

Methodological Annex: Greenhouse gas mitigation scenarios for major emitters

Analysis of current climate policies and mitigation commitments:
2023 update

Table of Contents

A1: Summary of methods.....	2
A2: Historical data	4
A3: Quantification of NDC targets	6
A4: NewClimate Institute projections.....	9
A5: The IMAGE model.....	11
A6: The GLOBIOM and G4M models.....	15
A7: Policy tables by country	17
Argentina.....	17
Australia	18
Brazil.....	20
Canada	22
China.....	23
Colombia.....	27
Egypt.....	29
Ethiopia	29
European Union (EU27)	30
India.....	32
Indonesia	34
Japan.....	35
Mexico.....	36
Morocco	38
Republic of Korea	39
Russian Federation.....	42
Saudi Arabia	43
South Africa	43
Thailand	45
Türkiye	46
United Arab Emirates.....	47
United Kingdom	47
United States of America	50
Viet Nam	52
References	54

A1: Summary of methods

Every year, existing policies may change and/or be abandoned for a variety of reasons, and new policies may be adopted. This implies that all projections are subject, and a certain extent expected, to change; our report reflects the state up to the analysis' cut-off date. Frequent updates are fundamental to assess progress of policy implementation over time.

NewClimate Institute, IIASA and PBL estimated the impact of current policies on future greenhouse gas (GHG) emissions. Here, we summarise the main updates and methodological changes in the 2023 update report:

- » Policy developments since the 2022 report have been included in the emissions projections (cut-off date: July 2023, with a few exceptions) based on the periodical updates of the Climate Policy Database (NewClimate Institute & Wageningen University and Research, 2022) under the European H2020 projects.
- » Country-level policies packages for quantification in GHG emissions scenarios were reviewed by in-country experts involved in the H2020 ELEVATE project to identify policies, not limited to those focused on energy and climate, expected to deliver significant emission reduction impact.
- » Historical GHG emissions data was updated according to latest inventories submitted to the UNFCCC (cut-off date: July 2023; see Appendix A.2).
- » GHG emissions projections under current policies were harmonised to the latest historical emissions data by adding the absolute emissions difference in the harmonisation year between the inventory data and the model data to the model projections (see Appendix A.3).

To calculate per capita and per GDP indicators, we used the population projections from the UN World Population Prospects 2022 (United Nations, 2022) and GDP projections from IMF's World Economic Outlook (IMF, 2023).

The information about NDC targets and official emissions projections under current policies or equivalent are collected mainly from government documents submitted to the UNFCCC. NDC documents were taken from UNFCCC NDC registry. We considered that the official estimates of an NDC target is available in absolute terms when it is provided in: (i) absolute terms, (ii) provided as a base year target with the base year GHG emissions reported in the national GHG inventory reports submitted to the UNFCCC, or (iii) BAU target with the BAU emission levels reported in the (I)NDC document, with description of the accounting of land use, land use change, and forestry (LULUCF) emissions.

In the 2023 update report, GHG emission values are expressed in terms of AR4 Global Warming Potentials (GWPs). Therefore, when NDC targets are expressed in other GWPs, we convert them to common AR4 terms.

This report assesses to which degree countries are on track to meet their own target but does not assess how countries' adopted policies or NDC targets contribute to the achievement of global mitigation objectives, such as the collective temperature goals of the Paris Agreement.

In the 2023 update report, the IMAGE implementation includes:

- » The Fit-for-55 and REPowerEU packages for the EU: The individual policies able to be implemented from Fit-for-55 and REPowerEU include the increased renewables share in electricity mix, the updated ETS scheme, electric vehicle target, CO₂ standards for cars and vans, and the energy performance standards in buildings.
- » The Inflation Reduction Act (IRA) for the USA: The IRA is primarily a financial support mechanism, so quantification and implementation in IMAGE followed the work of Bistline et al. (2023). We implemented the mean value of the multimodel range presented by Bistline et al. in

the areas of increased non-fossil capacity (solar and wind capacity increase between 2023-2030), emission reductions from unabated coal power generation and the updated new light duty vehicle share by 2030.

The current assessment has several methodological limitations, which are attributable to the differences in the nature and characteristics of NDCs and climate policies across countries:

- » The COVID-19 pandemic still affects most countries. Most countries show a rebound in emissions in 2021 but estimates for non-CO₂ gases and sectors beyond energy are still preliminary. The exact magnitude of the rebound will remain unclear until official inventory submissions cover the period up to 2022 for all countries.
- » The ongoing Russian invasion of Ukraine has direct implications to emission projections in both countries but also affect several other countries analysed. For example, the European Union implements many reforms in its energy and climate policy to reduce dependency on Russian fossil gas. The full effect of most reforms across countries remains unclear.
- » Current policies scenario projections are subject to the uncertainty associated with macroeconomic trends, such as GDP, population growth and technology developments, as well as the impact of policies. Some NDCs are also subject to the uncertainty of future GDP growth and other underlying assumptions. China and India have pledges indexed to economic growth, implying that the absolute emission levels under their targets are highly uncertain. Emission projections of other fast-growing economies are also uncertain due to economic growth expectations.
- » The last historical year can have considerable impact on GHG emission projections. This is particularly the case for the land use, land-use change, and forestry (LULUCF) emissions, which could fluctuate from year to year due to peat fires or natural disturbances. Severe droughts, such as those seen in Europe and China, also affect soil carbon storage and is an additional source of uncertainty. The impact of natural disturbances is not considered in the land use projections.
- » Emissions from LULUCF strongly influence total emission projections. This is especially the case for countries with high share of LULUCF emissions, such as Brazil and Indonesia.

A2: Historical data

Historical GHG emissions data sources

For Annex I countries, we used official GHG inventories submitted in 2023; the inventories used 100-year global warming potential (GWP) values from the IPCC Fourth Assessment Report (AR4).

Table A-1 presents an overview of data sources for historical emissions of non-Annex I Parties. For many countries, we used data from the most recent Biennial Update Reports (BURs) and National Communications submitted to the UNFCCC. All values were converted to AR4 whenever presented in another GWP.

Table A-1: Data sources for historical GHG emissions in non-Annex I countries (Gütschow & Pflüger, 2023; Ministério da Ciência Tecnologia e Inovação, 2023; UNFCCC, 2023).

Country	GHG emissions excluding LULUCF		LULUCF emissions	
	Source	Last reported data-year	Source	Last reported data-year
Argentina	BUR4	2018	BUR4	2018
Brazil	SIRENE	2020	SIRENE	2020
China	BUR2 & PRIMAP ¹⁾	2014 / 2021	BUR2	2014
Colombia	BUR3	2018	BUR3	2018
Egypt	BUR1 & PRIMAP ¹⁾	2015 / 2021	LULUCF outside scope	N/A
Ethiopia	NC3	2018	NC3	2018
India	BUR3 & PRIMAP ¹⁾	2016 / 2021	BUR3	2016
Indonesia	BUR2 & BUR3	2019	BUR2 & BUR3	2019
Iran	NC3 & PRIMAP ¹⁾	2020	NC3	2010
Republic of Korea	BUR4	2018	BUR4	2018
Mexico	NIR 2023	2019	NIR 2022	2019
Morocco	BUR1 & BUR3 & PRIMAP ¹⁾	2018 / 2021	BUR1 & BUR3	2018
Saudi Arabia	BUR1	2016	BUR1	2016
South Africa	BUR4	2017	BUR4	2017
Thailand	NC1 & BUR4	2019	NC1 & BUR4	2019
United Arab Emirates	NC4	2014	NC4	2014
Viet Nam	BUR3	2016	NC2	2014

¹⁾ Historical emissions data is based on Biennial Update Reports or National Communications up until the latest officially reported year but is extended using PRIMAP to account for more recent developments.

Whenever country-report data for historical emission excluding LULUCF were unavailable, we used PRIMAP-hist to extend the historical time series. We only extend time series in cases where officially reported data is outdated (over 5 years old) and historical data available in officially reported datasets and PRIMAP-hist are consistent. This approach is aligned with the estimates prepared by the CAT

project. We rely on PRIMAP-hist because it offers the option to prioritise country-reported historical emissions when compiling the full time series (Gütschow et al., 2016). This approach is similar to ours and is therefore compatible with estimates for other countries.

For China, LULUCF projections are harmonized to the historical data from the 2014 GHG inventories presented in the Second Biennial Update Report (BUR2) of China (Government of China, 2018). In the BUR2 report, the LULUCF sink was reported as -1.115 MtCO₂eq for 2014. This constitutes an increase of the LULUCF sink as compared to the 2012 reported estimate of -576 MtCO₂eq (Government of P. R. China, 2016) which was used for harmonizing the LULUCF projections for China in our 2019 report (Kuramochi et al., 2019).

Data harmonisation

The GHG emissions projections under current policies were harmonised to the historical emissions dataset based on Table A-2 by applying a constant offset value (i.e. the difference in emissions of the two datasets in the harmonisation year) to the entire emission pathway. For Annex I countries, emissions projections were harmonised to 2019 historical emissions. For non-Annex I countries, the column 'Last reported year' in Table A-2 serves as a reference for the harmonisation year.

A3: Quantification of NDC targets

In this report, we quantified and presented targets in terms of absolute emissions. However, countries submitted targets that follow distinct typologies:

- » **Base year target:** reduction from historical base year emissions. NDCs set a target reduction below historical base year emission level. This category covers: Australia, Brazil, Canada, the European Union, Japan, the Republic of Korea, the Russian Federation, the United Kingdom, and the USA.
- » **Baseline or business-as-usual (BAU) target:** emissions reductions relative to a baseline or BAU projection (specified in the NDCs). The mitigation component of the NDCs specifies the BAU emission projection. The type of emissions reductions relative to a baseline or BAU projection has been chosen for countries, and in this report for: Ethiopia, Egypt (even though not economy-wide), Indonesia, Iran, Mexico, Morocco, Thailand, Türkiye, UAE and Viet Nam.
- » **Baseline or BAU target (not specified):** emissions reductions relative to a baseline projection (not specified). Same as above, but here the NDCs baseline or business-as-usual emissions projections are not specified, such as for Saudi Arabia. For the calculations, we used the baseline projections from national studies (when available) and the estimates from the Climate Action Tracker.
- » **Intensity target:** emissions reductions relative to GDP as the main type of mitigation.
- » **Intensity and non-GHG target:** emission intensity target and non-GHG target. China and India aim for emission intensity improvements, a target for non-fossil fuels in primary energy consumption/power capacity, and for China, a target year for the peaking of emissions.
- » **Trajectory and fixed-level target:** South Africa presents a trajectory target stating the emission ranges for 2025 and 2030. Colombia and Argentina put forward a fixed-level target, specifying the MtCO_{2e} that they intend not to exceed.
- » **Submitted actions (cannot be quantified):** finally, many countries include mere qualitative descriptions of mitigation actions in their INDCs/NDCs, or specific targets for sub-sectors, such as for the implementation of renewable energy. As such targets complicate a precise quantification, we have not analysed them here.

The calculation of the NDC projection for the countries for all groups except group 5 is straightforward. China and India are the only G20 economies from group 5 that have proposed a combination of targets, which are less straightforward in the calculation, and highly depend on model parameterization. The targets include non-fossil energy targets, forest targets, and emission intensity targets (i.e., improvements of the ratio of emissions to GDP). For the PBL calculations, their combined effect was calculated using the PBL TIMER energy model (van Vuuren et al., 2021) for energy- and industry-related emissions and the IIASA GLOBIOM/G4M land use model (Havlík et al., 2014) for the land use, land-use change and forestry (LULUCF) emissions (see also (den Elzen et al., 2016), and for further details for China, (den Elzen et al., 2022)). The calculation of all new or updated unconditional NDCs has been updated, and are described in peer-reviewed literature (den Elzen et al., 2022, 2023). For countries not analysed by PBL (Colombia, Egypt, Ethiopia, Iran, Morocco, Saudi Arabia, and Thailand), we refer to Climate Action Tracker (Climate Action Tracker, 2023).

Table 1 provides an overview of how the NDC targets have been quantified and lists them by the accounting method which we assumed. Most of the analysed countries report emission target levels that include removals from activities related to the LULUCF sector. For countries that explicitly mentioned in their NDCs that emissions and removals from the LULUCF sector are excluded (Saudi Arabia and Thailand), the LULUCF sector is excluded from the calculation of the NDC target emission levels and current policies scenario projections.

Table 1: Overview of NDC configuration per country.

Country	Target type	LULUCF sector is included in the NDC
Argentina	Fixed-level target	LULUCF sector is included in the 2030 target.
Australia	Base year	LULUCF sector is included in the baseline year and the target.
Brazil	Base year	LULUCF sector is included in the baseline year and the target.
Canada	Base year	LULUCF sector is excluded in the baseline year and included in the target.
China	Intensity and non-GHG	LULUCF sector is included in the baseline year and the target.
Colombia	Baseline specified	LULUCF sector is included in the baseline year and the target. The NDC's deforestation emissions reduction target is calculated independently and in a unified manner at the national level in line with NREF projections to 2030.
Egypt	N/A	LULUCF sector is excluded in the NDC target
Ethiopia	Baseline specified	LULUCF sector is included in the baseline year and the target.
European Union	Base year	LULUCF sector is included in the baseline year and the target.
India	Base year intensity and non-GHG	LULUCF sector is included in the target, however, it is not clear for the baseline year and the intensity targets.
Indonesia	Baseline specified	LULUCF sector is included in the baseline year and the target.
Iran	Base year	LULUCF sector is included in the baseline year and the target.
Japan	Base year	LULUCF sector is excluded in the baseline year however it is included in the target.
Mexico	Baseline specified	LULUCF sector is included in the baseline year and the target.
Morocco	Baseline specified	LULUCF sector is included in the baseline year and the target.
Republic of Korea	Base year	LULUCF sector is excluded in the baseline year however it is included in the target.
Russian Federation	Base year	LULUCF sector is included in the baseline year and the target.
Saudi Arabia	Trajectory	LULUCF sector is excluded in the NDC target
South Africa	Trajectory	LULUCF sector is included in the baseline year and the target.
Thailand	Baseline specified	LULUCF sector is excluded in the NDC target
Türkiye	Baseline specified	LULUCF sector is included in the baseline year and the target.
Ukraine	Base year	LULUCF sector is included in the baseline year and the target.
UAE	Fixed-level target	LULUCF sector is included in the target and the base year.
United Kingdom	Base year	LULUCF sector is included in the baseline year and the target.
USA	Base year	LULUCF sector is included in the baseline year and the target.
Viet Nam	Baseline specified	LULUCF sector is included in the baseline year and the target.

Although there are uncertainties concerning which accounting approaches and methodologies countries will apply to account for LULUCF related emissions and removals, we assume that a majority of countries will apply the net-net accounting approach (den Elzen et al., 2016). In this approach, activities are accounted using the reported net emissions in each year of the accounting period minus the net

emissions in the base year. In the situation where the net emissions have decreased, a country may issue credits (i.e., removal units, or RMUs) and if net emissions have increased, it must cancel units (i.e., take on debits). The net-net LULUCF accounting method implies that credits and debits from the LULUCF sector are treated in the same way as any other GHG inventory sector, where emissions are compared to those in the base year.

This report identified two countries that apply the gross-net accounting approach (Japan and Republic of Korea). In this approach, the actual reported net emissions (or removals) in each year of the commitment period are accounted for without comparing the estimates with a base year. These countries expect the LULUCF sector to be net carbon sink in the target year, thus treating the LULUCF sector as a source of carbon credits. For these countries, our NDC target estimates exclude the expected amount of carbon credits and are compared to current policies scenario projections excluding LULUCF.

A few countries have established accounting approaches for each LULUCF sub-sector and documented these in national documents and regulations. Two such examples are Canada and the EU27. For the EU27 we apply a simplistic approach and assume that the EU27 will account for all LULUCF sub-sectors using the net-net accounting approach as this is the case for most the sub-sectors. For Canada, land-use is excluded in the base year and accounting approaches provide a contribution of the LULUCF sector to Canada's target. Canada uses a reference level approach for managed forest and associated harvested wood products (HWP). For all other LULUCF sub-sectors, Canada applies the net-net accounting approach. For this assessment we make a simple assumption assume that Canada will be using the net-net accounting for all sub-sectors.

A4: NewClimate Institute projections

Current policies projections

NewClimate Institute analysis follows the calculation steps used in the Climate Action Tracker (Climate Action Tracker, 2023). The starting point for the calculation of current policies emissions projections is a publicly available 'reference' projections for economy-wide GHG emissions or energy-related CO₂ emissions. For most countries, we use one of the sources below or a combination or two to show a range:

- » Most recent government submissions to the UNFCCC (such as, National Communications, Biennial Reports and Biennial Update Reports)
- » Other national policy projections (government source)
- » Projections from international organisations such as the International Energy Agency (IEA) World Energy Outlook (WEO) and other internationally research organisations.

The choice of a 'reference' scenario depends on a number of factors such as the coverage of policies, detailedness of the projections and its description (sector, gas, policies considered), and key underlying assumptions (e.g., GDP and population growth).

