Paris pledge. Using a baseline of 1990 means that without any effort they are on track to meet the goal of 75% of 1990s emissions by 2020. Due to a decrease in emissions following the collapse of the Soviet Union in the early 1990s, Russia's emissions are already nearly in compliance with their pledge. This is not due to good policy, but to the fact that if every country had a pledge as low as Russia, the planet would be on track for greater than four degrees of warming.¹⁰

Furthermore, Russia continues to subsidize fossil fuels, has no plans to phase out coal-fired generation or fossil-powered light duty vehicles, and its energy supposedly includes promotion of greater fossil fuel usage.¹¹ Between 2013 and 2015 the G20 countries provided approximately USD \$91.4 billion a year for fossil fuel power projects (coal, oil and gas projects and associated infrastructure), with Russia as one of the highest contributors.¹²

According to the Climate Action Tracker Russia's currently implemented policies will lead to emissions of between 2.6 and 2.7 Gt CO₂e in 2020 and between 2.8 and 3 Gt CO₂e in 2030 (both

excluding LULUCF). These are 0-4% and 6-14% above 2016 emission levels respectively, and represents a decrease in emissions from 1990 levels of 27-29% in 2020 and 20-25% in 2030. These emissions are all below the INDC targets, which allow emissions to grow 6–24% above 2016 levels by 2020 and 15–22% by 2030.¹³

Russia has very few climate policies and regulations in place. One of the few overarching national policies on climate change is the “*Climate Doctrine of the Russian Federation*” adopted in 2009. The Doctrine is considered to be an important step for Russia as it shows a will to address and the issues of climate change and the importance and the benefits of climate mitigation processes. Although not legally binding, and seen as a grand act by Russia in 2009, little has happened since the Doctrine was adopted.¹⁴ In 2014, a Progress Report on the Execution of the Climate Doctrine Implementation Plan, was released suggesting that in 2013 Russia adopted climate change adaptation measures aiming to reduce production loss risks in agriculture, reduce the frequency of forest and peat fires, limit negative impacts of flooding, and halt the retraction of mountain glaciers.

The only area where Russia has quantifiable targets found in laws and policies is within the energy sector. The energy efficiency law (Federal Law 261-F3 on Saving Energy and Increasing Energy Efficiency Increase and Amending Certain Legislative Acts of the Russian Federation) was adopted in 2003 and consists of regulations related to energy consumption and energy efficiency. The law has resulted in several follow-up implementing by-laws including: the Thermal Performance of Buildings code (2003) and “On Saving Energy and Increasing Energy Efficiency” (2009).^{15,16} Despite federal legislation in place for energy efficiency, it is largely declarative and provides few solutions on how to secure funding for energy efficiency projects.¹⁷ Hence, the current laws and regulation will have limited impact on reducing the emissions from the energy sector without further funding.

Policy Window and Timeline

Russia has a bicameral system as well as a Federal Assembly that consists of the State Duma and the Federal Council. Members of the Duma serve a five-year term and the members of the Federal Elections serve a four-year term. The Duma passes laws which are then passed on to the council for confirmation before sent on to president for signing. Elections for the Duma was last held in 2016 and the next election is to be held in fall 2021.¹⁸ Another important part of the Russia legislative system is the executive regulations, also known as decrees and directives. These are passed by the President and can be used on any issues that are not already regulated in federal law.¹⁹

President Vladimir Putin was elected president in 2012, re-elected in 2018 and the next election will not be held until March 2024. There is no vice president; premier appointed by the president with the approval of the Duma.²⁰ The next Duma elections in 2021 can be considered as a policy window for Greenpeace as new representatives will be elected, however Russia is known for being an

authoritarian state with a strong presidential influence and the most important policies are usually passed as presidential decrees.

Strategic Insights and Recommendations

According to the U.S. News “Best Countries” ranking published in collaboration with the BAV Group and Wharton School of Business, Russia’s is the second most powerful nation in the world (score: 9.9) and it also scores high regarding political and economical influence, with a score of 10 and 8 respectively. Based on this index, it is clear Russia is indeed one of the world’s most influential nations and has some of the most dominant international alliances. However, the index also shows that the environment is not a priority for Russia scoring 0.4/10.²¹

Russia’s lack of ambition in regard to combating climate change is relatively unique considering it is one of the largest greenhouse gas emitters in the world. There are three main reasons why Russia currently lacks incentives to contribute to the global efforts of reducing global warming. These aspects are important for Greenpeace International to consider when they structure their strategies on how to best impact Russia and will therefore be elaborated on in this section.

First, Russia has the world's largest natural gas reserves, the second largest coal reserves and the 8th largest oil reserves. It is the world's leading natural gas exporter and leading natural gas producer, while also the second largest oil exporter.²² Because of these vast natural resources Russia has one of the strongest economies in the world. Looking at these facts it is not difficult to see why Russia has such low ambitions and goals when it comes to reducing their greenhouse gas emissions. Being one of the world’s main exporters of coal, oil and natural gas, Russia’s economy would suffer greatly if the world transitioned into a low-carbon emitting world.

Secondly, even though Russia is a powerful player in global politics it is often reluctant in becoming too involved in issues related to global governance, mainly because global governance and multilateral agreements, such as the Paris Agreement, are seen as “western” ideas that are not necessarily aligned with Russia’s interests. Moscow, on the contrary to Beijing, is not as deeply integrated in the global political market and has a relatively smaller sphere of interest than China and is therefore less interested in participating in large multilateral agreements that might prevent their policies of opportunism. There are experts who argue that Russia even benefits from certain level of global volatility.²³

Thirdly, in Russia, in contrast to most other nations, there is not a common understanding that global warming is harmful. In 2017 a headline from the Moscow Times read “*Russia to Reap Benefits from Climate Change*” suggesting that Russia, with a few other nations would actually benefit from increased global warming. The article, based on an IMF report, suggests that climate change will

enable Russia to grow a greater volume and variety of crops, important to Russia as an emerging important wheat exporter. The article also states that the melting of the polar ice cap can benefit Russia as it allows Russian ships to navigate Arctic waters. This opens up the opportunity to further explore and exploit the Arctic continental, where substantial untapped energy reserves lie.²⁴

However, even though Russia would have low cost or even short-term net benefits from increased emissions, scientists all agree on that no country (including Russia), will be able to avoid the long-term effects of rising temperatures. Several degrees of warming will lead to trade disruption, mass migration and severe public health effects.²⁵ A report published by the Natural Resources and Environment Ministry in 2018 shows that experts within the Russian government are aware of the severe consequences of rising temperatures and advocate the importance of taking action. The report clearly highlights the risks related to global warming such as forest fires in Siberia, melting permafrost that lead to radioactive substances entering the anthroposphere, water shortages and increased public health costs related to increased pollution and temperatures.²⁶

Even though Russia does not currently prioritize the environment, there are indications that climate change is an increasing concern for the Russian government. An anonymous government source quoted in a 2018 Moscow Times article said that “an unexpected focus on the aftereffects of climate change probably mean the ministry intends to become the chief climate policy developer and coordinator.”²⁷ This suggests that the Russian government wants to have more insight and power over environmental policies. The same article stated that Russia has assigned around \$ 22 billion on new national environmental programs to encourage reforestation, recycling and air pollution reduction.²⁸ However, even though there are indications that Russia is taking climate change increasingly seriously, there are few indications that this will have any impact on Russia’s global policies and its INDC.

Another key aspect that heavily influences Russian politics is Russia’s and the EU’s trade interdependence. The EU is Russia’s largest trading partner and Russia is EU’s fourth largest trading partner. Russia primarily exports raw materials such as oil and gas to the EU; in 2017 energy products accounted for 60% of EU’s total import from Russia.²⁹ The EU is also the biggest investor in Russia with 75% of all direct investment stocks in Russia coming from EU member states. The EU and Russia’s political and economic relations are based on a Partnership and Cooperation Agreement (PCA). However, despite the regions interdependence on each other, trade between the two has decreased 44% since Russia joined the WTO in 2012. The main reason for this decrease is Russia’s failure to meet key commitments to WTO rules and regulations.³⁰ Furthermore, the relationship between Russia and EU worsened as a result of the “Ukraine crisis” and caused the EU to impose sanctions against Russia. However, the EU is still dependent on Russia for its energy as a net importer of energy products.

The authoritarian nature of the Russian state does not provide favorable social and political structures for social movements. The Putin Administration labels many environmental groups as

“anti-Russian” and disrupts their work through a variety of authoritarian methods including intimidating journalists, raiding NGO offices and instituting new legislation that limits the ability of advocacy. Consequently, environmental movements have had limited triumphs. However, one of the few successes achieved by the Russian environmental movement is the expansion of the so-called “protected areas”. Nevertheless, it is very clear that the muzzling of the civil society prevents the development of a powerful green social movement in Russia.³¹

Policy Recommendations

- ***More comprehensive and cohesive legislative framework***

It is striking how the current legal regulation on the fuel and energy sectors in Russia seems like a patchwork and are few holistic and cohesive laws on energy that can effectively regulate the electric power. Each energy sector is governed by its own separate law, which results in few achievements and low set goals. It is evident that Russia needs more comprehensive and cohesive legislative framework for climate change and this is something that Greenpeace International and Greenpeace Russia should lobby for in Russia.