When a scenario with only energy-related CO₂ emissions was used as basis, emissions projections for other GHGs were gathered from various sources to ensure complete coverage of all emissions sources. For non-CO₂ GHG emissions, the US EPA report on global anthropogenic GHG emissions (U.S. EPA, 2019a). Projections for non-energy CO₂ emissions are most often taken from national governments' submissions to the UNFCCC.

For all publicly available emissions projections in this analysis, we examined whether important policies implemented to date and planned policies with a high degree of certainty of implementation in the near future are included. If a recently implemented policy with a considerable expected mitigation impact potential is not covered, the impact of that policy is accounted for by carrying out separate 'add-on' calculations based on the information from various sources.

Methodology for specific policy instruments and targets

Current policies projections by NewClimate Institute include add-on mitigation impact calculations for recently implemented policies. The calculation steps are policy specific; in some cases, CO₂ reduction impact values estimated in external sources are applied directly to 'reference' scenarios for energy-related CO₂ emissions, whereas in other cases more detailed technical calculations are carried out. The choice of quantification method is also heavily dependent on data availability. We present common approaches used to quantify distinct policy types:

- » **Renewable energy targets:** CO₂ emissions reductions are calculated based on the energy balance projections underlying the 'reference' scenario for energy-related CO₂ emissions. Case-specific assumptions define which fuels would be replaced by the increased renewable energy production.
- » **Vehicle fuel efficiency standards:** A simplified stock turnover model is used for many countries. Calculations were done using the underlying data from the Global Transportation Roadmap Model of the International Council on Clean Transportation (ICCT, 2012).
- » **Emissions trading schemes:** The targeted emission levels are applied to the sectors covered by the scheme. Carbon price levels are not considered in the analysis.
- » **Economic measures:** Due to the limitation of bottom-up, spreadsheet-based calculations, NewClimate Institute projections consider economic measures such as carbon tax, feed-in tariff scheme and subsidies only if their mitigation impacts have already been quantified by other institutions.

presents the URLs and the posted dates of country assessment updates by the Climate Action Tracker project.

Table 2: Country assessments by Climate Action Tracker referenced in this report.

Country	URL	Last updated
Argentina	https://climateactiontracker.org/countries/argentina	October 2023
Australia	https://climateactiontracker.org/countries/australia	September 2023
Brazil	https://climateactiontracker.org/countries/brazil	September 2022
Canada	https://climateactiontracker.org/countries/canada	December 2022
China	https://climateactiontracker.org/countries/china	July 2023
Colombia	https://climateactiontracker.org/countries/colombia/	November 2022
Egypt	https://climateactiontracker.org/countries/egypt/	August 2023
Ethiopia	https://climateactiontracker.org/countries/ethiopia	September 2023
European Union	https://climateactiontracker.org/countries/eu	June 2023
India	https://climateactiontracker.org/countries/india	July 2023
Indonesia	https://climateactiontracker.org/countries/indonesia	September 2023
Iran	https://climateactiontracker.org/countries/iran/	September 2023
Japan	https://climateactiontracker.org/countries/japan	May 2023
Mexico	https://climateactiontracker.org/countries/mexico	September 2023
Morocco	https://climateactiontracker.org/countries/morocco	April 2023
Republic of Korea	https://climateactiontracker.org/countries/southkorea	July 2023
Russian Federation	https://climateactiontracker.org/countries/russianfederation	November 2022
Saudi Arabia	https://climateactiontracker.org/countries/saudiarabia	September 2023
South Africa	https://climateactiontracker.org/countries/southafrica	September 2023
Thailand	https://climateactiontracker.org/countries/thailand/	September 2023
Türkiye	https://climateactiontracker.org/countries/Türkiye	May 2023
United Arab Emirates	https://climateactiontracker.org/countries/uae/	July 2023
United Kingdom	https://climateactiontracker.org/countries/uk/	September 2023
USA	https://climateactiontracker.org/countries/usa	September 2023
Viet Nam	https://climateactiontracker.org/countries/vietnam/	September 2023

* In a few cases, the information used in this analysis will become available on the CAT website after the publication of this report.

A5: The IMAGE model

For the PBL analysis, we used the integrated assessment model (IAM) IMAGE 3.3 (Hof et al., 2022; Van Vuuren et al., 2018) to assess the impact of national current policies. The IMAGE model is well suited for such an assessment given the relatively high degree of detail with which this model represents the activity levels in the different sectors and its focus on a physical description of activities (allowing a rather straightforward interpretation of the implemented policies).

More specifically, the IMAGE model framework includes the TIMER energy model, where most of the policies were implemented. The TIMER model simulates long-term energy baseline and mitigation scenarios (van Vuuren et al., 2017) on the global and regional level. The TIMER energy model describes energy demand in five different end-use sectors, i.e. industry, transport, residential sector, service sector and other, on the basis of detailed sectoral sub-models. In these sub-models, the demand for energy services is described for 26 world regions in terms of physical indicators (person kilometre travelled; tons of steel produced etc.). Different energy carriers can be chosen to fulfil this demand based on their relative costs. The model can also decide to invest in energy efficiency instead. On the supply side, the model describes the production of primary energy for fossil fuels, bioenergy, and several other renewable energy carriers. The costs of these primary energy carriers depend on depletion, technology development and trade. The demand and supply models are connected via several models describing energy conversion processes such as the electric power and hydrogen production model.

IMAGE-land is a spatially explicit part of the model and is coupled with the agro-economic model MAGNET (Woltjer & Kuiper, 2014). It contains a detailed representation of environmental aspects including land use, land use change and forestry (LULUCF), the carbon cycle, and the global agricultural economy. This integration allows for assessments of countries' current land-based mitigation policies on their future land use and land use change and its interactions across the borders.

Methodology for specific policy instruments and targets

For all policies and targets analysed in this study (see tables in country chapters), the methodology for calculating the effect on emissions is described briefly below (for more details, see (Roelfsema et al., 2020, 2022)). The calculations were done using the IMAGE/TIMER implementation of the SSP2 scenario (van Vuuren et al., 2021).

In general, climate policies are implemented in integrated assessment models through a carbon tax, at a level resulting in a desired GHG emission level. A carbon tax attaches a price to carbon emissions and induces a response of the energy system where investments in energy efficiency, fossil fuel substitution and additional investments in non-fossil options increase (Van Vuuren, 2007). These carbon taxes can be differentiated at regional and sector levels. Other policy instruments, such as feed-in-tariffs, cannot be directly implemented in these models. Therefore, policy instruments were translated to targets that can be implemented in the IMAGE model, most notably the TIMER energy model. Model input parameters were changed in such a way that the desired target is achieved.

After the target year, no assumptions were made on continuation of the policy, as information on if and how a policy may be continued or even strengthened is not always available. However, due to technology learning, effects of the policy may continue. This is especially the case for renewable energy capacity additions but does not happen in the case of more generic policy instruments like carbon taxation.

Some measures, such as energy and emissions intensity targets, cannot be implemented as such, but are checked afterwards, by calculating the resulting energy use or emissions divided by GDP. If the targets are not met, they are calculated iteratively by the implementation of either other policy measures, or a carbon tax.

Renewable mix targets, i.e., a certain share of renewable energy in a target year. The share of renewable energy is either measured in terms of primary energy supply or electricity generation (which is a form of secondary energy supply). The difference between the two is that primary energy supply also includes energy use outside the electricity sector and that it accounts for energy losses in power plants within the electricity sector. The target in the share of electricity production from a certain renewable technology (e.g., wind, solar), can be prescribed using desired fractions in the energy supply module of TIMER, which uses a multinomial logit function to determine investment shares of each energy technology. Along those lines, technologies can be made more expensive by applying a premium factor, used to simulate e.g. coal phase-out targets.

Renewable capacity targets, i.e., a certain amount of installed power capacity of a certain renewable source, can be prescribed using desired capacities in the energy supply module of TIMER. Learning-by-doing, i.e. cumulative installed renewable energy capacity, lowers the capital costs and as such affects installed capacity also after the policy target year (de Boer & van Vuuren, 2017).

Non-renewable mix or capacity targets are more common in certain countries. Such policies that promote, e.g., reduction in electricity production from nuclear, coal, natural gas or oil are implemented in the TIMER energy model the same way the renewable targets are implemented on the target year of the policy.

Power plant standards (i.e., the CO₂ emissions per unit generated electricity) applying to new power plants are implemented as such in TIMER. In essence, the implementation of a standard results in no new installation of technologies with emissions intensity above said standard. Power plant standards applying to existing stock are implemented through a carbon tax on the energy supply sector.

Coal phase-out policies are implemented imposing a premium factor on electricity production from coal, and as such making coal power production unattractive compared to other technologies such as natural gas power plants or renewable electricity production. The option to make the technology completely unavailable for a country/region that has a coal phase-out as a policy is also possible.

Capacity caps on certain technologies are implemented by making the technology unavailable for that region after the target year capacity has been achieved. TIMER keeps the existing capacity operating until the end of its lifetime but will not add any more capacity even if it is financially or technologically more attractive.

Efficiency goals for new and existing capacity are goals set for specific electricity generation technologies and are implemented as such in TIMER. If new capacity does not meet this goal, it will not be installed, and respectively, if existing capacity does not meet this goal, it will be retired.

Feed-in-tariffs is an energy-supply policy focused on supporting the development of new renewable power generation. The most common feed-in-tariffs policy provides a fixed rate per kilowatt hour (US\$/kWh) for the electricity produced for a guaranteed period of time (Blok & Nieuwlaar, 2016). A feed-in-tariff cannot be implemented as such, but is proxied by target shares for renewable energy, by assuming these tariffs support a strategic policy document. Such a document would, in itself, not be defined as current policy, but classifies when it is supported by policy instruments such as feed-in tariffs.

Emissions Trading Systems (ETS) are implemented by applying a carbon tax to the sectors that are covered by the ETS (e.g., energy supply and industry) in order to reach the emissions reductions targeted by the ETS.

A **fuel efficiency car standard** aims to achieve a certain fuel efficiency for new cars within a specific period. The effect of fuel efficiency standards for cars is calculated by the TIMER transport model (Girod et al., 2012). Fuel efficiency of new cars is an input parameter and is set for fossil fuel cars to the policy target for the specific target year. The fuel efficiency for years before the target year is interpolated

between 2015 and the target year, but only if that results in more efficient cars compared to the SSP baseline. Non-energy costs, such as car manufacturing costs, are changed accordingly.

A **biofuel target** sets a mandatory minimum volume or share of biofuels to be used in the total transportation fuel supply. Biofuel targets are also included using the TIMER transport model. Cars in TIMER drive on one fuel (except for electric and H₂ cars), so biofuel blending is modelled by fixing the ratio of biofuel cars and liquid fuel cars. However, the biofuel target input variable that can be set applies to the biofuel share of the total new fleet in a specific year, i.e., including electric and H₂ cars, and only applying to new cars. Therefore, this parameter is set to such a level that it results in the desired biofuel share for the total liquid car fleet.

Electric vehicle targets are included in the TIMER transport model. Electric vehicle targets are usually described in national policy documents as either a percentage of the total vehicle fleet at a target year, or as a percentage of sales of new vehicles by a target year and are implemented in the TIMER model as such.

Fuel taxes or subsidies are implemented directly in the TIMER transport model. Subsidy per person-kilometre (pkm) driven is an input parameter in the TIMER transport model, which can be interpreted as negative taxes. The total vehicle costs decrease when a subsidy is implemented, thereby changing the output of the multinomial logit function that determines vehicle shares. Fuel tax in terms of currency per litre is translated to 2005 US dollar per pkm by using the exchange rate between the specific currency and dollars (for specific years), as well as the fuel efficiency in terms of km/L. The latter is calculated from the fuel efficiency per car type (MJ/pkm), which is an input parameter to the TIMER model, by assuming a fixed energy content of 34.8 MJ/L fuel and average load of 1.6 persons per car.

Regulation on methane (CH₄) leakage from coal, oil and gas production is implemented by increasing the reduction potential of methane leakage. This is a parameter in TIMER and is set to such a level that it results in the desired reduction of methane emissions.

Regulation on F-gases is implemented by first translating the desired emissions reductions to an absolute target level for F-gases. Then an exogenous emissions tax is applied only to F-gases in order to reach the target level per region.

Building codes are implemented in TIMER's residential buildings module through a variety of ways:

Buildings energy efficiency is improved through insulation. A premium factor on building insulation levels simulates a minimum standard policy. Furthermore, subsidies for insulation are introduced for new and older buildings during their construction and renovation process, respectively.

Appliance standards (kWh/year) are implemented as such in TIMER. Appliances must adhere to a maximum unit energy consumption (UEC) based on relevant policies.

Residential PVs and/or heat pumps are installed to all new buildings in specific regions. This implementation simulates the construction of NZEB in which the energy demand is covered by renewables. Heat pump installation is avoided in some cases as a region's poor electricity fuel mix can lead to an increase in emissions.

Policies related to **agriculture, forestry, and other land use** (AFOLU) were implemented in the IMAGE-land model and incorporated into our analysis. We only considered policies that are currently embedded in national laws and focused on countries with considerable AFOLU emission reductions.

For Brazil, this entailed the implementation of the Agricultural Policy for Climate Adaptation and Low Carbon Emission (ABC+), which aims to expand planted forested area by 4 million hectares by 2030 compared to the no-policy baseline scenario.

For Canada, we implemented the 2 Billion Trees Commitment plan, which aims for 2 billion trees planted by 2030. In IMAGE-land, this was translated to 1.3 million hectares of new forested land.

China has an ambitious goal in its NDC to afforest 100 million ha (6 billion m³) compared to 2005 levels. However, following Gallagher et al. (2019) and for feasibility reasons, we followed the smaller ambition to allocate 26% of the land cover to forests by 2030. In IMAGE-land this implies an increase of 44.2 million hectares from 2020 to 2030.

In our previous report update, India had a target of re- and afforestation of 10 million ha (Green India Mission 2011) between 2015 and 2030 and relative to the no-policy scenario. This policy has now ended, but after consultation with experts and research into the country's forest and tree coverage, it is assumed that that target has been reached, so we updated our IMAGE-land model data to reflect that.

Finally, for Indonesia we implemented the Forest Law Enforcement National Strategy (FLENS), using the afforestation target of 5 million hectares by 2030 in the IMAGE-land model relative to the no-policy baseline scenario.

A6: The GLOBIOM and G4M models

For the IIASA analysis of LULUCF projections, two complementary models are being used, an economic land use model (GLOBIOM) (Havlík et al., 2014) and a detailed forestry model (G4M) (Gusti & Kindermann, 2011). The GLOBIOM model is a partial equilibrium model with a detailed sectoral coverage and detailed representation of production technologies and geographically explicit representation of land use and associated greenhouse gas emission. GLOBIOM relies on forestry productivity information from the G4M model which also estimates the impact of forestry activities (afforestation, deforestation and forest management) on biomass and carbon stocks.

More specifically, the GLOBIOM model is a global recursive dynamic partial equilibrium model of the forest and agricultural sectors. The model is based on a bottom-up approach where the supply side of the model is built-up from the bottom (land cover, land use, management systems) to the top (production/markets). The agricultural and forest productivity is modelled at the level of grid cells of 5 x 5 to 30 x 30 minutes of arc (Skalský et al., 2009), using biophysical models. The demand and international trade are represented at the level of 35 regions covering the world. Besides primary products, the model has several final and by-products for the different sectors, for which processing activities are defined. The model computes market equilibrium for agricultural and forest products by allocating land use among production activities to maximize the sum of producer and consumer surplus, subject to resource, technological, demand and policy constraints. The level of production in a given area is determined by the agricultural or forestry productivity in that area (dependent on suitability and management), by market prices (reflecting the level of demand), and by the conditions and cost associated to conversion of the land, to expansion of the production and, when relevant, to international market access. Trade is modelled following the spatial equilibrium approach, which means that the trade flows are balanced out between different specific geographical regions. Trade is furthermore based purely on cost competitiveness as goods are assumed to be homogenous. This allows tracing of bilateral trade flows between individual regions.

The G4M model is applied and developed by IIASA and estimates the impact of forestry activities (afforestation, deforestation and forest management) on biomass and carbon stocks. By comparing the income of used forest (difference of wood price and harvesting costs, income by storing carbon in forests) with income by alternative land use on the same place, a decision of afforestation or deforestation is made. As G4M is spatially explicit (currently on a 0.5° x 0.5° resolution), different levels of deforestation pressure at the forest frontier can also be handled. The model can use external information, such as wood prices and information concerning land use change estimates from GLOBIOM. As outputs, G4M produces estimates of forest area change, carbon sequestration and emissions in forests, impacts of carbon incentives (e.g., avoided deforestation) and supply of biomass for bioenergy and timber.