- ***Lobby for increased energy efficiency***

According to the World Bank, Russia’s energy inefficiency in 2014 was equal to the annual primary energy consumption of France. If Russia realized its full efficiency potential it could save up to 45% of its total energy consumption and it would also be able to reduce greenhouse gas emissions by 20%, below the 1990 level, by 2030. Furthermore, half of the potential savings could be achieved through financially viable investments.³² However, to bring about these cuts the Russian government will need to adopt and implement new ambitious and clear energy standards. The government should also increase its efforts to create a business environment where energy efficiency is rewarded. Russia has everything to win by becoming more energy efficient and it is currently an expensive policy not to address the energy waste in the country. Greenpeace International should therefore, through political advocacy, lobby for increased energy efficiency in Russia.

- ***Force Russia to change their energy policies through global trade patterns***

As a “fossil fuel superpower” and one of the world’s leading energy exporters it is difficult to incentivize Russia to step up its efforts to combat climate change. However, the fact that Russia’s economy is so dependent on its energy trade might be used as a strategic tool to force Russia to reduce its greenhouse gas emissions. Despite the Ukraine crisis, the EU is still Russia’s largest trading partner, meaning Russia is significantly affected by EU’s trading policies. As the EU is eager to move away from its energy dependence on Russia, it is looking for alternative energy sources. Greenpeace International should therefore advocate for a reduction in energy imports to the EU from Russia, particularly natural gas, and encourage

the EU to increase its use of renewable energy. This type of shift in trade would force Russia to rethink its energy policies.

- ***Support Human Rights movements in Russia***

As mentioned earlier, social movements are facing a number of challenges in Russia. This is problematic primarily because social movements are crucial in the process of Russia transitioning into a more sustainable, low-carbon economy. GPI should therefore support human rights movements and programs in Russia aiming to strengthen environmental movements in Russia.

- ***Turn the vast Russian Forests in to a global Carbon Sink***

Russia has 19% of the world's boreal forests reserves by surface area. However, because they are boreal, and not tropical forests, its vast forest reserves have gotten little attention in global climate talks, as global forest projects have over the passed years mainly focused on tropical forests. However, each year, boreal forests sequester more than 1.5 billion tonnes of CO₂, and Russian forests account for between 300 and 600 million tonnes of that sequestration. This is still a significant quantity and an amount that could be dramatically increased with improved forest management. However, experts, including scientists at the Russian Academy of Sciences, warn that because of insufficient domestic regulation the net CO₂ absorption by the country's forests may drop to zero towards the mid-2040s.³³ Sustainable forest management in combination with reforestation holds great and undiscovered potential for limiting Russia's emissions and it would therefore be worthwhile for GPI to advocate for protection of the "world's second lung" in Russia.

- ***Initiate collaboration with WWF Russia to protect Russian Forests***

World Wildlife Foundation (WWF) is also advocating for improved forest management in Russia. In a report released in 2018, WWF expressed their concern regarding the "National Strategy for forest industry development in the Russian Federation until 2030", stating that Russia needs more protective and long-term policies for their forests.³⁴ WWF Russia emphasized that carbon sequestration rates are dependent on the age of a tree and tree growth characteristics including the tree species and wood density and these are factors that should be taken into consideration when drafting forests policy. Considering the fact that Russia is a difficult country to influence politically Greenpeace could benefit from initiating a partnership with WWF, Russia improving the odds of impacting Russian forest policies and turning the Russian forests into a global carbon sink.

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Country Case Study

UNITED STATES

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Country Profile Overview

As one of the world's largest GHG emitters, the United States is pivotal in terms of global climate governance. Although the US is vulnerable to climate change in terms of its ecological, social, and economic environment, the current federal-level perspective on climate governance is negative and as a result has impacted key international climate agreements.¹ While the Obama administration prioritized an energy transition to reduce carbon emissions, the Trump administration has since rolled back multiple environmental regulations considered burdensome to the fossil fuel industry.² Based on current plans, US emissions are projected to decrease slightly through 2020 but overall maintain high levels of GHG emissions.³

In 2017, the United States was the second largest contributor to global GHG emissions, with significant emissions coming from multiple sectors.⁴ Within G20 countries, the US has the highest transport emissions per capita and the highest motorization rate.⁵ The energy sector is the biggest source of emissions, and between 2017 and 2018 there was a 3.4% increase in energy-sector emissions, representing the largest increase since 2010.⁶