For the countries where the G4M model was applied to assess the current policies projections (Ethiopia, Iran, Morocco, Saudi Arabia, Thailand, United Arab Emirates and Vietnam), the G4M was calibrated to historical afforestation and deforestation rates for the period of 2000-2010 as reported by the country to the 2015 FAO Forest Resources Assessment (FAO FRA) (Keenan et al., 2015). The calibration is done in such a way that net forest area change rate (afforestation rate minus deforestation rate) matches that of FAO FRA data. Additional constraints were imposed on minimum afforestation rate, minimum deforestation rate and the trend of net forest area change (a difference between 2000-2005 average net forest area change and 2005-2010 average net forest area change). For the EU and UK, combined GLOBIOM/G4M estimates are being applied and projections are for the UK based on the 2016 EU Reference Scenario (European Commission, 2016) and for the EU based on the 2020 EU Reference Scenario (European Commission, 2021a).

Methodology for specific policy instruments and targets

Current policies projections by IIASA have been assessed for the specific country using the GLOBIOM and/or the G4M model. The model that has been used to develop the projection for a specific county is specified in the country chapters. Below follows a generic description of the methodology used for calculating the effect of the policies for the LULUCF sector. In general, climate policies are implemented in GLOBIOM and G4M through a carbon tax or directly in the models by changing parameters or adding constraints in such a way that a target is achieved.

Afforestation / reforestation / deforestation targets are implemented by applying a carbon tax to the forest sector in GLOBIOM/G4M in order to reach the annual afforestation/reforestation target. The carbon tax is set at a level that leads to the target level being reached the desired year and is thereafter kept constant over time.

Forest area targets are implemented by applying a carbon tax to the forest sector in GLOBIOM/G4M for the forest sector to reach the annual afforestation/reforestation target. Implementation of the carbon tax leads to a reduction of the annual deforestation rate and increases the annual afforestation rate.

Harvest intensity targets, i.e., an increase of the forest harvest rate by X% or X m³, can be prescribed in GLOBIOM or G4M applying constraints directly in the models.

Forest carbon stock targets sets a mandatory level of the forest carbon stock by a specific period. The fulfilment of the target is implemented using a carbon tax in G4M on the forest sectorial emissions and removals. The carbon tax is set at a level that leads to the target level being reached the desired year and is thereafter kept constant over time.

Emissions reductions targets are implemented by applying a carbon tax to the LULUCF sector in GLOBIOM/G4M to reach the target.

A7: Policy tables by country

The following tables present all policies that are quantified in greenhouse gas emissions projections for the 25 economies analysed in the 2023 update report. In a few cases, relevant policies are not quantified in the emission projections but listed due to their relevance in the national context; we indicated these policies with footnotes.

Argentina

Table 3: Overview of key climate change mitigation policies in Argentina (Eversheds Sutherland (US) LLP & Fratantoni, 2018; FARN, 2019; Government of Argentina, 2019, 2022; Resolución 136 - E/2016. Energía Eléctrica de Fuentes Renovables. Convocatoria Abierta Nacional e Internacional, 2016; Impuesto a Las Ganancias. Ley 27430. Modificación, 2017; LSE Grantham Research Institute on Climate Change and the Environment, 2018; Ministry of Environment and Sustainable Development of Argentina, 2018; Pensamiento Civil, 2019)

Sector	Policies (marked with '(+)' when mentioned in NDC)	Description
Cross-cutting	National Climate Mitigation and Adaptation Plan (2022)	This policy document was designed to support the implementation of Argentina's NDC and structure the transition along the following key thematic areas: the energy transition, the productive transition, sustainable mobility, sustainable and resilient territories, conservation of biodiversity and common goods, and sustainable management of food systems and forests.
Energy supply	Renewable Energy Law 27.191 setting renewable targets (2015) ¹⁾ , National Development Scheme for the Use of Renewable Energy Sources (RenovAr)	This law sets out renewable electricity targets of 18% by 2023 and 20% by 2025 (excl. hydro larger than 50 MW), as well as a tendering scheme to support their achievement.
	Carbon tax on energy (2017) ¹⁾	Tax levels are adjusted every trimester, reaching a top rate of USD 5/tCO ₂ in 2020. Targeting emissions from transport fuels and coal. The carbon tax excludes natural gas consumption and shale gas production.
	Decree 892/2020 on natural gas supply and demand scheme (2020) ¹⁾²⁾	This plan aims to produce 30,000 Mm ³ of natural gas in four years. It includes incentives and benefits for companies looking to produce unconventional natural gas.
	Law 27.424 on net-metering for distributed generation (2017) ¹⁾²⁾	This law supports distributed renewable energy generation and establishes a net metering mechanism.
Transport	Biofuels Law (updated 2021) ¹⁾	This law sets out a blending mandate of 5% for biodiesel and 12% for ethanol in gasoline from 2021. This new regime allows authorities to adjust blending mandates based on input prices, with a floor of 3%.
Agriculture and Forestry	Joint resolution 1/2018 creating the Environmental and Insurance Sustainability Program (September 2018) ²⁾	This policy aims to increase forest plantations from 1.3 million hectares to 2 million hectares by 2030. This would mean expanding forested areas by 62,000 hectares per year.
	Extension and amendment of Law 25.080 related to the investments for cultivated forests (2018) ²⁾³⁾	The law aims to increase the investments, area, and quality of cultivated forests within the country. The law grants among other benefits, an annual non-refundable economic contribution to approximately 3,000 small and medium forest producers.

Sector	Policies (marked with '(+)' when mentioned in NDC)	Description
	Law for Minimum Budgets for Environmental Protection of Native Forest (2007) ^{2) 3)}	This law sets out a regulatory frame to control the reduction of native forest area and prevent net deforestation.
	National Forest Management Plan with Integrated Livestock (2015) ^{2) 3)}	This policy aims to contribute to the sustainable use of native forests through incorporating livestock activities in native forest area in a sustainable manner, thus preventing further agricultural land expansion.
	Investments for Cultivated forests (2008) ²⁾	This policy sets out the development of afforestation projects on a total of 500,000 hectares of land based on economic incentives.
	National plan for the restoration of native forests (2019) ²⁾	This plan sets out the creation of the National Plan for the Restoration of Native Forests, which seeks to restore 20 thousand hectares of native forest per year by 2030.
	Strategic plan for forestry and industrial forestry Argentina 2030 ^{2) 3)}	This policy aims to improve the management of productive forest areas, developing the value chain and benefiting communities of producers.
	National Principles and Guidelines for the Management of Forests with Integrated Livestock in accordance with Law N° 26.331 (2023) ^{2) 3)}	This policy aims at promoting productive use of forests while ensuring the provision of ecosystem services and avoiding their fragmentation.
	National Forest Management Plan with Integrated Livestock (2015) ^{2) 3)}	This policy aims to contribute to the sustainable use of native forests through incorporating livestock activities in native forest area in a sustainable manner, thus preventing further agricultural land expansion.

¹⁾ Not quantified in NewClimate Institute projections. ²⁾ Not quantified in PBL IMAGE model projections.

³⁾ Not quantified in IIASA model projections.

Australia

Table 4: Overview of key climate change mitigation policies in Australia (ACT Government, 2011, 2018; Australian Government, 2020; Australian Government Department of Environment, 2016; Australian Government Department of the Environment and Energy, 2017, 2019; Climate Analytics, 2021; Government of Australia, 2023a, 2023b, 2017, 2019, 2020; Government of Australia Department of Climate Change, Energy, 2015; Government of Australia Department of Industry Science and Resources, 2021; Government of South Australia, 2020; Northern Territory Government, 2015; NSW Government, 2014; Queensland Government, 2021; South Australia Government, 2015; Tasmania Government, 2019; West Australia Government, n.d.)

Sector	Policies	Description
Cross-cutting	Emissions Reduction Fund (ERF) (2014, updated in 2022) ¹⁾ – <i>relabelled Climate Solutions Fund in 2019</i>	The fund sets out a reverse auction mechanism designed to reduce emissions at the lowest available cost. The government purchases carbon credits generated by companies that voluntarily reduce their emissions. The fund was modified in 2022 to allow existing purchase contracts to be terminated and for companies to sell their credits in the market.
	Energy Productivity Plan (2015) ¹⁾	This policy sets out a target to increase energy productivity (unit of GDP per unit of energy use) by 40% by 2030, relative to 2015 levels.

Sector	Policies	Description
	Hydrofluorocarbon (HFC) emissions reduction under the Montreal Protocol (2017)	This policy sets out a target to reduce HFC emissions by 55% by 2030, relative to 2010 (and 85% by 2036).
	Federal Budget 2021 - 2022 ¹⁾	The budget includes climate-related measures including the funding for hydrogen hubs and CCS, support for farmers to reduce emissions through the national soil carbon innovation challenge and trials for low-emission technologies, the implementation of a Safeguard Crediting Mechanism, support for voluntary climate action through an expanded Climate Active framework, and investment to help Australian businesses and supply chains adopt energy efficiency measures.
	Climate Change Act (2022)	This act sets out Australia's greenhouse gas emissions reduction targets, to provide for annual climate change statements, to confer advisory functions on the Climate Change Authority, and for related purposes
Energy supply	Technology Investment Roadmap and Low Emissions Technology Statement ¹⁾	The Technology Investment Roadmap sets a process to develop and deploy low emissions technologies. The Low Emissions Technology Statement sets government's technology priorities and goals. For 2021 these include: clean hydrogen (also from fossil sources), ultra-low-cost solar, electricity storage, low emissions steel and aluminium, carbon capture and storage, and soil carbon.
	Community solar incentives (2023) ¹⁾	The government has instituted two mechanisms to support community solar projects. The Community Batteries for Household Solar program makes up to AUD 200 million available to install over 400 batteries and provide flexibility to over 100,000 households across the country. The Community solar banks fund aims to support shared solar systems for people who cannot install solar systems on their own. Under the fund, the government is co-investing AUD 100 million to deploy these systems over the country.
	State-level renewable energy targets and roadmaps	This includes renewable energy targets of Victoria, Queensland ⁴⁾ , Tasmania ⁴⁾ , and the Northern Territory and the New South Wales Electricity Infrastructure Road Map.
	Energy Efficient Communities Program ¹⁾	This program provides yearly grants for businesses and community organisations to improve energy efficiency and reduce electricity bills.
Transport	Fuel tax (2006, last amendment in 2019) ^{1) 3)}	This policy sets out a fuel tax for diesel and gasoline currently set at AUD 0.42 per litre.
	Future Fuels and Vehicle Strategy (2021) ¹⁾	This strategy sets out a technology-led approach to tackle emissions in the transport sector aimed at increasing the uptake of hybrid, hydrogen, electric and biofuelled vehicles. It plans to reduce 8 MtCO ₂ e by 2035.
	State-level vehicle strategies and policies ²⁾	Most states and territories (ACT, NSW, VIC, QLD, SA) offer different degrees of registration discounts for electric vehicles. The State of South Australia aims for all new passenger vehicles sold to be fully electric by 2035. The ACT government has an action plan for zero-emissions vehicles with a target to achieve net-zero GHG emissions by 2045. Both NSW and Victoria have policies requiring that 50% of all new cars sold in 2030 must be EVs.
Buildings	National Construction Code (2019) (updated in May 2022) ^{1) 2)}	This update to the building code includes new residential energy efficiency provisions.

Sector	Policies	Description
Agriculture and Forestry	Growing a better Australia. A billion trees for jobs and growth (2018) ¹⁾	This program aims to plant a billion new trees to boost the Australian economy and drive jobs and growth in its rural industries and regional manufacturing.
	Carbon Farming and Land Restoration Program (2021) ^{1) 5)}	Realise the potential of the agriculture sector to sequester carbon. Including financial assistance, grants for carbon sequestration and capacity building activities.
	Land use, land-use change and forestry sector emissions reduction pledge (2021) ^{1) 5)}	This policy aims at reducing GHG emissions, protecting native forests, restoring degraded landscapes and planting millions of new trees.
Waste	National Food Waste Strategy (2017) ¹⁾	This policy provides a framework to support action towards the national goal of halving Australia's food waste by 2030.
	State-based waste policy frameworks ¹⁾	Most states and territories have specific waste strategies and most also additional targets to the national targets.
	National Waste Policy (2018) and Action plan (2019) ^{1) 2)}	This policy sets national targets to the export of some waste, reducing total waste generation in Australia, setting minimum waste recovery standards from all waste streams, increasing the use of recycled content, phasing out some plastics, halving the amount of organic waste sent to landfill and improving data availability to support investment and policy decisions.

¹⁾ Not quantified in PBL IMAGE model projections. ²⁾ Not quantified in New Climate Institute projections. ³⁾ Quantification based on OECD (2013) ⁴⁾ Renewable electricity exports are excluded from the share. ⁵⁾ Not quantified in IIASA projections

Brazil

Table 5: Overview of key climate change mitigation policies in Brazil (Government of Brazil, n.d., 2007, 2008, 2020, 2021a, 2021b; Ministry of Energy and Mines, 2019, 2020)

Sector	Policies (marked with '+' when mentioned in NDC)	Description
Energy supply	Resolution No 806 of 2020 from ANP Brazil (2020) ¹⁾	This resolution regulates flaring and losses from oil and gas developments, establishing that burning of crude oil and non-associated gas is forbidden unless due to emergency reasons
Transport	National Biodiesel Programme (2005)	This program mandates a biodiesel share in diesel of 7% from 2015 and 11% from 2019 onwards, increasing by 1%-point every March until reaching 15% by March 2023.
	Ethanol Blending Mandate (1993)	This program mandates a bioethanol share in gasoline of 27% from 2015 onwards.
	RenovaBIO (2018)	This policy aims to improve the carbon intensity of biofuels by 7% between 2017 and 2028, reaching 66.8 gCO ₂ /MJ by 2028.
Agriculture and forestry	National Plan on Climate Change (2008) ¹⁾	This plan aims to reduce deforestation rates in all Brazilian biomes to reach zero illegal deforestation.
	The Low-Carbon Agriculture (ABC) Plan (2010) (+)	This plan aims to restore an additional 15 million hectares of degraded pasturelands by 2030 and enhance 5 million hectares of integrated cropland-livestock-forestry systems by 2030.
	Green Rural Product Certificate (Rural Verde Producers Certificate) (2021) ¹⁾	This policy regulates Rural Product Certificates related to activities of conservation and recuperation of native forests and their biomes.

Decree 11.367 creating the Permanent Interministerial Commission for the Prevention and Control of Deforestation and taking other measures (2023) ¹⁾

This decree establishes the Permanent Interministerial Commission for the Prevention and Control of Deforestation, reestablishes the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon - PPCDAm and deals with the Action Plans for the Prevention and Control of Deforestation in the Cerrado, in the Atlantic Forest, in the Caatinga, Pampa and Pantanal.

¹⁾ Not quantified in PBL IMAGE projections.

Canada

Table 6: Overview of key climate change mitigation policies in Canada (Government of Canada, 2014, 2017, 2018a, 2018b, 2021b, 2021a, 2022a, 2022b)

Sector	Policies (marked with '+' when mentioned in the NDC document)	Description
Cross-cutting	Greenhouse Gas Pollution Pricing Act (adopted June 2018; pricing started January 2019)	The Act consists of two parts: one puts a carbon levy on small emitters including industries under 50 ktCO ₂ e, and the other sets a cap-and-trade system or output-based pricing system bigger facilities. The federal price on emissions, starting at C\$20/tCO ₂ e in 2019 and rising by C\$10/tCO ₂ e per year until \$50/tCO ₂ e in 2022, applies to provinces and territories that request it or have not implemented their own carbon pricing regime ('backstop').
	Update to the Pan-Canadian Approach to Carbon Pollution Pricing 2023-2030 (2021)	This update to the Federal benchmark establishes that carbon pollution pricing systems must have a minimum carbon pollution price of at least \$65 per ton of GHG emissions calculated in CO ₂ e in 2023, rising by \$15 per year to \$170 per ton of CO ₂ e in 2030
	Regulation of HFCs (2020)	This regulation aims at reducing HFC emissions by 85% by 2036, relative to 2012.
	2030 Emissions Reduction Plan ¹⁾	The plan outlines sector-by-sector measures to achieve a 40% reduction of total GHGs by 2030, and net-zero emissions by 2050. The measures are not yet fully implemented.
Energy supply	CO ₂ standard for new power plants (2012) – updated in November 2018 to phase out traditional coal	This policy sets out a standard of 420 gCO ₂ /kWh from 1 July 2015; plants must comply by 2030 at the latest. It includes a phase-out of traditional coal (without CCS) by 2030.
	Regulations limiting carbon dioxide from natural gas fired electricity generation (January 2019) ¹⁾	This regulation limits CO ₂ emissions from natural gas plants to 420 g/kWh for boiler units and large combustion units, and 550 g/kWh for smaller combustion units.
	Faster and Further – Canada's Methane Strategy (2022)	This policy builds upon previous regulations set in the sector. Its aim is to reduce methane emissions from the country's oil and gas sector by at least 75% from 2012 levels by 2030. The strategy also includes a target for a 35% reduction of all domestic methane emissions in Canada below 2020 levels by 2030.
	Hydrogen Strategy for Canada (2020) ¹⁾	The Strategy aims to reduce GHG emissions to 45 million metric tonnes a year in 2030 and would create up to 350 000 new jobs by 2050, building a \$50 billion domestic hydrogen market.
Transport	Efficiency standards light commercial vehicles (2004)	This policy sets out new fuel efficiency standards of 34.1 mpg (14.9 km/l) by 2017, and 55 mpg (23.2 km/l / 0.91 MJ/pkm) by 2025.
	Efficiency standards heavy-duty trucks (2013)	This policy sets out new fuel efficiency standards of per type of truck (aligned with federal-level regulations in the US) to 1.38 MJ/tkm by 2027 for medium trucks, 0.83 MJ/tkm by 2027 for heavy trucks.
	Zero Emission Vehicle Infrastructure Deployment (2019, updated 2021)	This policy sets out a target of a 30% share of low-emissions vehicles in new light-duty vehicle sales by 2030 (10% by 2025 and 100% by 2040). To support that, CAD130 million is available through the 2019 Budget (2019-2024), for deploying charging and refuelling stations in localized areas, among others. In 2021, the target year has been moved from 2040 to 2035. The 2021 update has not been quantified.