While a number of cities and states around the country have emissions reduction goals, the US does not have a national, federal-level emission reduction goal or policy.⁷ The country's Nationally Determined Contribution (NDC) per the signed *Paris Agreement* includes a target to reduce overall emissions by 26%-28% below 2005 levels by 2025,⁸ including emissions from the AFOLU sector, yet the current administration has expressed its intent to withdraw from the treaty.⁹ In compliance with the *Paris Agreement*, in 2016 the Obama administration completed a "Mid-Century Strategy for Deep Decarbonization," which outlined a target of 80% below 2005 emissions levels by 2050, including emissions from the AFOLU sector.¹⁰ However, the document and mentions of this target have since been removed from all government websites.¹¹ Even by meeting this NDC target, the US' contribution to emissions reductions would be insufficient to stay within 1.5°C.¹²

Developed by an international team of researchers led by Johan Rockström, the "Carbon Law" states that emissions should peak by 2020 at the latest and fall to approximately zero by 2050.¹³ To achieve this goal, 2020 net emissions should be reduced by 50% by 2030, and emissions should be cut by another 50% by 2050, which is estimated to give the world a 75% chance of keeping Earth below 2°C.¹⁴ At this time, current U.S. policies are projected to reduce emissions only by 11% to 13% below 2005 levels (6589.14 million tonnes CO₂e) by 2025, which is approximately 13-18% below the US'

Paris Agreement NDC.¹⁵ Moreover, President Trump's recent repeal of multiple environmental regulations, including the *Clean Power Plan*, the *Climate Action Plan*, and the rollback of the Corporate Average Fuel Economy (CAFE) standards, and his communicated intent to withdraw from the *Paris Agreement*, further indicates that the US is unlikely to reach the 2025 targets, let alone cut emissions in half over the next decade.

Sectors and Emissions

According to a report by the United Nations Framework Convention on Climate Change (UNFCCC), in 2016 the United States emitted 5,794.52 million tonnes CO₂e overall.¹⁶ The highest emissions in the US come from the energy sector, at 3,139.61 million tonnes CO₂e, and the transportation sector, at 1,786.33 million tonnes CO₂e.¹⁷ As such, we recommend that Greenpeace focus on the energy and transport sectors, which have the potential to have the largest impact on emissions reductions.

In order to meet the "Carbon Law," overall emissions need to be reduced to 2,985 million tonnes CO₂e by 2030. If focusing on the energy sector alone, the "Carbon Law" could be achieved by cutting energy sector emissions by 100%. Alternatively, by looking at cross-sectoral solutions for the highest emitting sectors, the energy sector would have to reduce emissions by approximately 70%, or avoid exceeding 941.88 million tonnes of CO₂e, while the transportation sector would have to reduce emissions by approximately 30%, or avoid exceeding 1,250.35 million tonnes of CO₂e. These percentage approximations can alternatively be redistributed among the sectors. To reduce this quantity of emissions in the energy sector, at least 70% renewable energy must be deployed. To meet the 1.5°C limit, the United States would need to implement both the *Clean Power Plan* and the full *Climate Action Plan* or equivalent measures.¹⁸

Policy Overview and Analysis

The *Clean Power Plan* implemented in 2015 by former President Barack Obama aims to cut carbon emissions from power plants, cut emissions from the electricity sector, and transition to renewable energy.¹⁹ This plan aimed to reduce GHG emissions coming from the energy sector by reducing CO₂ emissions from coal, oil, and natural gas-fired power plants.²⁰ This policy could be improved by including a plan for the phase-out of coal. However, in March 2017, President Trump signed an executive order directing the Environmental Protection Agency (EPA) to consider repealing the plan.²¹ In October 2017, Scott Pruitt, former Chief of the EPA, announced the repeal of the *Clean Power Plan*, which will take up to two years to come into effect.²² When the *Clean Power Plan* was originally

passed in 2015, it was expected to cut energy-sector emissions 32% by 2030, relative to 2005 emissions, so the repeal of this act is a step in the wrong direction in terms of climate change policy and emissions reduction.²³

In August 2018, the EPA released its proposal for the *Affordable Clean Energy (ACE) Rule*, which is intended to replace the *Clean Power Plan*.²⁴ The ACE Rule aims to allow states to determine their specific emission standards for existing coal-fueled power plants, whereas the original *Clean Power Plan* determined emission standards on a federal level.²⁵ Instead of reducing emissions by transitioning to cleaner energy technologies, an EPA analysis for the *ACE Rule* concluded that coal-fired power plants can reduce CO₂ emissions by making on-site energy efficiency upgrades.²⁶ The programs and changes that the *ACE Rule* makes to the *Clean Power Plan* are in direct opposition to what is needed to reduce emissions. If implemented as-is, the *ACE Rule* would have severe consequences for climate change and would result in emissions increases in the US. Energy efficiency upgrades for coal-fired plants will not address emissions reduction at the scale that is needed. In order for the *ACE Rule* to move in the direction needed to limit warming, it would need to provide a stringent plan to phase-out coal, enforce an emissions cap for power plants, and require a transition to 100% renewable, zero-net greenhouse gas emissions.²⁷