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Buildings	EcoENERGY efficiency (2011) ³⁾	This program supports the implementation of energy codes, among other things, to improve energy efficiency of buildings.
	Federal Energy Efficient Equipment and Appliances Program (2007) ¹⁾	This policy is expected to result in GHG emissions reduction of 10.4 MtCO ₂ eq by 2030, relative to baseline.
	Building Energy Technology Programme (2019) ¹⁾	This policy sets out a target of a 50% improvement in energy performance of buildings. Various levels of government will develop increasingly stringent building codes, starting in 2020, aiming for provinces and territories to adopt a 'net-zero energy ready' model building code by 2030
Agriculture and forestry	The Growing Forward 2 (2013) ^{1) 2)}	This policy supports the initiatives to advance environmentally sustainable agriculture.
	Green Construction through Wood Program (2018) ^{1) 2)}	This program supports projects and activities that increase the use of wood as a building material in infrastructure projects
	2 billion Trees Commitment (2022)	The 2 billion Trees program is part of the Natural Climate Solutions Fund, and aims at 1.3 Mha of afforestation by 2030
	Nature Smart Climate Solutions Fund (2021) ^{1) 2)}	Reduce Canada's net greenhouse gas emissions using natural climate solutions, while providing benefits for biodiversity and human wellbeing. Supporting projects that conserve, restore and improve the management of wetland, peatland, grassland, and forest ecosystems to store and capture carbon.
	PEI Agriculture Climate Solutions Program (2021) ^{1) 2)}	Support farmers to mitigate the production of GHGs and/or sequester carbon in the soil. By providing assistance and financial support to reduce GHG emissions from the agriculture sector.

¹⁾ Not quantified in PBL IMAGE model projections. ²⁾ Not quantified in IIASA model projections. ³⁾ Quantified in PBL IMAGE model as building codes for space heating. The second biennial report estimated the mitigation impact of this policy to be 6.5 MtCO₂/year by 2020, relative to their baseline (Government of Canada, 2016).

China

Table 7: Overview of key climate change mitigation policies in China (Asia Pacific Energy, n.d.; Central Compilation & Translation Press, 2016; *China: Heavy-Duty: Fuel Consumption*, 2020; China Dialogue, 2022; Government of China, 2021; MIIT of China, 2021; MOHURD, 2022; NDRC, 2021, 2022a, 2022b; Office of the State Council China, 2020; SASAC, 2021; The State Council of the People's Republic of China, 2015; The State Council of The People's Republic of China, 2014; Yi, 2021)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	National Action Plan on Climate Change (2014) ^{1), 2)}	This plan sets out an emissions trading program for the power sector expected to be operational by 2020.
	14th Five-Year Plan (2021-2025) ⁵⁾	This policy sets out several targets, including: 20% non-fossil share in TPES in 2025 (midterm target to achieve NDC non-fossil target in 2030)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		Energy intensity cut by 13.5% over the period ²⁾ Carbon intensity cut by 18% over the period ²⁾
	Medium and Long-Term Plan for the Development of Hydrogen Energy Industry (2021-2035) ^{1) 2)}	This policy sets out the target of producing 100,000-200,000 tonnes of hydrogen with renewable sources by 2025
	Kigali Amendment	Phase down schedule for the use of HFCs expressed in % compared to baseline, in year: <ul style="list-style-type: none"> - Peak in 2024 at consumption levels of 2020-2022 - 90% by 2029 - 70% by 2035 - 50% by 2040 - 20% by 2045
	National Economic and Social Development Plan (2021 and 2022)	The plan sets policies with regard to a range of fossil fuels that aim to maintain affordable access to power sources. Reaching peak carbon emissions and achieve carbon neutrality, and how to coordinate them.
Energy supply	14 FYP Modern Energy System Planning	This policy sets out several targets, including: <ul style="list-style-type: none"> - "About" 39% non-fossil power generation 2025 - Energy production capacity of 4.6 billion tonnes coal equivalent, 200 million tonnes of oil and 230 billion cubic metres of gas by 2025 - Electricity generation 30% of total final energy consumption - Total installed power capacity 3000 GW
	14th Five-Year Renewable Energy Development Plan	This policy sets out several targets, including: <ul style="list-style-type: none"> - 3300 TWh of electricity to be generated from renewable sources in 2025 - 33% of total electricity generation to be from renewable sources, with 18% to come from non-hydropower sources - Over half of incremental electricity consumption growth from 2021-2025 to be met by renewable sources
	Energy Supply and Consumption Revolution Strategy (2016-2030) ¹⁾	This policy sets out several targets, including: <ul style="list-style-type: none"> - 15% share of gas in total primary energy consumption in 2030 ⁶⁾ - Cap at 6 billion tonnes coal equivalent in total primary energy consumption in 2030 - Non-fossil share of electricity generation over 50% by 2030
	Notice on Printing and Distributing the "Guiding Opinions on Promoting the High-quality Development of Central Enterprises and Doing a Good Job in Carbon Neutralization" ¹⁾	This policy sets out the target of renewables making up half of all installed power capacity by 2025
	Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy ¹⁾	This policy sets out several targets, including: <ul style="list-style-type: none"> - Strictly limit the increase in coal consumption over the 14th Five-Year Plan period (2021-2025) and phase it down in the 15th Five-Year Plan period (2026-2030) - Petroleum consumption to reach its peak and plateau during the 15th Five year plan period (2026-2030)
	Energy Development Strategy Action Plan (2014-2020)	This policy sets out several targets, including:

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		<ul style="list-style-type: none"> - Cap on coal consumption in 2020 at 4.1 billion tce (84.5 EJ/year) ⁵⁾ - A 10% target share of gas in primary energy supply in 2020 ⁵⁾ - Limit share of coal to 58% of total energy supply by 2020 ¹⁾ - 15% non-fossil fuel share in TPES in 2020 ⁵⁾ - Renewable electricity: 340 GW hydropower excl. pumped storage, 210 GW wind, 105 GW solar PV, 5 GW solar thermal, 15 GW biomass, 0.1 GW tidal - 800 million m² collector area ¹⁾ - 10 million tonnes ethanol, 2 million tonnes biodiesel ¹⁾ - 58 GW nuclear power (150 GW by 2030)
	Action Plan for Upgrading of Coal Power Energy Conservation and Emission Reduction Released (2014) ¹⁾	This policy sets out the target to reduce average net coal consumption rate of new coal-fired power plants to 300 g of standard coal per kWh (implemented as a coal-fired power plant standard of 840 gCO ₂ /kWh by 2020) ²⁾ .
	Renewable portfolio standard benchmark China (2019)	<p>This benchmark is Implemented to achieve non-fossil share target of NDC, it will increase consumption of RE and reduce curtailment rates. Covering the period 2020-2025.</p> <p>It includes 35% of electricity to be from RE sources by 2030, also increased 2018 and 2020 non-hydro power consumption targets for some provinces</p>
Transport	Mid-Century Long-Term Low Greenhouse Gas Emission Development Strategy	This policy sets out the target to achieve around 40% market share of vehicles sold for NEVs (new energy vehicles, including EVs)
	Vehicle fuel economy standards (2005)	This policy sets out new fuel efficiency standards for new heavy-duty trucks of 1.2 MJ/tkm by 2021.
	Expansion of Ethanol Production and Promotion for Transportation Fuel (2017)	<p>This policy sets out a new ethanol blending mandate of 10% (E10) in selected provinces by 2020.</p> <p>In January 2020, the rollout of the 10% mandate was suspended and it remains suspended indefinitely.</p>
	'Made in China 2025' standards for auto industry (2013)	This policy sets out the target of implementing new fuel economy standards of 5L/100 km by 2020, as well as reaching 1 million units of new energy vehicles sold in 2020. In addition, a fuel efficiency target of 3.2 litres/100 km was outlined for new passenger cars on average by 2030.
	Phase V fuel consumption standards for passenger vehicles (2019)	The new standard sets a corporate average fuel consumption target of 4.0 litres/100 km for 2025.
	New Energy Vehicle Industry Development Plan (2021-2035)	The plan's objective is that new energy vehicles reach 20% of new vehicle sales in 2025
Industry	Carbon peaking for steel sector ¹⁾	This policy sets out the target of peaking carbon from the steel sector by 2030
	'Made in China 2025' CO ₂ intensity target (2013) ¹⁾²⁾⁵⁾	This policy sets out the target for manufacturing industries to reduce their CO ₂ emissions per unit of added value by 22% by 2020 and 40% by 2025 from 2015 levels.
	14th Five-Year Circular Economy Development Plan ¹⁾	This plan's objective is to reduce comprehensive energy consumption per tonne of steel by 2% by 2025

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Buildings	Green Industry Development Plan (2016-2020) China 2016 ^{1) 2) 5)}	This policy sets out the target to decrease energy consumption per value added by 18% between 2015 and 2020.
	Mid-Century Long-Term Low Greenhouse Gas Emission Development Strategy ¹⁾	This policy sets out several targets, including: <ul style="list-style-type: none"> - Implementing green building standards in 100% of new buildings by 2025 - “strive to” install solar panels on 50% of the rooftops on new public buildings and factories starting in 2025 - 8% replacement of fossil fuel energy consumption by renewables by 2025
	Appliance Standards and Labelling Programme ¹⁾	This is an energy efficiency program supplemented with subsidies and awareness-raising campaigns.
	National Building Energy Standard ^{1) 4)}	This policy sets out the target of 30% of newly constructed buildings to meet new standards by 2020.
	"Design Standard for Energy Efficiency of Public Buildings" and the "Design Standard for Energy Efficiency of Residential Buildings" ¹⁾	This is a standard for maximum energy consumption per square metre for different types of buildings.
	Green and High-Efficiency Cooling Action Plan (2019) ¹⁾	The plan targets a 30% improvement in energy efficiency levels of cooling products and a 20% increase in the market share of green and high-efficiency cooling products by 2022. By 2030, the plan targets a 30% boost in the cooling efficiency of large-scale public structures, a greater than 25% enhancement in the overall energy efficiency of cooling systems, and a more than 40% expansion in the adoption of eco-friendly and highly efficient cooling products.
Agriculture and Forestry	The 14th Five-Year Plan for the development of forestry and grassland conservation (2021-2025) ¹⁾	This policy sets out several targets, including: <ul style="list-style-type: none"> - Forest coverage to reach 24.1% (ca. 230.53 million hectare) with forest stock volume of 19 billion cubic meters. - Commercial harvest over natural forest to be prohibited, preserving 1.944 billion mu of forests (129.6 million hectares). - Grassland vegetation cover to reach 57% and protection rate of wetland to reach 55%. - Increase of nature reserve areas to 18% of national land area, and transformation of decertified land by 0.1 billion mu (6.67 million hectares).
	Program plan for national reserve forest (2018-2035) ¹⁾	This policy sets out several targets, including: New planted reserve forest (for wood products) of 7 million hectares by 2020, and 20 million hectares by 2035 (i.e., 13 million hectares between 2021 and 2035), with annual forest stock volume increases of 200 million cubic meters (i.e., 10 cubic meters per hectare). Annual forest stock volume increase of native species and the large-diameter timber volume to reach 63 million cubic meters.
	Revision of Forestry Law of the People's Republic of China (2019) ¹⁾	China revised its Forest Law for the first time in 20 years, with the most significant policy change being the implementation of a ban (in effect as of July 2020) on the purchasing, processing, or transport of illegal logs for Chinese companies. The law enhances protection for forests classified by the law as public-benefit, natural, protected, or rare. The law also includes changes to the forest tenure system,

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		afforestation mechanism, forest resource protection system, and the forest management, and harvesting mechanism.
	Revision of Land Administration Law of the People's Republic of China (2019) ¹⁾	The law, which became effective in January 2020, re-affirms a policy redline of a minimum of 120 Mha of arable land. In case of conversion of agricultural land, the law requires the same area and quality of land be reclaimed for agricultural use.
	15-year plan (2021-2035) to protect ecosystems (2020) ³⁾	This policy sets out several objectives, including targets to increase forest cover to 26% of national land area by 2035 and forest stock volume to 21 cubic meters, to stabilize natural forest area at 200 million h and to increase grassland vegetation cover to 60% and nature reserve areas to 18%
	Five-year plan on the National Agricultural and Rural Science and Technology Development (2021-25) (2022) ^{1) 3)}	This document sets the government's sectoral development strategy over five years. It notably seeks to increase resilience, reduce risks on output, improve fertiliser and plastic usage. It defines a number of targets, including an expansion of grain and meat production.

¹⁾ Not quantified in PBL IMAGE model projections. ²⁾ Not quantified in NewClimate Institute projections. ³⁾ Not quantified in IIASA model projections. ⁴⁾ Implemented by PBL via assuming standard means 439 MJ/m². ⁵⁾ Not quantified separately in PBL IMAGE projections, but achievement checked after implementation of other (related) targets. ⁶⁾ The Energy Supply and Consumption Revolution Strategy (2016-2030) presents a 15% natural gas target in energy supply by 2030. This target is included in NewClimate projections instead of the one presented in the Energy Development Strategy Action Plan (2014-2020). In NewClimate Institute's projections this target was considered unfeasible and was revised to 12% in 2030 aligned with CNPC projections

Colombia

Table 8: Overview of key climate change mitigation policies in Colombia (Assman, 2017; CCAP, 2016; Congreso de la República, 2016; Consejo Nacional de Política Económica y Social et al., 2018; Government of Colombia, 2018, 2021a, 2021b; IEA, 2013; Resolución MinAmbiente No.1988 de 2017: Por La Cual Se Adoptan Las Metas Ambientales y Se Establecen Otras Disposiciones., 2017; Decree 926, 2017; Rules to Develop Fracking Pilot Projects (Resolution 40.185), 2020; Ministry of Environment and Sustainable Development, 2016, 2017; Transport NAMA Database, 2017a, 2017b; UPME, 2017)

Sector	Policies ³⁾ (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Decree 926 (2017) ¹⁾	This decree establishes a mechanism for exemption of the national liquid fossil fuel Carbon Tax (Law 1819 Art 221). To be exempt, actors need to demonstrate carbon neutrality (achieved through offsets from external projects on, e.g., renewable energy and energy efficiency.)
	Resolution No.1988 (September 2017) ¹⁾ Resolution No.585 (October 2017) ¹⁾	Resolution No. 1988 establishes the adoption of environmental goals and measures in the transportation, energy, industry, and buildings sectors, as described in the Indicative Action Plan on energy efficiency (PROURE) 2017–2022 (Resolution No. 41286 of 2016).

Sector	Policies ³⁾ (marked with '(+)' when mentioned in the NDC document)	Description
		The resolution No. 585 establishes procedures to carry out those measures.
Energy supply	Colombian Low-Carbon Development Strategy (+) (ECDBC) (2012)	Through the implementation of eight Sectoral Mitigation Action Plans, this strategy aims to deviate from BAU emissions levels, which are estimated to be over 60% from current levels by 2030.
	Law 697: Programme for rational and efficient use of energy and other forms of non-conventional Energy (PROURE) (2010; latest adopted in 2016) ¹⁾	This policy sets out the target to reach a 9.05% energy efficiency improvement in the transport and industry sectors between 2017 and 2022.
Buildings	NAMA Project for the domestic refrigeration sector (2017-2021)	This program aims at a reduction of emissions from the domestic refrigeration sector. It sets out the target of an annual reduction of around 3.8 MtCO ₂ e by 2030 (50% reduction from BAU) and 16.8 MtCO ₂ e over the lifetime of a single equipment.
	National policy for sustainable buildings (2018) ¹⁾	This policy aims at making new construction in Colombia more energy efficient.
Transport	NAMA Project for Transit Development (TOD) (2015 to 2019)	This program supports the construction of lasting infrastructure and buildings that will lock in efficient land use and travel patterns with estimated annual emissions reduction between 3.6 to 5.5 MtCO ₂ e/year by 2040.
Agriculture and Forestry	The National Development Plan of Colombia (+) (2015)	This policy sets out the target to reduce the annual deforestation rate from 121,000 hectares in 2013 to 90,000 hectares by 2018.
	REDD+ Zero Deforestation in the Amazon by 2020 (2009) ²⁾	This plan consists of four phases of strategy with a total of 18.5 million USD for planning and implementation.
	Resolution to increase the area of protected forest land in the Amazon (2018)	This policy sets out a target to increase Colombia's protected forest area coverage to 30 million hectares to reach a total of 38 million hectares.
	National Policy for the Control of Deforestation and Sustainable Management of Forests (2021) ²⁾	This policy aims to implement cross-sectoral strategies for deforestation control and forest management that promote the sustainable use of natural capital, the forest economy, and community development in areas of high deforestation.
	Decree 690 on the sustainable management of wild flora and non-timber forest products (2021) ²⁾	This policy regulates the sustainable management of wild flora and non-timber forest and non-timber forest products, to be applied by environmental authorities and by anyone interested in the management of these products. of these products.
	National Restoration Plan (2015-2035) (2022)	This plan aims to ecologically restore a cumulative total of 962,615 ha between 2015 and 2030.

¹⁾ Not quantified in NewClimate Institute projections. ²⁾ Not quantified in IIASA model projections.

Egypt

Table 9: Overview of key climate change mitigation policies in Egypt (Egypt Today, 2021; Government of Egypt, 2021, 2022; IEA, 2015; Mazghouny & Co, 2022; Middle East Insights, 2022; Zgheib, 2022)

Sector	Policies	Description
Energy supply	Integrated Sustainable Energy Strategy to 2035 (2015)	This policy sets out a target to reach 20% of power generation from renewable sources by 2022 and 42% by 2035, focusing on wind (14%), hydro (2%) and PV (25%).
	Renewable Energy Law (2014) ²⁾	This law seeks to stimulate the private sector to invest in renewable power generation. The regulation brings diverse mechanisms such as competitive bidding and Feed-in tariffs.
	Renewable Energy Tax Incentives (2015) ²⁾	This policy sets out a reduction of energy sales taxes to 5%, in order to attract private sector investment.
Transport	Presidential decree to promote the use of compressed natural gas in transport	This decree sets out the goal of converting 450 thousand vehicles to CNG, reaching a total of 1 million.
Agriculture and Forestry	Egypt targets to increase agricultural production by 30% in 2024 (2021) ²⁾	The Minister of Planning and Economic Development Hala El-Said announced a target to increase the gross domestic product (GDP) contribution of agriculture to 12 percent by 2024, in addition to increasing agricultural production by 30 percent by 2024.
	Prime Ministerial Decree no. 104/2022 (2022) ¹⁾²⁾	This policy sets out investment incentives under articles 11 of Egypt's Investment Law No. 72/2017 and 10 of its Executive Regulations issued by Prime Ministerial Decree no. 2310/2017 including renewable energy projects, agriculture, livestock.
	Decree No. 20 includes within the economic development strategy the production, storage, and export of hydrogen and green ammonia. (2022) ¹⁾²⁾	This decree establishes that the production, storage, and export of hydrogen and green ammonia are part of the Economic Development Strategy. To enhance the production of these products is also accompanied by fiscal and tax incentives in the Investment Law No 72 of 2017 (Investment Law).

¹⁾ Not quantified in IASA model projections, ²⁾ Not quantified in NewClimate institute projections.

Ethiopia

Table 10: Overview of key climate change mitigation policies in Ethiopia (Eshete & Stoop, 2007; Ethiopian News Agency, 2020; Ethiopian Press Agency, 2020; Federal Democratic Republic of Ethiopia, 2011; Government of Ethiopia, 2016; Ministry of Environment and Forest, 2015)

Sector	Policies ⁴⁾ (marked with '+' when mentioned in the NDC document)	Description
Cross-cutting	Climate Resilience and Green Economy Strategy (CRGE) (2011) (+) ¹⁾	This strategy includes various mitigation measures to limit economy-wide GHG emissions in 2030 to 150 MtCO _{2e} (250 MtCO _{2e} below BAU). It also sets out the target of developing up to 25 GW of renewable power capacity by 2030.
Energy supply	Growth and Transformation Plan II (2016) (+) ¹⁾	This policy defines twelve major targets for the energy sector for the period 2015 to 2020 such as increasing power generating capacity from 4 GW in 2015 to 17 GW by 2020 (with hydropower

Sector	Policies ⁴⁾ (marked with '(+)’ when mentioned in the NDC document)	Description
		accounting for over 13 GW) and increasing electricity access from 60% in 2015 to 90% by 2020.
	Scaling-Up Renewable Energy Program for Ethiopia (SREP Investment Plan) (2012)	This policy sets out the target to increase power generation capacity from the present level of 2 GW to 10 GW by 2015 and to 25 GW by 2030. Focus on five major investment projects of wind, geothermal and hydroelectric energy generation.
	National Biogas Programme (2007)	This policy sets out the target to build 20,000 biogas plants by 2017 (2nd phase: 2014-2017).
Transport	Intra-Urban Electric Rail NAMA (2012) ¹⁾	This policy sets out the target to replace 50% of cargo transport with electric rail transport. This is expected to reduce emissions by 8.9 MtCO ₂ e/year by 2030.
Agriculture and Forestry	Afforestation and reforestation actions (part of the CRGE and further specified in NDC of 2021) (2011, update in 2021) (+)	This policy sets out various targets, including the unconditional target of 7 million hectares of afforestation and reforestation by 2030 ¹⁾ Further targets conditional on financial support: <ul style="list-style-type: none"> - Reforestation of 3 million hectares of land by 2030 - Restoration of 5 million hectares of land by 2030 and 9 million hectares of land by 2050 15,000-17,000 hectares of forest to be brought under protection and natural regeneration over a 30-year planning period as part of Ethiopia’s Forest Sector Development Plan and other initiatives
	Green Legacy initiative (2019) (+) ¹⁾	This large-scale tree planting initiative aims to plant more than 20 million seedlings through four annual seeding campaigns between 2019 and 2022.

¹⁾ Not quantified in NewClimate Institute’s projections.

European Union (EU27)

Table 11: Overview of key climate change mitigation policies in the EU27 (Appunn & Wettengel, 2023; Council of the European Union, 2017; European Commission, 2021b, 2022, 2023; European Council, 2023; European Environment Agency, 2020; European Parliament, 2009b, 2009a; European Parliament and the Council of the European Union, 2018, 2023, 2014; The European Parliament and the Council of the European Union, 2023)

Sector	Policies (marked with '(+)’ when mentioned in the NDC document)	Description
Cross-cutting	Fit-for-55 package (2022)	The legislations proposed in the Fit-for-55 package aim to ensure that EU policies are into line with the climate goals agreed by the Council and the European Parliament of reducing the Union’s emissions by 55% compared to 1990 levels by 2030. It introduces economy-wide amendments to regulations and schemes such as the Emissions Trading System, Effort Sharing Regulations, emissions standards for cars and vans and the Energy Efficiency Directive
	EU ETS Directive (2003/87/EC revised by Directive 2023/959)	This directive establishes a cap on emissions from electricity/heat and industry to reduce emissions by 62%

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		below 2005 levels by 2030. The cap is reduced at an annual rate of 4.3% (2024-2027) and 4.4% (2028-2030) annually
	Effort sharing regulation (annual GHG targets for non-ETS sectors in the period 2021-2030) (2023) ¹⁾³⁾	This policy sets out a target to reduce GHG emissions from non-ETS sectors by 42% by 2030, relative to 2005
	Revised Energy Efficiency Directive (EED) EU 2022 ³⁾	This policy sets out a target to reduce final energy consumption by 11.7% by 2030 (compared to the 2020 modelling projections for 2030)
	F-gas regulation (517/2014)	This policy sets out a target to reduce F-gas emissions by 37% by 2020 and by 79% by 2030, relative to the average values between 2009 and 2012.
	Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality (European Climate Law) (2022)	This document establishes 1) a comprehensive framework to enable climate change mitigation efforts, including carbon removal, across the Union, and 2) a framework aiming to meet the global adaptation goal set out in Article 7 of the Paris Agreement (art. 5). It further commits the Union to an enhanced target of GHG emissions reduction by 2030 (art. 4) and to climate neutrality by 2050 (art. 2).
Energy supply	REPowerEU Plan (2022)	With this plan, EU increased its binding target of renewables share in electricity production for 2030 to 42.5%, with the ambition to reach 45%. The binding Energy Efficiency Target under the 'Fit for 55' package of European Green Deal legislation is also increased from 9% to 13%.
Buildings	Eco-design Framework Directive (Directive 2009/125/EC)	This policy sets out a series of specific standards for a wide range of appliances
	Energy Performance of Buildings EU 2018/844	This policy sets out a target for all new buildings to be nearly zero-energy from 2021 onwards.
Transport	Regulation of CO ₂ emissions from heavy-duty vehicles (2019)	This policy sets the following targets: <ul style="list-style-type: none"> - New heavy-duty trucks: 30% reduction of CO₂ emissions per tonne-km from 2019 levels by 2030 - The share of renewable energy within the final consumption of energy in the transport sector is at least 14 % by 2030⁴⁾
	Regulation 2023/851 strengthening the CO ₂ emission performance standards for new passenger cars and new light commercial vehicles (amending Regulation 2019/631)	The regulation includes the following CO ₂ emission reductions for new cars and vans: <ul style="list-style-type: none"> - Limit of 95 gCO₂/km for cars and 147 gCO₂/km for vans (established 2021 targets) - 55% reduction for cars and 50% for vans (compared to the 2021 targets) - 100% reduction for cars and vans
Agriculture and Forestry	EU Biodiversity Strategy for 2030 (2020) ^{2), 4)}	Part of the European Green Deal, a strategy by the European Commission which proposes several actions related to biodiversity, including the aim to legally protect 30% of the area in the EU, of which 30% would be strictly protected.
	EU LULUCF Regulation (2021) ⁴⁾	This policy regulates the inclusion of the LULUCF sector in the overall EU 2030 climate and energy framework and the overall GHG emission reduction target for EU. Provides updated accounting rules and a no-debit rule that all Member State have to ensure that the accounted GHG

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		emissions from the LULUCF sector are balanced by at least an equivalent accounted amount of removals of CO ₂ .
	EU Farm to Fork Strategy (2019) ²⁾⁴⁾	This policy is part of the European Green Deal, a strategy by the European Commission related to fair, healthy and environment-friendly food systems.
	3 Billion Trees Pledge (map tree counter) (2021) ⁴⁾	Under the European Green Deal, the EU biodiversity strategy for 2030 commits to planting at least 3 billion additional trees in the EU by 2030 in full respect of ecological principles.
	EU Nature Restoration Law (2022) ²⁾	This law presents overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.
	Proposal Regulation of the European Parliament and of the council on the making available on the Union market as well as export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010 (2021) ²⁾	The objective of this initiative is to curb deforestation and forest degradation that is provoked by EU consumption and production. The initiative aims to minimize the consumption of products coming from supply chains associated with deforestation or forest degradation – and increase EU demand for and trade in legal and 'deforestation free' commodities and products.

¹⁾ Not quantified in NewClimate Institute. ²⁾ Not quantified in IIASA model projections. ³⁾ Not quantified separately in PBL IMAGE model projections, but achievement checked after implementation of other (related) targets. The final energy consumption target is interpreted alternatively as a maximum final energy target according to a PRIMES Baseline and is reached. The share of renewables in final energy consumption target is within reach. ⁴⁾ Not quantified in PBL IMAGE model projections.

India

Table 12: Overview of key climate change mitigation policies in India (BEE, 2015; Chaliawala, 2021; Department of Heavy Industries, 2015; Government of India, 2015, 2022a, 2022b, 2023a, 2023b; Ministry of Consumer Affairs Food and Public Distribution, 2015; Ministry of Environment Forest and Climate Change (MoEF&CC), 2015; MNRE, 2017, 2023; MoP, 2022; PIB, 2023)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Energy Conservation (Amendment) Bill (2022) ¹⁾	The amendment is aimed at helping India fulfil its NDC commitments by introducing a carbon credit trading scheme, obligations to use non-fossil sources of energy, energy conservation code for buildings and standards for vehicles and vessels.
	National Green Hydrogen Mission & Green Hydrogen/Green Ammonia Policy (2022) ¹⁾	The Mission sets a green hydrogen production target of 5 million tonnes per annum (MTPA), with the potential to scale up to 10 MTPA depending on export demand growth. The Policy provides incentives for green hydrogen and green ammonia producers with the objective of reducing production costs. Notable incentives include:

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		<ul style="list-style-type: none"> - waiver of inter-state transmission charges for up to 25 years - banking of renewable energy for up to 30 days - allowing renewable energy consumed for green hydrogen production to count towards state renewable purchase obligations
Energy supply	Renewable energy targets and support schemes (+)	<p>Measures in support of renewables include:</p> <ul style="list-style-type: none"> - 43% share of renewables in the electricity supply of distribution companies by 2030 – 7% from wind, 3% from hydropower, and the rest from other type of renewables - Capacity target for 2028: 50 GW annual renewable power capacity additions between 2023-2028 - Capacity target for 2030: 500 GW total non-fossil power capacity - Renewable Purchase Obligations scheme (2022) ²⁾ - Renewable Energy Certificate mechanism (2011) ^{1) 2)}
	Viability Gap Funding for development of Battery Energy Storage Systems (BESS) (2023) ¹⁾	The scheme envisages development of 4 GWh of BESS projects by 2030-31, with a financial support of up to 40% of the capital cost as budgetary support in the form of Viability Gap Funding (VGF).
	National Electricity Plan (2023) ¹⁾	<p>This plan updates the National Electricity Plan from 2018. It includes a detailed plan for power capacity changes up to 2027 and a prospective plan with projections up to 2032.</p> <p>Key projections for 2031-32 include:</p> <ul style="list-style-type: none"> - 243% increase in renewables capacity (including hydropower and pumped storage) to reach 596 GW - 190% increase in nuclear capacity to reach 20 GW - 26.5% increase in coal capacity to reach 260 GW - No change in fossil gas capacity, staying at 25 GW
Transport	Fuel economy standards	This policy sets out the following standards: 1.3 MJ/pkm to 130 g CO ₂ /km by 2017 and 0.9 MJ/pkm to 113 g CO ₂ /km by 2022, for light-duty vehicles.
	Third phase of Faster Adoption and Manufacturing of (Hybrid & Electric Vehicles (FAME-II) initiative (2019) ²⁾	<p>This policy supports the uptake of EVs by providing upfront incentives for the purchase of vehicles and by fostering the development of charging infrastructure.</p> <p>It includes the following targets:</p> <p>Subsidizing the purchase of 1,000,000 electric two-wheelers, 500,000 electric three-wheelers, 55,000 electric four-wheelers and 7,000 buses.</p> <p>Reaching 15% EV share in car stock by 2023, 30% by 2030.</p>
	Support for biofuels (2007), National Policy on Biofuels (2018) ²⁾	<p>These policies include the following targets:</p> <p>5% blending target for ethanol with petrol (no timeline set).</p> <p>20% blending target for bioethanol in gasoline, 5% biofuel in diesel by 2030 (proposed target).</p>
Industry	Energy efficiency in industry (PAT scheme) (2011)	<p>This policy sets out a benchmarking scheme to compare the performance of designed companies against best practice, combined with a market mechanism to trade energy savings certificates.</p> <p>The sixth PAT cycle has commenced with effect from 1st April 2020, and aims to achieve a total energy savings of 1,277 Mtoe by the end</p>

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		of 2023. The next cycle has been notified in October 2021 for the period 2022-23 to 2024-25 with an overall energy savings target of 6,627 Mtoe
Agriculture and Forestry	Green India Mission (2011)	This policy sets out the target to increase the forest/tree cover in moderately dense forests by 5 million hectares, and to improve forest/tree cover of forest areas by 5 million hectares

¹⁾ Not quantified in PBL IMAGE model projections. ²⁾ Not quantified in NewClimate Institute projections.

Indonesia

Table 13: Overview of key climate change mitigation policies in Indonesia (Government of Indonesia, 2023; Herbert Smith Freehills, 2021; Kementerian PPN, 2019; KESDM, 2016; Kharina et al., 2016; President of the Republic of Indonesia, 2018; Republic of Indonesia, 2018, 2019; Reuters, 2021; Sidharta et al., 2021)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Carbon trading policy to reduce emissions (2021) ¹⁾	This policy sets out carbon trading rules to establish a market mechanism to help achieve the country's greenhouse gas reduction targets by 2030
	Indonesia's New Carbon Law (2021)	This law introduces a general carbon tax, a general carbon price, sector-based emission caps, and a carbon trading framework.
Energy Supply	National Energy Policy (NEP) (2014) (+) ³⁾	This policy sets out a target of 23% new and renewable energy (including nuclear) in total primary energy supply by 2025
	Electricity Supply Business Plan (RUPTL 2021–2030)	This policy sets out a target of 20.9 GW added renewable electricity capacity over 2021-2030 (52% total). Renewables account for 23% generation mix by 2030.
	RPJMN 2020-2024 ^{1) 3)}	This policy sets out a target of renewable power capacity of 37.3 GW by 2024.
Transport	Biofuel targets (2023) ⁴⁾	The blending target set out in 2013 was 15% share of biofuels in all transportation fuels by 2025 (25% biodiesel, 20% bioethanol). The biodiesel blending rate was raised to 30% in 2020 and is set to 35% as of 2023.
Agriculture and Forestry	Presidential Instruction number 6/2013 on Forest Moratorium (2013) ¹⁾	This policy restricts oil palm extension to peatland or to primary forest as defined in the Ministry of Forestry land cover map.
	Food Estate Program (2020) ^{1) 2)}	This policy allows protected forests to be cleared at a large scale for the purpose of food production.
	Omnibus Law on Job Creation (2020) ^{1) 2)}	This policy eliminates a previous requirement that all regions in Indonesia maintain a minimum 30% of their watershed and/or island area as forest area.
	Indonesia's FOLU Net Sink 2030 (2022) ¹⁾	This policy sets out the target to make the FOLU sector a Net Sink in 2030. This translates to a 60% reduction in national Greenhouse Gas (GHG) emissions through GHG reduction in the Forestry and Other Land Use (Forest and Other Land use) sector.