The *Climate Action Plan* was implemented in 2013 under the Obama Administration and aimed to cut carbon emissions in the energy sector, prepare for climate change impacts, guide the US to become a global leader in combating climate change, and drive progress through international negotiations.²⁸ Some of the specific focuses of this policy to address climate change include: expansion of renewable energy (hydropower, wind power, and solar), establishment of carbon standards for new and existing power plants, improvement of energy efficiency for commercial and residential buildings through the President's Better Buildings Challenge, and reductions of overall GHG emissions.²⁹ While carbon standards assist in limiting emissions, more drastic measures are needed to make significant change in energy sector emissions. This policy is missing a plan to phase-out coal and other fossil fuels that contribute to GHG emissions and climate change. With a plan to phase-out fossil fuels, the US would have more success and ease in transitioning to renewable energy sources.

The *Energy Policy Act of 2005* was implemented under the Bush administration to establish an energy research and development program covering energy efficiency, renewable energy, oil and gas, coal, and nuclear.³⁰ A highlight of this law is its aim to increase the use of coal as an energy source while simultaneously reducing air pollution by authorizing clean coal initiatives.³¹ Although the law

authorizes tax credits for renewable energy producers and encourages further research and development into renewable energy, it aims to expand the use of coal as an energy source, which undermines attraction for producers to get involved in supplying renewable energies.

Despite only recently garnering public support, one progressive and ambitious policy that has been a topic of discussion for the last few years is the *Green New Deal*. The *Green New Deal* aims to transform the US to a low-carbon economy, fulfill the right to clean air and clean water, restore land, strengthen urban sustainability and resilience, create jobs, and ensure a just transition.³² The low-carbon economy portion of this policy includes specific actions such as 100% clean and renewable electricity by 2035, zero net emissions from energy by 2050, 100% net-zero building energy standards by 2030, 100% zero emission passenger vehicles by 2030, and 100% fossil-fuel-free transportation by 2050.³³ Unlike many other policies, the *Green New Deal* suggests zero net emissions from energy by 2050 and incorporates a plan to replace fossil fuels with renewable energy sources.

Since it was announced that the *Clean Power Plan* would be repealed, there is very little time left with this policy in place. The official repeal of the policy means that Greenpeace does not have the ability to influence this policy itself, but action is required to quickly replace it. The repeal was officially announced in October 2017, and it can take up to two years for the repeal to come into effect.³⁴ This is a very short time period within which to develop an alternate policy, but nonetheless is an opportunity for a more specific policy to arise in order to address emissions from the energy sector. Through President Trump's 2017 Executive Order rescinding the *Clean Power Plan*, the *Climate Action Plan* of 2013 was also rescinded in one fell swoop, effective immediately. Like the *Clean Power Plan*, Greenpeace does not have the ability to influence the *Climate Action Plan*. The *Energy Policy Act of 2005*, however, is still in effect.

As discussed, the *Green New Deal* is a progressive, ambitious policy that has the potential to significantly reduce GHG emissions from the energy sector and replace fossil fuels with renewable energies. On March 26, 2019, the *Green New Deal* failed in the Senate. However, this has changed the conversation on climate change, and the policy has the potential to be at the forefront of the 2020 presidential election. The *Green New Deal* forced the discussion of climate change on Capitol Hill, even among Republicans who were previously inclined to reject it.³⁵

The next Presidential election in the US will take place November 2020, and candidates are already beginning to campaign. This is an opportunity for Greenpeace to become acquainted with candidates who prioritize climate change policy and who in particular have goals to reduce emissions in the

energy sector and promote policy for renewable energy. Every two years, elections determine who controls each chamber of Congress, with House members serving two year terms and Senators serving six year terms. The next congressional election will be at the same time as the next Presidential election, so Greenpeace should increase its presence at election campaigns and debates, social campaigns, and climate strikes.

Policy Windows

2019: The *Affordable Clean Energy Rule* allows states to determine their specific emission standards for existing coal-fueled power plants, while the original *Clean Power Plan* determined emission standards on a federal level.³⁶ Greenpeace International should oppose the *ACE Rule* and push for policy that plans to phase-out coal-fired power plants.

State-level Renewable Portfolio Standards have been implemented in over half of US states, each of which have different targets over different timelines.³⁷ Greenpeace International should campaign for stricter policy and targets and push for Renewable Portfolio Standards on a National level, which would require all utilities in all states to source a designated portion of their energy from renewable sources.³⁸

2020: The *Climate Action Plan*, which was repealed by President Trump in 2017, aimed to double renewable electricity generation by 2020, install 100 megawatts of renewables in federally assisted housing, and establish wind and solar on public lands to power more than 6 million homes.³⁹ This policy also planned to expand the Better Buildings Challenge to cut building energy use by 2.5% annually (\$58 million in energy savings per year).⁴⁰ Greenpeace International should advise the *Climate Action Plan* be recovered and campaign for stricter targets.

2025: The Corporate Average Fuel Economy Standards (CAFE) aimed to achieve 54.4 mpg passenger cars and light trucks by 2025 (which was expected to reduce emissions by 570 million tonnes annually by 2030).⁴¹ These regulations were frozen by the Trump administration.⁴² The policy window to bring this policy back is now, which Greenpeace International should advocate and push for.

The US' target for the *Paris Climate Agreement* is to reduce overall emissions by 26%-28% below 2005 levels by 2025.⁴³ Greenpeace International should push for policies such as the *Green New Deal* which would support the success of these targets.

2030: The *Clean Power Plan* that was repealed by President Trump in 2017 aimed to cut energy sector emissions 32% by 2030 relative to 2005 emissions levels.⁴⁴

The *Green New Deal* sets a target of 100% net-zero building energy standards by 2030 and 100% zero emission passenger vehicles by 2030.⁴⁵ Greenpeace should advocate and push for this policy.

2035: The *Green New Deal* sets a target of 100% renewable electricity by 2035.⁴⁶ Greenpeace should push for this policy.

2050: The Obama-era *2050 Mid-Century Strategy for Decarbonization* set a target to reduce overall emissions by 80% below 2005 emissions by 2050, but this has been removed from all government websites.⁴⁷ Greenpeace International should campaign for stricter targets aligned with this strategy.

The *Green New Deal* sets a target of 100% fossil-fuel-free transportation by 2050.⁴⁸

General: Leading up to the next presidential and congressional elections, Greenpeace could advocate for candidates who support environmental action and policy.

Policy Recommendations

The United States is a leader for the rest of world and often sets the tone for political actions and stances.⁴⁹ As noted above, three main climate policies passed during the Obama Administration were rescinded via an Executive Order issued by President Trump. While these rescinded policies may not have gone far enough in reducing emissions as quickly or as substantially as needed, they moved the needle in the direction needed to limit warming to 1.5° C.

According to the U.S. News “Best Countries” ranking published in collaboration with the BAV Group and Wharton School of Business, the United States’ political influence received a score of 96 (9.6/10), economic influence score of 99 (9.8/10), strong international alliances and leader metric score of 100 (10/10), and in terms of caring about the environment received a score of 12 (1.2/10).⁵⁰ Therefore, while the country does not prioritize environmental targets and goals (based on the findings of this index), its global leadership role and high political and economic influences on its strong international alliances indicates that changes in the United States’ approach to addressing climate change are likely to influence other countries.

Under the current Trump Administration, progress in terms of federal climate policies are highly unlikely. Greenpeace's efforts are therefore most likely to be able to influence US emissions through state-level regulations and federally by influencing campaigns and candidates running in the 2020 elections, including presidential and congressional candidates. In response to the lack of effort under the current administration, many states have taken the lead on climate action and passed more robust state-level policies to make up for federal inaction. For example, in 2019, New Mexico passed a target of 45% below 2005 levels by 2030 and Pennsylvania passed targets of 26% below 2005 levels by 2025 and 80% below 2005 levels by 2050.⁵¹ Even more ambitious is Hawaii's target of reaching 100% renewable by 2045, which appears feasible given that the state currently gets 33% of its electricity from rooftop solar and has days on which up to 60% of its electricity is generated by renewables.⁵²

Currently, New York Representative Alexandria Ocasio-Cortez is at the forefront of the *Green New Deal*, the latest push for broad, all-encompassing federal climate policy. Support of the proposal by Greenpeace, and support of candidates backing the *Green New Deal*, would help to keep this policy on the agenda.