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
	Minister of Environment and Forestry Regulation No. 17/2017 ¹⁾ ²⁾	This regulation aims to conserve the primary forest and peat ecosystem with essential function (no logging allowed) which located under the work area of private timber plantation.
	Presidential Regulation No. 98 of 2021 on the Implementation of Carbon Pricing to Achieve the NDC (2022) ¹⁾ ²⁾	This regulation is intended to serve as a basis for the implementation of carbon pricing (NEK) and to be a guideline on GHG emission reduction through policies, measures, and activities to achieve NDC target and to control GHG emissions in the national development.

¹⁾ Not quantified in PBL IMAGE model projections. ²⁾ Not quantified in IIASA model projections ³⁾ Not quantified separately but checked if achieved after implementation of other policies. ⁴⁾ Implemented in PBL IMAGE model as 22.5% total biofuel share.

Japan

Table 14: Overview of key climate change mitigation policies in Japan (ECCJ, 2022; IEA, 2022a; METI, 2018, 2019, 2020, 2021a, 2021b, 2023)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Global warming countermeasures tax (2012) ¹⁾	This policy sets out an upstream tax of 289 JPY/tCO ₂ (around 2.3€) on fossil fuels on top of existing petroleum and coal tax.
	Energy Conservation Act (1993 amendment) ¹⁾	This policy sets out the target of reducing energy consumption by 1%/year and annual reports to the government by large operators.
	Green Transformation (GX) Basic Policy (2023) ¹⁾ ²⁾	This policy outlines directions to achieve Japan's NDC and 2050 net zero pledge. Notable points include: (i) nuclear power policy to build next-generation reactors and extend the lifetime of existing reactors, (ii) support schemes for hydrogen and ammonia supply chain (including their co-firing with fossil fuels), (iii) establishment of green bonds, iv) full-fledged emissions trading system by companies from 2026.
Energy supply	2021 Basic Energy Plan (+)	This policy sets out the target of reaching 36% to 38% renewable electricity (incl. large hydro) by 2030.
	Renewable Energy Act (feed-in tariff) (2012) ¹⁾	This policy requires electric utility operators to purchase all electricity generated at designated prices; applicable to most renewable technologies.
Buildings	Building Energy Efficiency Act (2022 amendment)	All new buildings are now required to meet the minimum energy efficiency standards.
	2018 Basic Energy Plan (+)	This policy sets out the target of making all new buildings net-zero energy by 2030.
Transport	Passenger vehicle fuel efficiency standards (2020 amendment) ²⁾	This policy sets out a target of 25.4 km/l by 2030 for passenger vehicles, representing a 32.4% improvement compared to 2016 values.
	Top Runner Standards (2020 amendment of the Energy Conservation Act) ¹⁾ ²⁾	The Top Runner Program is a mandatory standard programme based on the Energy Conservation Act targeting manufacturers

		and importers of energy-consuming products. The standards also apply to electric vehicles.
	Green Growth Strategy (June 2021 revision) ²⁾	This policy sets out a target of 100% share of electrified vehicles (including fuel cell vehicles and non-plugin hybrids) in new passenger car sales by 2035.
F-gases	Act on Rational Use and Proper Management of Fluorocarbons (2013, last amendment 2019) ¹⁾	This policy sets out stricter control of the entire F-gas chain (GWP targets for equipment types, obligation of F-gas destruction for entities re-using recovered F-gases). The 2019 amendment includes several penalty and obligatory measures to increase the F-gas recovery rates up to the targeted 50% by 2030 from 38% in 2017.
	Ozone Layer Protection Act (2018 amendment) ²⁾	Regulation on production and import volumes to comply with the Kigali Amendment of the Montreal Protocol.
Agriculture and Forestry	Strategy for sustainable food systems (2021) ¹⁾	This strategy aims to create jobs, improve livelihoods and encourage balanced diets for the Japanese population. To do so, it aims to create smart food value chains, boost human development, boost research and development, and encourage innovation, notably in rural areas. It also sets specific measures to decarbonise the food sector and make it more resilient.
	The Act for Promotion of Use of Wood in Public Building (2010, Act number 36) (2019) ¹⁾³⁾	This act establishes the guidelines to use wood in the construction sector with sustainable principles
	The Forest Act (1951, Act number 249) (2019) ¹⁾³⁾	This act establishes the guidelines to promote forest conservation and restoring practices.
	Law No. 37/2022 concerning the Promotion of Environmental Burden Reduction Activities for the Establishment of Environmentally Harmonised Food Systems (2022) ¹⁾³⁾	This law establishes basic principles relating to the establishment of a food system that is harmonised with the environment. It aims to contribute to the sustainable development of agriculture, forestry, fisheries and the food industry, whilst ensuring a stable food supply for citizens.

¹⁾ Not quantified in PBL IMAGE projections ²⁾ Not quantified in NewClimate Institute projections. ³⁾ Not quantified in IIASA projections.

Mexico

Table 15: Overview of key climate change mitigation policies in Mexico (Cámara de Diputados del Congreso de la Unión, 2015; CEMDA, 2020; Centro Nacional de Control de Energía, 2017; CONAFOR, 2001; De Diputados et al., 2017; Diario Oficial de la Federación, 2021; DOF, 2014b, 2014a; Government of Mexico, 2021b, 2020, 2021a; Greenpeace México, 2020; IEA, 2016; Mexico, 2011; SENER, 2015)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Special Program on Climate Change (2021 to 2024) ¹⁾²⁾	This policy sets out to reduce GHG emissions by implementing specific measures in all sectors.
	General Law on Climate Change (LGCC, (+)) (2012, with subsequent reforms in 2014, 2015, 2016, 2018, 2020, and 2022) ¹⁾²⁾	This law is the basis for climate policy in Mexico which translates the overarching GHG emission reduction targets (added to the law in a reform in April 2018) into strategies and plans and provides the institutional framework for their implementation. A reform in 2020 dissolved the Climate Change Fund.

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		A further reform is underway to remove the National Ecology and Climate Change Institute (INECC) and transfer its functions to the Environmental Ministry (SEMARNAT).
	Emissions Trading Scheme (2018) ²⁾	This policy sets out a national emissions trading scheme that will start a three-year pilot phase in 2020. The regulatory framework for the ETS is expected to be fully operational by 2023.
Energy supply	Electric Industry Law (LIE, (+)) (2014, 2021 update) ^{1) 2)}	<p>This law establishes a free competition regime in electric power generation and commercialization. It also allows participation of private actors in transmission and distribution.</p> <p>The 2021 amendment allows fossil plants run by the Federal Electricity Company (CFE) to obtain clean-energy certificates which were previously planned exclusively for renewable energy suppliers. It also prioritises fossil fuel electricity generation over renewable energy in the Mexican grid.</p>
	Energy Transition Law (2015)	<p>This law provides a framework for clean energy, energy efficiency and greenhouse gas emissions reductions.</p> <p>It also sets out targets for clean energy (includes efficient gas-fired cogeneration) of 25% in 2018, 30% in 2021 and 35% by 2024.</p> <p>Power auctions for wind and solar energy supporting the implementation of the targets were cancelled in 2019.</p>
	National Transition Strategy to Promote the use of clean fuels and technologies (2016)	<p>This policy is a planning document for medium and long-term clean energy (incl. efficient cogeneration).</p> <p>It sets out “clean” power generation targets of 35% by 2024, 37.5% by 2030 and 50% by 2050.</p>
	Performance criteria and application for flaring and ventilation of natural gas (CNH.06.001/09) (2011) ^{1) 2)}	This policy sets out the target of reducing emissions from oil and gas production through a decrease in venting of 73 MtCO ₂ e below BAU in 2020 and 92 MtCO ₂ e in 2030.
	Program for the development of the national electric system (PRODESEN) (2022) ²⁾	This policy sets out clean energy targets up to 2036, including 25.5% for solar, and 12.8% for wind.
Transport	CO ₂ emissions standards for light duty vehicles ²⁾	<p>This policy sets out the following vehicle emissions standards:</p> <p>Passenger cars: 135 to 180 gCO₂/km (depending on vehicle size).</p> <p>Light duty trucks: 163 to 228 gCO₂/km (depending on size).</p>
Agriculture and Forestry	National Forestry Programme 2025 (2001) ^{1) 3)}	This policy aims to conserve and restore the capacity of strategic forest areas to provide ecosystem services through an inclusive and participatory approach that contributes to guaranteeing a healthy environment for the development and well-being of the population.
	REDD+ National Strategy (2017) ¹⁾	This policy sets out a target to reduce LULUCF emissions and achieve net-zero deforestation by 2030.
	Sowing Life Programme (Sembrando Vida, 2020) ¹⁾	<p>This policy sets out a target to plant 1 billion trees and pays farmers to plant fruit or timber trees on small plots of land to encourage industry in deprived rural areas.</p> <p>Impact is still unclear as planting big swaths of commercial species, sometimes on land that held native forests, can potentially end up increasing deforestation rates.</p>

Sector	Policies (marked with '(+)’ when mentioned in the NDC document)	Description
	Reform: The general law of sustainable forest development (2022) ¹⁾	The reformed policy seeks to avoid granting support or economic incentives for agricultural and livestock activities in deforested areas or for those that promote land-use change.
	Support for sustainable forestry development (2021) ^{1) 3)}	This policy supports the owners and inhabitants of forest areas to implement actions that contribute to the protection, conservation, restoration, and incorporation of sustainable forest management practices.
	Community Forest Management (CFM) programme and CONAFOR's Payment for Environmental Services (PES) programme (2022) ¹⁾	Reduced CO ₂ emissions from avoided deforestation. Increase carbon stocks.
	Management and enhancement of carbon sinks in protected natural areas under federal jurisdiction (2022) ¹⁾	Improvement in management of federally protected natural areas and increase in federal conservation area.

¹⁾ Not quantified in PBL IMAGE model projections. ²⁾ Not quantified in the NewClimate Institute projections. ³⁾ Not quantified in IIASA model projections.

Morocco

Table 16: Overview of key climate change mitigation policies in Morocco (AFD, 2018; Democratic Republic of the Congo, 2015; Kingdom of Morocco, Minister of Energy, Mines, 2013; Kingdom of Morocco, Ministry Delegate of the Minister of Energy, Mines, 2014; Kingdom of Morocco, 2016, 2018, 2019; Kingdom of Morocco Ministry of Equipment and Transport, 2010; Schinke & Klawitter, 2016)

Sector	Policies ⁴⁾ (marked with '(+)’ when mentioned in the NDC document)	Description
Cross-cutting	2030 National Climate Plan (2019)	This policy sets out various targets, including: <ul style="list-style-type: none"> - Renewable electricity capacity of 52% by 2030. - Reduce energy consumption by 15% by 2030. - 'Significantly' reduce fossil fuel subsidies. - Support afforestation and reforestation. - Governance measures: create a National Commission on Climate Change, enhance inter-sectoral coordination and reinforce the participation of NGOs in climate policy.
	Creation of a Strategic Committee for Sustainable Development (Decree 2.17.655) (2018) ¹⁾	This organization is in charge of the coordination of sustainable development policies, including the implementation of the National Strategy for Sustainable Development, which aims to make Morocco's economy 'green and inclusive' by 2030.
	Moroccan Climate Change Policy (MCCP) (2014) ¹⁾	This policy regulates the coordination and alignment of various sectoral and cross-sectoral national policies tackling climate change.
Energy supply	National Energy Strategy (2009, updated 2012) (+) Morocco Integrated Wind Energy Programmes (2020) (2030) (+)	These policies include the following targets: <ul style="list-style-type: none"> - Renewable power capacity: 42% share in total capacity by 2020 and 52% by 2030. - Energy savings of 12–15% in 2020 and 20% in 2030.

Sector	Policies ⁴⁾ (marked with '(+)' when mentioned in the NDC document)	Description
	Morocco Solar Plans (2020) (2030) (+) ²⁾ Morocco Hydroelectric Plan (2020) (2030) (+) ²⁾	<ul style="list-style-type: none"> - Extension of national wind farms to total 1,467 MW by 2020 and 2,180 MW by 2030. - Extension of solar power capacity to 827 MW by 2020 and 4,000 MW by 2030 (both concentrated solar power plants & photovoltaic systems). - Extension of hydro power capacity by 1,098 MW by 2030.
Transport	High-speed train line between Rabat, Tangier and Casablanca (2018)	This policy sets out the upgrade of existing railway to high-speed train line completed in 2018.
	Extension of Casablanca tramway (2016)	This policy sets out the extension of Casablanca tramway by 45 km by 2025.
	Improvement of environmental standards for vehicles (2021) (+)	This policy sets out new environmental standards for vehicles.
	Introduction of Euro 6 emission standards (2023) (+)	This policy introduces Euro 6 vehicle emission standards, which tighten limits on air pollutant emissions, to all new vehicles sold in the Moroccan market.
Industry	Energy efficiency program in the industry sector (2011)	This policy sets out energy efficiency programs for the industry, buildings and transport sector (excluding large energy consuming industries).
Buildings	Energy efficiency program in the building sector (2009)	This policy sets out minimum requirements for new residential and commercial buildings.
	Energy efficiency program for public lighting (2009)	This policy sets out the instalment of new public lighting technologies.
Waste	National Strategy for the Reduction and Recovery of Waste (2019) (+)	This policy introduces a programme focusing on the mechanical-biological treatment and co-incineration of waste.
Agriculture and Forestry	Preservation and Sustainable Forest Management Strategy (2021)	This policy sets out a target of afforestation and regeneration of approximately 50,000 hectares of forest per year.
	Green Generation Strategy (+)	This policy sets out a plan for the sustainable management and general modernization of the agricultural sector and sets tree plantation targets.

¹⁾ Not quantified in NewClimate Institute projections. ²⁾ See Climate Action Tracker (Climate Action Tracker, 2023) for the implementation status. ³⁾ Not quantified in IIASA model projections.

Republic of Korea

Table 17: Overview of key climate change mitigation policies in the Republic of Korea (APERK, 2019; Argus Media, 2021; Climate Policy Database, 2020; Hwang, 2014; Ministry of Trade, 2017; MOTIE, 2019; Republic of Korea, 2012, 2020)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Emissions Trading System (2015) ¹⁾	This policy manages 68% of the national GHG emissions and covers nearly 600 companies from 23 sub-sectors. The emissions caps for Phase III

Sector	Policies (marked with '+' when mentioned in the NDC document)	Description
		(2021–2025) will be strictly set to be consistent with the annual target emissions from the 2030 Greenhouse Gas Reduction Roadmap.
Energy supply	Renewable energy targets ¹⁾ 3 rd Energy Master Plan (2019) 9 th Basic Plan for Long-term Electricity Supply and Demand (2019)	These policies set out the following targets: <ul style="list-style-type: none"> - Share of renewables in total electricity generation: 20% by 2030 and 30–35% by 2040.⁴⁾ - Total 58.5 GW renewable capacity by 2030²⁾: 2.1 GW hydropower, 17.7 GW wind, 33.5GW solar power, 1.7GW biomass, and 0.3GW waste capacity.
	Renewable Portfolio Standard (2012, 2021 update) ²⁾	This policy requires generation companies with a capacity over 500 MW to include a certain percentage of renewables. In 2021, the standards were raised, reaching 25% in 2026.
	5 th Basic Plan for New and Renewable Energy (2019)	This policy sets out a target to reach 20.3% supply of new and renewable energy in total electricity generation by 2030, and 25.8% by 2034 (Renewable energy 22.2%, New energy 3.6%).
Transport	Renewable Fuel Standard (2013; 2020 update) ²⁾	This policy mandates a biodiesel share in diesel of 3% from 2018 onwards. The 2020 update aims to improve share to approximately 5% in 2030. The update has not been yet quantified in our projections.
Agriculture and Forestry	2030 NDC Advance (2021) - Joint Ministries ²⁾	This policy sets out a target to enhance the national carbon sinks from 22.1 MtCO ₂ e in 2020, to 26.7 MtCO ₂ e by 2030 including forest, ocean, and other natural sinks.
	2030 NDC Roadmap (2018) – updated ^{2) 3)} 1st National Carbon Neutrality and Green Growth Master Plan (Draft) (2023) - Joint Ministries ^{2) 3)}	The 2030 NDC Roadmap was revised in 2018, and the roadmap for the land use sector has been changed to the new joint ministries plan. In case of the LULUCF, the total emission reduction target of 26.7 MtCO ₂ e by 2030 has not changed.
	6 th Forest Master Plan (2018-2037) ^{2) 3)}	This policy sets out a target to increase the contribution of the LULUCF sink so that by 2030, it accounts for 10% of total emissions.
	2 nd Comprehensive Plan for Improvement of Carbon Sinks (2018-2022, updated) ^{2) 3)} 3 rd Comprehensive Plan for Improvement of Carbon Sinks (2023-2027) ^{2) 3)}	This policy sets out the following targets: <ul style="list-style-type: none"> - To increase national forest carbon stocks to 2.1 billion tCO₂ in 2022, compared to 1.8 billion tCO₂ in 2015. - To expand carbon storage in domestic harvested wood products (HWP) by up to 36 Mt by 2022, compared to 23 Mt in 2017. - 2027 expectation: increasing national total forest carbon sequestration by 28.26 MtCO₂e, 70,000 tCO₂e for new carbon sequestration sources using marginal area, 1.2 MtCO₂e for using harvested wood products (HWPs), energy substitution 1.04 MtCO₂e using forest biomass, reducing emission from forest fire 570,000 tCO₂e, 5M tCO₂e by foreign REDD+ activities. 2027 total 30 MtCO₂e sequestration target.
	Forest Renaissance Promotion Strategy for forest management (2022-2027) ^{2) 3)}	This strategy aims to achieve a total of 32 MtCO ₂ e of forest carbon sequestration (domestic: 25.5 MtCO ₂ e, foreign: 5 MtCO ₂ e, biomass: 1.5 MtCO ₂ e) until 2023. This target takes 10% of the NDC. This policy sets out the detailed strategies for the target as follows: <ul style="list-style-type: none"> - 1 million ha of forest restoration and afforestation in urban and deforested area and on idle land until 2027. - Apply forest tending on 319 thousand ha of forest area until 2027.

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
		<ul style="list-style-type: none"> - Enlargement of forest reserve up to 150 thousand ha until 2027. - Upgrade REDD+ pilot project in Cambodia, Myanmar and Laos to Subnational REDD+ and figure out new projects by adding the partner countries (e.g., Vietnam, Peru, Mongolia).
	2 nd Comprehensive Plan for Wood Use (2019-2024) ²⁾	<p>This policy sets out the following targets:</p> <p>To increase domestic wood self-sufficiency rate by 22.4% by 2024, compared to 19% in 2019.</p> <p>To expand the size of timber industry to \$40 billion by 2024 by utilizing currently unused domestic forest biomass resources.</p>
	3 rd Rural Area Promotion Projects Master Plan (2023-2027) ^{2) 3)}	This policy aims at reducing emissions from 12.2 MtCO ₂ e to 9.7 MtCO ₂ e until 2030 (20.5%). Application of biochar 0 in 2021 to 58,000 tCO ₂ e in 2030 and reducing 30% of methane emission until 2030.
	2050 Carbon Neutral Promotion Strategy of Agriculture and Food Sector (2021) ²⁾	This policy aims at reducing emissions in the non-energy sectors by 28.3% by 2050 compared with 2018 estimates. This policy sets out targets to reduce emissions from rice production by 0.54 MtCO ₂ e, fertilizer use by 2.25 MtCO ₂ e, livestock waste treatments by 2.25 MtCO ₂ e.
	2050 Carbon Neutral Forest Sector Promotion Strategy (2021) ^{2) 3)}	<p>This policy sets out a target of increasing the annual LULUCF removals by 23.6 MtCO₂e. This policy set out the following targets:</p> <ul style="list-style-type: none"> - Increase forest plantations in idle land and urban area from 17 thousand ha to 61 thousand ha. - Afforestation of 288 thousand ha forest using carbon-efficient tree species. - Restore 11 thousand ha of forest by 2050. - Reduce the annual forest area damaged by disaster to 636 ha by 2050, compared to the expectation of 2,339 ha.
	2050 Carbon Natural Promotion Strategy of Ocean and Fishery Sector (2021) ^{2) 3)}	This policy set out a target of sequestration by blue carbon around 1.362M tCO ₂ e.
	4th Protection plan from environmental disruption caused by mining (2022-2026) ^{2) 3)}	This plan sets out financial investment of 20.9 billion KRW (about \$15.2 million) for restoring forest damaged by mining. The policy aims to afforest 43.5 ha of land.
	Food and Rural Affairs Business Plan (2022) ²⁾	This policy sets out a target to reduce GHG emissions from Agriculture to below 18.0 MtCO ₂ e by 2030 and 15.3 MtCO ₂ e by 2050, compared to 20.4 MtCO ₂ e in 2017.

¹⁾ Not quantified in NewClimate Institute projections. ²⁾ Not quantified in PBL IMAGE model projections. ³⁾ Not quantified in IIASA model projections. ⁴⁾ Not quantified separately in PBL IMAGE projections, but achievement checked after implementation of other (related) targets.

Russian Federation

Table 18: Overview of key climate change mitigation policies in Russian Federation (Government of the Russian Federation, 2013, 2014, 2015, 2016, 2019, 2021a, 2021b; IEA, 2022b; Ministry of Energy of the Russian Federation, 2020; Nachmany et al., 2015; TASS, 2022)

Sector	Policies (marked with '(+)' when mentioned in the INDC document)	Description
Cross-cutting	Federal Law No. 261-FZ 'On energy saving and improvement of energy efficiency' ¹⁾²⁾	This law creates the general framework for energy efficiency in Russia. It contains mandatory energy saving requirements for companies, a ban of inefficient incandescent light bulbs, and incentives for companies investing in energy efficiency.
	Energy intensity targets (2008) ⁴⁾	This policy sets out a target to reduce the energy intensity of GDP by 40% between 2007 and 2020, and by 44% between 2005 and 2030.
	Regional energy savings programmes (Decree of July 31, 2014, No. 754) ¹⁾	This policy provides subsidies and government financing to regions for improving energy-efficient technologies and energy conservation programmes.
	Social-economic development of the Russian Federation with low GHG emissions levels (Decree of October 21, 2021 No. 3052-r) ¹⁾	This policy reiterates 2030 NDC target and outlines strategy to achieve carbon neutrality by 2060. The reductions are mostly bolstered by negative LULUCF emissions and increasing forest's carbon storage capacity.
Energy supply	Renewable energy targets (Governmental resolution No. 512-r of 2013, 2015 amendment to the Decree No. 1-r of 2009) ³⁾⁵⁾	This policy sets out a target to reach 4.5% renewables share in total electricity generation by 2024 (excluding hydropower larger than 25 MW).
	Energy Strategy of the Russian Federation for the period up to 2035 (2020) ¹⁾	This strategy outlines the expected development of Russia's energy sector for the next 15 years. The strategy indicates that Russia will continue to heavily support its fossil fuel industries and only briefly mentions renewables other than hydropower. It also sets new, less ambitious targets for limits on associated gas flaring.
Transport	Transport strategy until 2030 with a forecast up to 2035 (2021)	Target to reduce the energy consumption of the transport sector by 30% by 2030 by employing measures including vehicle standards, energy efficiency, alternative fuels, and electric vehicles.
Industry	Investment tax credit for energy-efficient technologies and projects (Decree of June 17, 2015, No. 600) ¹⁾	This policy provides investment tax loans to organisations that invest in eligible energy-efficient technologies or projects. The number of eligible technologies has increased from an original 4 to 56.
Buildings	Strategy for development of building materials sector for the period up to 2020 and 2030, adopted by Government Decree no. 868 (2016) ¹⁾	This policy sets out a target of a 20% reduction in residential heat consumption per m ² by 2030 relative to 2014.
	On clarification of energy efficiency requirements for public procurement objects (Decree of April 21, 2018, No. 486 and December 31, 2009, No. 1221) ¹⁾	This policy establishes energy efficiency requirements for public procurement objects, new and refurbished apartment buildings, and public and administrative buildings.
Agriculture and Forestry	National Strategy of Forestry Development by 2020 (2008) ¹⁾²⁾	This policy sets out a target to increase forest intensification and harvesting of wood by 5.8% per year compared to 2007.

Sector	Policies (marked with '(+)' when mentioned in the INDC document)	Description
	Decree banning timber-related exports to the EU (2022) ¹⁾²⁾	This policy bans the export of wood and timber-related products, including raw materials to produce paper and plywood, to 'unfriendly countries' until the end of 2022.
Waste	Phased launch of a new system for the management of solid utilities waste (MSW) – Federal Law No. 486-FZ (2016) ¹⁾	This policy sets out a target to increase the utilization of municipal solid waste generated until of 30% by 2024.

¹⁾ Not quantified in PBL projections. ²⁾ Not quantified in NewClimate Institute projections. ³⁾ Small hydropower is not distinguished from hydropower in the TIMER model. The renewable share targets were not quantified separately but checked after implementation of capacity targets. ⁴⁾ Not quantified separately in PBL projections, but achievement checked after implementation of other targets. ⁵⁾ NewClimate Institute projections assume the 4.5% target will be reached in 2030 due to the slow progress.

Saudi Arabia

Table 19: Overview of key climate change mitigation policies in Saudi Arabia (Al-Ghabban, 2013; Borgmann, 2016; General Authority of Zakat and Tax, 2018; Kingdom of Saudi Arabia, 2015, 2016, 2017; Nereim, 2017; Nereim & Cunningham, 2018; Saudi Green Initiative, 2021; Toumi, 2017)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Vision 2030 (updated in 2021)	This policy sets out to reform and diversify Saudi Arabia's oil-dependent economy was revised multiple times. The latest version, released in 2021, aims for 50% of electricity to be generated with renewable energy and 50% with fossil gas in 2030.
	5% VAT in fuel prices (2018) ¹⁾²⁾	This policy sets out a 5% VAT on fuels.
Energy supply	National Renewable Energy Program (NREP) (2017,2019, revised 2021)	This is the policy through which the Ministry of Energy implements the latest 'Vision 2030' renewable energy target. Renewable power capacity is auctioned through competitive tenders.
Transport	Fossil fuel price reform (2017) ¹⁾²⁾	This policy sets out a new slower schedule for energy subsidy cuts. The plan is now to reach international gasoline parity prices, increase diesel prices up to 90% of international prices, and raise the price for other fuels between 2018 and 2025.
Buildings	Saudi Energy Efficiency program ²⁾	This policy sets out efficiency labels for a range of household appliances and introduces standards for insulation materials.
Agriculture and Forestry	Greening Saudi Initiative (2022) ²⁾	This Initiative contributes to the target of planting 10 billion trees across Saudi Arabia.

¹⁾ Not quantified in NewClimate Institute projections. ²⁾ Not quantified in PBL IMAGE projections

South Africa

Table 20: Overview of key climate change mitigation policies in South Africa (Department Environmental Affairs (South Africa), 2013; Department of Energy, 2013; Department of Environmental Affairs South Africa, 2015; Department of Minerals and Energy, 2008; Department of Transport South Africa, 2018;

Marquard et al., 2021; NPC, 2010; Republic of South Africa, 2015; South Africa Department of Energy, 2018; South African Department of Energy, 2011)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Carbon tax (2019) (+) ¹⁾	The carbon tax covers fossil fuel combustion emissions, industrial processes and product use emissions, and fugitive emissions such as those from coal mining.
	National Development Plan (2012) (+) ¹⁾²⁾	This policy aims to eliminate poverty, reduce inequality, increase access to water and electricity.
	National Climate Change Response Policy (2011) (+) ¹⁾²⁾	This policy aims to effectively manage climate change impacts and make a fair contribution to the global effort to stabilise GHG concentrations.
	Climate Change Bill (CCB) (2022) ²⁾	Among other measures, includes adaptation strategies, and an obligation to determine a national GHG emissions trajectory and sectoral emissions targets.
Energy supply	Integrated Resource Plan for electricity (supported by REIPP, Renewable Energy Independent Power Producer Programme) (2011; 2019 update) (+)	<p>This policy sets out the following plans and targets:</p> <ul style="list-style-type: none"> - Nuclear to remain stable at 1,860 MW throughout 2030. <ul style="list-style-type: none"> o Extending lifetime of existing plant. o The Government's intentions to support nuclear capacity in the future remain uncertain. Policy Position 8 of the IRP2019 emphasises the need for a 2.5 GW nuclear build programme, which is not reflected in the actual capacity planning until 2030. - Renewable electricity generation capacity targets: <ul style="list-style-type: none"> o Hydropower to reach 4,600 MW by 2030 (adding 2,500 MW) o Solar photovoltaic to reach 8,288 MW by 2030 (adding 6,000 MW beyond already committed/contracted capacity) o Wind to reach 17,742 MW by 2030 (adding 14,400 MW beyond already committed/contracted capacity) - Concentrated solar power to reach 600 MW by 2030 (adding 300 MW, which is already contracted) <ul style="list-style-type: none"> o Decommissioning of 5.4 GW of coal
Transport	Petroleum Products Act (Biofuels Industrial Strategy) (2007)	This policy sets out mandatory blending of biofuels. Concentration for blending: 2-10% for bio-ethanol and minimum 5% for biodiesel from 2015 onwards.
Buildings	National Building Regulation (2011) ²⁾	This policy sets out building codes and standards.
Agriculture and Forestry	National Forest Act (1998) ²⁾³⁾	<p>This law aims at securing ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p> <p>It also seeks to facilitate improved timber availability and secure supply of timber to ensure sustainability of entire timber value chain.</p>
	Strategic Plan for the Development of Agriculture, Forestry and Fisheries (2013) ^{2), 3)}	This policy aims to promote the conservation of forest biological diversity, ecosystems and habitats, while promoting the fair and equitable distribution of their economic, social, health and environmental benefits.
	Conservation Agriculture Policy (2021) ²⁾³⁾	Promote the sustainability in the agriculture sector.

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
	DFFE Strategic Plan (2023) ²⁾	Strategic Plan for 2017/2018 to 2023/24 provides for the afforestation of 15 000 ha, rehabilitation of 1 500 ha of state-owned forest, rehabilitation of grasslands and wetlands, and also includes the reduction in land degradation (40 452 ha).

¹⁾ Not quantified in NewClimate Institutes projections. ²⁾ Not quantified in PBL IMAGE model projections

³⁾ Not quantified in IIASA model projections.

Thailand

Table 21: Overview of key climate change mitigation policies in Thailand (APERC, 2019; Department of Energy Business, 2015; Government of Thailand, 2019; Ministry of Energy of Thailand, 2020; NESDB (Office of The National Economic and Social Development Board), 2016; Office of Natural Resources and Environmental Policy and Planning of the Kingdom of Thailand, 2015; Thailand Automotive Institute, 2020)

Sector	Policies (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Climate Change Master Plan (2015-2050) (2015) (+)	This policy sets out the following targets: 7–20% GHG emissions reductions by 2020 below BAU in the energy and transport sectors. Share of at least 25% of the total energy consumption from renewable energy sources by 2021. Reduction of energy intensity by at least 25% compared to BAU by 2030.
	Alternative Energy Development Plan and Power Development Plan (2015 (+); 2018 rev. ¹⁾	This policy sets out the following targets: Increase of renewable energy shares to 30% of total energy consumption, 21% of power generation (plus additional 9% from imported hydro), 35% of heat generation and 35% of transport fuels by 2037. The plans also project a reduction in coal-fired power generation (23% to 12%), an increase in gas-fired power generation (37% to 53%) and overall demand reduction of 6% in comparison to 2018.
	Energy Efficiency Plan (2015-36) (+) ¹⁾	This policy sets out a target to reduce energy intensity per GDP (in final energy terms) by 30% by 2036, as compared to 2010, with total savings of 90 TWh by 2036.
	Oil Plan (2015-2036) ¹⁾	This policy sets out measures to save fuel in the transportation sector and enhance ethanol and biodiesel consumption.
Transport	Environmentally Sustainable Transport System Plan (2013-30) (2012) (+) ¹⁾	This policy supports the improvement of rail infrastructure to reduce annual logistics costs and the annual energy bill by about 2% and 1% of GDP respectively.
	National EV Roadmap	This policy aims to transform the country into an EV hub within the ASEAN region. It sets out a target to reach 250 000 EVs, 3 000 electric public buses, and 53 000 electric motorcycles by 2025 and for EVs to make up 30% of production by 2030.

Sector	Policies (marked with '+' when mentioned in the NDC document)	Description
	Excise tax on new vehicles (2016)	The tax varies between 20-50%, depending on the type of vehicle and CO2 emissions intensity. It aims to help the adoption of cleaner and more efficient vehicles. The policy is expected to be revised in the upcoming years to push for quicker adoption of EVs, necessary to respect the EV Roadmap's objectives
Industry	Energy Conservation and Promotion Act (1992, amended 2007) ¹⁾	This law sets out a target to stabilise the share of energy demand for the three most energy-intensive sectors at 40% by 2030.
Buildings	Minimum Energy and High Energy Performance Standards (MEPS/HEPS) (2011) ¹⁾	This policy sets out mandatory MEPS for air conditioners, refrigerators, self-ballasted compact fluorescent lamps and double-capped fluorescent lamps. HEPS for 28 appliances and types of equipment.
	Building energy code (2009) ¹⁾	This policy sets out a target to reduce electricity use by large commercial buildings by > 50% by 2030 compared with BAU.
Agriculture and Forestry	National Forest Financing Strategy of Thailand (2021) ²⁾	This policy describes different strategies put in place to finance forestry activities.