From the energy production side, the *Clean Power Plan* proposed that US emissions from the power sector be reduced to 32% of 2005 emissions levels by 2030.⁵³ In 2005, the US emitted approximately 3,139.61 million tonnes CO₂e.⁵⁴ Therefore, a 32% reduction would mean production of approximately 2,134.93 million tonnes of CO₂e by 2030, or a reduction of 1,004.68 million tons of CO₂e. Based on calculations above indicating that to meet the "Carbon Law," a reduction of 2,985 million tons of CO₂e is needed, this is approximately 1,980 million tonnes less than the quantity that is needed to meet the "Carbon Law." Since the time that the now-rescinded *Clean Power Plan* was originally passed, the costs of renewable energy have decreased, and it is therefore feasible (on a state-level or in future federal administrations) to think beyond the 32% target included in the *Clean Power Plan*.⁵⁵ In order to make an impact on US emissions, it is clear coal needs to be phased-out. To phase out coal, the US would need to set a more stringent target - for example, 2030 or 2050 -, require the necessary incremental reductions each subsequent year, and ultimately shut down coal-fired power plants. At the same time, the US would need to scale renewables up substantially and would need to invest in both renewable storage and development of infrastructure for renewables in order to allow for renewable energy sharing among regions to fix intermittency problems. Further, the country would need to provide training programs for former fossil-fuel-based energy sector employees to move into the renewable energy sector.

While state-level Renewable Portfolio Standards have been implemented in over half of US states, a particularly salient idea for reducing emissions is to develop a National Renewable Portfolio Standard, which would require all utilities in all states to source a designated portion of their energy from renewable sources.⁵⁶ At this time, this prospect has not made it to the national stage in any significant manner; S. 1264, the *Renewable Electricity Standard Act*, was introduced in the Senate in May 2015 by Democratic New Mexico Senator Tom Udall, but no further action was taken.⁵⁷ Greenpeace could work directly with Senator Udall on developing a new *Renewable Electricity Standard Act* and on gathering the support needed to get the legislation passed.

At the city-level, 70 US cities have committed to 100% renewable energy, and 201 mayors have indicated a commitment towards a 100% renewable energy target, which if implemented is estimated to reduce emissions by 107 million tonnes per year.⁵⁸ Greenpeace efforts should look at influencing this National Renewable Portfolio Standard as well as making impactful strides towards 100% renewable energy targets on state- and city- wide bases.

From the energy demand side, emissions can be reduced by improving the efficiency of appliances and technology. For example, emissions savings from changes in energy demand are possible through improvements in building efficiency, building density, and public transportation systems. Grubler et. al. estimates that through high-efficiency thermal end-use devices and through simultaneously doubling the quantity of building retrofitting, energy efficiency in the global north can be reduced by up to 75%.⁵⁹ To extrapolate that to the US alone, reducing energy sector emissions by 75% through these improvements would result in a reduction of 2,354.71 million tonnes of CO₂e (based on the energy-sector total referenced above of 3,139.61 million tonnes of CO₂e). This would require changes in building code requirements to increase efficiency, changes in land use zoning policies to allow for greater building density, and strategic transportation plans that incorporate changes to zoning regulations by locating transit stations and stops near high-density locations. Further, more stringent policy standards for devices and appliances would be needed to reduce energy intensity and increase energy efficiency.

Changes in energy demand require collaboration between Greenpeace and a variety of actors - private companies developing technology and involved in the building industry, local and state regulators, and planners who influence zoning, development, and transportation. Further changes to energy demand can stem from actions by large cities, such as implementing congestion pricing schemes similar to the one recently passed in New York City, in which vehicles pay a premium to

drive in the most congested areas of a city, and implementing car-free days, modeled after Bogota's Sunday car-ban on a large portion of the city's roadways.⁶⁰

The United States' primary trade partners are Canada and Mexico (encompassing approximately one-third of the country's total exports), followed by China.⁶¹ Top exports include: machinery (e.g. computers), mineral fuels (e.g. oil), electrical machinery and equipment, aircraft, vehicles, optical, technical, and medical apparatuses, plastics, gems, pharmaceuticals, and organic chemicals.⁶² Top imports include the majority of the same goods as those that are exported, substituting aircraft for furniture, bedding, lighting, signs, and prefab buildings.⁶³

In the U.S. News 'Best Country' ranking, Canada scores 88 out of 100 in terms of caring about the environment.⁶⁴ Given that Canada is the United States' main trade partner, working with the Canadian government on limiting specific imports from the US could provide a financial strain needed to incentivize the U.S. to make substantial changes. While this is an area that requires further research in terms of NAFTA requirements, examples include:

- Banning imports of machinery and equipment that do not meet certain thresholds for energy-efficiency. This would involve working with the Canadian Government as well as working internally in the US on improving national energy efficiency standards for all products both used and sold through government regulations or by working directly with Apple, Johnson and Johnson, Intel, and Cisco Systems, the top 4 export companies for machinery and equipment in the US in 2018, to develop products that meet higher energy efficiency standards.⁶⁵ In 2016, the Appliance Standards Awareness Project (ASAP) and the American Council for an Energy Efficient Economy (ACEEE) estimated that updates to the national energy efficiency standards could result in annual savings of 335 billion kWh by 2050.⁶⁶ This is equivalent to an annual reduction of 236,895,585 metric tonnes of CO₂e, or 8.7% of what is needed to meet the "Carbon Law" in the US.⁶⁷ Additionally, this would result in emissions savings for Canada as well as the U.S.' other trading partners who purchase these products.
- Banning imports of aircraft and vehicles that do not meet certain thresholds for fuel-efficiency. This would involve working with the Canadian Government and subsequently means either developing higher national fuel efficiency standards or working directly with the Boeing Company, Ford Motor, and General Motors, the companies that export the highest quantity of aircraft and vehicles in the US as of 2018.⁶⁸

- Updated Corporate Average Fuel Economy (CAFE) standards were approved by the EPA and Department of Transportation in 2012, equivalent to 54.5 miles per gallon for passenger cars and light trucks by 2025, expected to reduce emissions by 570 million tonnes annually by 2030 (when combined with the updates to the standards passed in 2010).⁶⁹ However, these regulations have been frozen by the Trump administration.⁷⁰ The US fuel efficiency standards set the trend for many countries worldwide, and the 54.4 mpg standard would still have been lower than European fuel efficiency standards, therefore indicating market feasibility for these higher standards.⁷¹ By working with these companies to return to the Obama-era standards, the US could accomplish approximately 21% of the emissions reductions necessary to meet the “Carbon Law” in the US alone, based on the UCS estimate above, and would also result in emissions reductions in Canada and other countries to which the US exports aircraft and vehicles.
- Other ideas for vehicles include: 1) requiring all states to offer incentives for Electric Vehicles (EV’s) in the form of rebates, access to carpool lanes, etc., or 2) to take it a step further, phase-out fossil-fuel generated vehicles on a national level and offer rebates to swap fossil-fuel vehicles for EV’s, ensuring a mass transition to EV’s. Ideas to cut emissions from aircraft and air travel include: 1) requiring stringent, high fuel efficiency requirements for aircraft traveling both in and out of the US, 2) retiring older US-based airplanes that do not meet new stringent fuel efficiency standards, and 3) on a federal level, adding a required ‘carbon offset’ charge to each airplane ticket purchased, which would go to an earmarked fund for emissions-reducing projects.

Conclusion

At this current moment, Greenpeace’s efforts are most likely to be able to influence US emissions on a federal level by supporting and partnering with campaigns and candidates preparing for the 2020 elections and separately through state- and local-level regulations. While emissions reductions are necessary across all sectors, recommendations in this memo focus on the energy and transportation sectors, which are responsible for the largest quantity of US emissions and therefore can drive the largest quantity of emissions cuts. The *Green New Deal* in-part encourages a standard for 100% renewable energy. If achieved, 100% renewable energy would result in the reduction of 3,139.61 million tonnes of CO₂e (e.g. the total quantity of current energy-sector emissions), which is over 100% of the cut that is needed to meet the “Carbon Law” by 2030. Other options proposed in this memo include advocating for and working on a National Renewable Portfolio Standard and

incentivizing both states and large cities to set 100% renewable targets. Assuming states are roughly equal in terms of energy use, or alternatively assuming the most populous states would adopt these standards more readily, if 20 states were to meet 100% renewable targets, this would accomplish 38% of the necessary reductions, and if 30 states were to meet 100% renewable targets, this would accomplish 64% of the necessary reductions. Alternate recommendations include reinstating the *Clean Power Plan*, which would reduce approximately 1,004.68 million tonnes of CO₂e, or 36% of the necessary reductions, reinstating CAFE standards, which would accomplish 21% of the necessary reductions, and phasing-out coal, which could achieve 31% of the necessary reductions (coal is currently 27.4% of the US electricity mix).⁷² Further, improving building efficiency and energy efficiency of appliances and technology, could achieve 84% of the necessary reductions by some estimates (other estimates indicating that improving energy efficiency of appliances alone could only achieve 8.7% of the cuts). Lastly, recommendations include congestion pricing schemes, changes in zoning to allow for greater building density and thus efficiency, improvement and expansion of public transportation systems, incentivizing or mandating EV's, and improving airplane fuel efficiency, each of which individually would be likely to reduce emissions by at minimum 10% of what is necessary to meet the "Carbon Law." In effect, unless 100% renewable is pursued on a national scale, numerous combinations of these various suggestions could reach the level of emissions reductions that are necessary to meet the "Carbon Law," which as discussed above is estimated to provide a 75% chance of staying within 2° C by 2030.

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