¹⁾ For policies in energy and industry sectors, see APERC (2019) for detailed assumptions. ²⁾ Not quantified in IIASA model projections.

Türkiye

Table 22: Overview of key climate change mitigation policies in Türkiye (Government of Turkey, 2009, 2019, 2022; Ministry of Energy and Natural Resources, 2014, 2018; Ministry of Environment and Urbanization, 2010; Turkish Ministry of Energy and Natural Resources, 2022)

Sector	Policies	Description
Cross-cutting	Energy intensity target (Energy Efficiency Law) (2012) ^{1) 2)}	Reduce primary energy intensity by 20% by 2023, compared to the 2008 level.
	Energy Efficiency Action Plan (2017) ^{1) 2)}	Reduce primary energy consumption by 14% compared to the BAU scenario in 2023.
	Turkey's 2022 Roadmap ^{1) 2)}	Turkey's Roadmap covers future planning for transformations in energy, transportation, industry, agriculture (and LULUCF) that are required to meet the country's 2053 Net Zero Emissions Target that was announced in 2021.
Energy supply	National Energy Plan for 2020-2035 (2022) ^{1) 2)}	The plan foresees an increase in the share of renewable energy in primary energy consumption from 16.7% in 2020 to 23.7% in 2035.
	11 th Development Plan (2019) ^{1) 2)}	Sets a target of 38.8% renewables in electricity production by 2023.
	Natural Resources Strategic Plan 2019-2023 (2019) ¹⁾	This policy sets out the following renewable capacity targets by 2023: Wind (11.8 GW), hydroelectric (32 GW), geothermal (2.8 GW) and solar (10 GW).
Agriculture and Forestry	Initiative to plant 252 million saplings by year end (2021) ^{1) 2)}	This initiative sets out a target to plant 252 million tree saplings by the end of 2021, as well as a target to plant 7 billion saplings by the end of 2023

¹⁾ Not quantified in NewClimate Institute projections. ²⁾ Not quantified in PBL IMAGE model.

United Arab Emirates

Table 23: Overview of key climate change mitigation policies in UAE (Government of the UAE, 2021, 2023; IRENA and IEA-ETSAP, 2015; UAE Ministry of Climate Change and Environment, 2017).

Sector	Policies ¹⁾ (marked with '(+)' when mentioned in the NDC document)	Description
Cross cutting	Energy Strategy 2050 (2017) Updated in 2023 (+)	This policy sets out a target of reaching 50% of clean energy in the electricity mix by 2050, including renewables (44%) and nuclear (6%). In the transport sector, this policy sets out a target for deployment of EVs of 691,000 vehicles by 2030 and 3 million by 2050
	Fuel pricing reform (2015) (+) ¹⁾	This policy aims at phasing out subsidies for gasoline and diesel
Transport	Federal Decree Law No. 8 (2018) ¹⁾	This law sets out a 5% VAT tax for petrol and diesel, but crude oil and natural gas are exempted.
	Vehicle fuel quality standard (+) ¹⁾	This policy sets out a fuel quality standard of 10 ppm sulphur content and Euro 5 standards.
	Federal Law No. 2 (2009) ¹⁾	This law approves the creation of Etihad Rail to build and operate a 1200 km national railway network.
	Green building codes in Abu Dhabi (2011) and Dubai (2014) ¹⁾	These policies include measures to support building retrofits, increasing the penetration of district cooling, and facilitating access to project finance.
Buildings	Energy Efficiency Standardization and Labelling Program ¹⁾	This policy covers a range of household goods and appliances.

¹⁾ Not quantified in NewClimate Institute projections.

United Kingdom

Table 24: Overview of key climate change mitigation policies in the United Kingdom (Committee on Climate Change, 2019; Department for Business Energy & Industrial Strategy, 2020; Department for Transport, 2022, 2023; UK Government, 2008, 2019a, 2019b, 2019c, 2020, 2021)

Sector	Policies ¹⁾ (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Climate Change Act (2008, 2019 update) (+)	This amendment in 2019 introduced a net-zero 2050 emissions target, strengthening its previous 2050 goal of at least an 80% GHG emissions reduction below 1990 levels by 2050 The sixth carbon budget proposed by the Committee on Climate Change (CCC) in December 2020 sets an emission reduction target for 2030 of 68% compared with 1990 levels. This target was subsequently adopted by the UK government.
	Ten Point Plan for a Green Industrial Revolution (2020) (+)	This policy defines several policy interventions in the energy, buildings, transport, nature, and technologies sectors, aiming to mobilise GBP 12 billion of government investment of which GBP 4 billion is new funding
	National Infrastructure Strategy United Kingdom (2020)	This strategy presents an overview of multiple policy interventions and actions across different sectors, many of which also reflected in sectoral plans.

Sector	Policies ¹⁾ (marked with '(+)’ when mentioned in the NDC document)	Description
	Clean Growth Strategy (2017) (+)	This policy presents intended actions by the UK government to accelerate the shift to low carbon transport, deliver clean and flexible power, improve energy efficiency, and reduce emissions from households.
	Climate Change Levy (2001, 2018 update) (+)	Amended in 2018 to increase the tax levels over time, the Climate Change Levy taxes the supply of energy in the industry, commerce and public sectors (electricity, gas, solid fuel, liquefied gases).
	UK F-Gas regulation (2019) (+)	This regulation ensures the continuation of emission reductions beyond the UK’s exit from the EU from January 2021 onwards of a 79% phase down of hydrofluorocarbons while further banning some F-gases and strengthening regulations related to leakage and repair.
	Environmental Act 2021 ²⁾ ³⁾	This act aims to improve air and water quality, tackle waste, increase recycling, halt the decline of species, and improve the country’s natural environment to make it more resilient to climate shocks.
Energy supply	Energy White Paper (2020) (+) supported by Ten Point Plan for a Green Industrial Revolution (2020) (+)	<p>This white paper outlines an expected 230 MtCO₂e in cumulative emissions reductions by 2032, presenting several measures in the energy supply sector:</p> <ul style="list-style-type: none"> - Announcement of UK Emissions Trading System (UK-ETS), which started operations in 2021 - Investments in nuclear power with a commitment to make a final investment decision of at least one nuclear power plant by 2024 and funding for research on advanced nuclear technology - Targeting 40 GW of offshore wind power capacity by 2030, incl. 1 GW of innovative floating offshore wind - Increase installation rate of electric heat pumps from 30,000 per year to 600,000 per year by 2028
Transport	Transport Decarbonisation Strategy (2021) (+)	<p>This strategy outlines the government’s intention end the sale of fossil fuel heavy goods vehicles (HGVs) by 2040, with sales of smaller trucks banned by 2035. These dates have not been finally adopted as of August 2021.</p> <p>The strategy also presents plans to make domestic aviation net-zero emissions by 2040, with total aviation emissions to reach net-zero by 2050.</p>
	National Bus Strategy (2021)	The strategy outlines the government’s plans to enhance and expand the public bus networks across the United Kingdom, among other measures, by support the purchase of at least 4,000 new zero emission buses.
	Jet Zero strategy: delivering net zero aviation by 2050	This strategy targets 10% sustainable aviation fuel (SAF) by 2030.
	Energy White Paper (2020) supported by Ten Point Plan for a Green Industrial Revolution (2020) (+)	<p>These policies set out a ban on selling petrol and diesel vans and cars by 2030, with all vehicles being required to have a significant zero emissions capability from 2030 and be 100% zero emissions from 2035.</p> <p>Several investment packages to support the following:</p> <ul style="list-style-type: none"> - Electrification of UK vehicles and their supply chains (GBP 1 billion) - Accelerate the roll out of charging infrastructure (GBP 1.3 billion) - Enhancement and renewal of rail networks and city public transport (more than GBP 10 billion) - Supporting clean maritime technology (GBP 20 million) and support the production of sustainable aviation fuels (GBP 15 million)

Sector	Policies ¹⁾ (marked with '(+)' when mentioned in the NDC document)	Description
	UK Road Vehicle Emission Performance Standards (2019)	<p>This regulation sets vehicle emission standards in line with EU regulations stipulating a limit of 95g CO₂/km for new passenger vehicles and 147g CO₂/km for vans from 2020 onwards with the subsequent changes:</p> <ul style="list-style-type: none"> - From 2025 onwards, these will further be adjusted to a 15% emissions reduction below a 2021 baseline for both cars and vans - From 2030, these will further be adjusted to a 37.5% reduction below the 2021 baseline
	2023 Zero Emission Vehicle mandate	This mandate requires 80% of new cars and 70% of new vans sold in Great Britain to be zero emission by 2030, increasing to 100% by 2035
Buildings	Heat and Buildings Strategy (2021) (+)	<p>This strategy outlines the government's intention to make all new heating systems to be 'net-zero compatible' by 2035 through a ban of new natural gas boilers. In September 2023 the government announced that this will only cover around 80% of UK homes. In the meantime, the government aims to install 600,000 heat pumps per year by 2028 and reducing costs for heat pumps by 25-50% by 2030.</p> <p>The strategy further outlines action areas for supply chain improvements for domestic heat pump production, increased R&D, and hydrogen-based heating applications.</p>
	Energy White Paper (2020) (+) supported by Ten Point Plan for a Green Industrial Revolution (2020) (+)	<p>These policies include the following relevant measures:</p> <ul style="list-style-type: none"> - Implementation of the Future Home Standard for new residential buildings (timeline not defined) - 600,000 heat pump installations per year by 2028 - Extension of Green Homes Grant Voucher and Local Authority Delivery schemes by one year (for 2021)
Industry	Industrial Decarbonisation Strategy United Kingdom (2021)	<p>This strategy outlines the government's intention to reduce industry sector emissions by around 66% by 2035 and at least 90% by 2050, both compared to 2018 baseline.</p> <p>For this purpose, the strategy outlines several policy actions in the industry sector and non-GHG targets. On the latter, the government aims for 3 MtCO₂ captured through Carbon Capture, Usage and Storage (CCUS) and around 20 TWh switching to low carbon fuels by 2030.</p>
	Hydrogen Strategy United Kingdom (2021)	The strategy outlines the government's plans to develop hydrogen production and use in the UK. For 2030, among other targets, the government aims to achieve 1 GW of low carbon production capacity by 2025 and 5GW post-2030.
	Energy White Paper (2020) (+) supported by Ten Point Plan for a Green Industrial Revolution (2020) (+)	<p>These policies include the following relevant measures:</p> <ul style="list-style-type: none"> - GBP 1 billion up to 2025 to facilitate the deployment of CCUS in two industrial clusters by the mid-2020s, and a further two clusters by 2030 - Target to develop 5GW of low-carbon hydrogen production capacity by 2030 and create a Net Zero Hydrogen Fund of GBP 240 million - Support of four low carbon clusters by 2030 and at least one fully net-zero cluster by 2040
	Industrial Decarbonisation and Energy Efficiency Action Plans (2017)	Voluntary commitments by the government, industry, and other parties to accelerate decarbonisation and to improve energy efficiency in the industry sector.

Sector	Policies ¹⁾ (marked with '(+)’ when mentioned in the NDC document)	Description
	Industrial Strategy (2017)	This strategy outlines an investment of GBP 162 million in innovation in low-carbon industry with a key focus on a reduction of energy use.
	Carbon Reduction Commitment Energy Efficiency Scheme (2010)	This mandatory scheme for large businesses aims to improve energy efficiency by mandating that businesses to measure their energy consumption and put in place cost-effective energy savings measures.
Agriculture and Forestry	25 Year Environment Plan (2018) (+) ¹⁾	This policy sets out a target to increase the area of woodland in England to 12% by 2060 by planting 180,000 ha by 2042.
	Woodland Carbon Guarantee (2019) ¹⁾	This policy sets out a £50 million incentive scheme to increase the planting trees rate across England. Working with Woodland Carbon Units (WCU), the scheme allows landowners to sell the carbon credits generated to either the government or to the open market up to 2055/56.
	England Trees Action Plan 2021 to 2024 (2021) ¹⁾	This plan sets out the government’s long-term vision for the treescape it wants to see in England by 2050 and beyond. It provides a strategic framework for implementing the Nature for Climate Fund and outlines over 80 policy actions the government is taking over this Parliament to help deliver this vision.
	England Peat Action Plan (2021) ¹⁾	This document seeks to make the country’s peatlands meet their Net Zero contribution, but also contribute to wider environmental goals. It calls for responsible management and enhancement of restoration efforts

¹⁾ Not quantified in IIASA model projections. ²⁾ Not quantified in NewClimate Institute projections. ³⁾ Not quantified in PBL IMAGE model.

United States of America

Table 25: Overview of key climate change mitigation policies in the United States of America (U.S. Department of State, 2016; U.S. EPA, 2018a, 2018b, 2019b; U.S. EPA & U.S. NHTSA, 2020)

Sector	Policies (marked with '(+)’ when mentioned in the NDC document)	Description
Cross-cutting	Infrastructure Investment and Jobs Act (2021) ¹⁾	This act comprises investments in a wide range of areas (totalling USD 1.2tn) that can indirectly enable the transition to a low-carbon economy, including the development of EV charging infrastructure, upgrading the power grid, and improving energy efficiency and electrification in buildings.
Energy supply	Methane waste prevention rule (2016) ²⁾	This policy sets out specific standards for oil and gas production to reduce CH ₄ emissions by 35% from 2014 levels by 2025. The November 2018 amendment removed requirements of the 2016 rule.
	Bipartisan Budget Act (2018) ¹⁾	This act provides a tax credit for carbon dioxide captured through CCS (section 45Q), including carbon dioxide used for enhanced oil recovery.
	Renewable Portfolio Standards (+) ¹⁾	31 Renewable Portfolio Standards (RPS) in place at a state level.
Transport	Emissions standards for light-duty vehicles (2021)	This policy sets out more stringent GHG emissions standards for LDVs for model year (MY) 2023 through 2026. The new standards require automakers to achieve a vehicle mileage of 52 miles per gallon (mpg) by 2026

Sector	Policies (marked with '(+)’ when mentioned in the NDC document)	Description
	Fuel efficiency standards for light-duty vehicles (CAFE) (2022)	The new standards set out a target to increase fuel efficiency 8% annually for MY 2024-2025 and 10% annually for model year 2026, achieving a fleet average of 49 mpg by 2026, improving by nearly 10 mpg relative to MY 2021
	Efficiency standards heavy-duty vehicles	The new standards include differentiated requirements per truck type.
	Renewable fuel standard (2015)	This policy sets out new standards for biofuel blending, setting out a target to increase biofuel use from nine billion gallons in 2008 to 36 billion gallons by 2022. In 2020, the USD 1 per gallon biodiesel blending tax credit was extended to 2022 and the required advanced category biofuel (i.e. biodiesel) volume was raised relative to 2019 levels.
Buildings	Better buildings Challenge (commercial buildings) ²⁾	This policy sets out a target to increase energy efficiency in commercial and industrial buildings by 20% by 2020.
	Energy Star Tax credits for buildings ¹⁾	Tax credits for energy efficiency products and solar energy systems.
	Building Energy Codes Program	This program sets out efficiency codes adopted at a state level.
Industry	Curbing emissions of hydrofluorocarbons (HFCs) (+)	As of April 2018, the US EPA has announced that it will not enforce HFC regulations under the Significant New Alternatives Policy Program (SNAP) In 2021, the Biden Administration requested the US Senate’s consent to ratify the Kigali Amendment, which aims to phase down hydrofluorocarbons (HFCs) worldwide.
	American Innovation and Manufacturing (AIM) Act (2021)	This Act directs the US Environmental Protection Agency (EPA) to phase down the production and consumption of HFCs. The rule aims to gradually reduce the production and imports of HFCs by 85% over the following 15 years after its implementation (2021–2036).
Agriculture and Forestry	Forest Ecosystem Restoration and Hazardous Fuels Reduction Programs (2000) ^{1),2) 3)}	These programs set out a mix of actions to increase forest resilience, reduce wildfires, and increase the area of set aside forests.
	Healthy Forests Restoration Act of 2003 (Public Law 108–148) (2022) ^{1),2) 3)}	This Act aims to improve the capacity to conduct hazardous fuels reduction projects on National Forest System lands, to enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape, and for other purposes. The Act notably seeks to enhance carbon sequestration capabilities.
	Plan to Conserve Global Forests: Critical Carbon Sinks ^{1),2) 3)}	This plan sets out to Incentivize Forest and ecosystem conservation and forest landscape restoration; Catalyse private sector investment, finance, and action to conserve critical carbon sinks.
	The Forest Legacy and Community Forest Programs ^{1),2) 3)}	The Forest Legacy Program (FLP) is a federally funded and state-administered program that supports efforts to protect private forest lands that are environmentally, economically and socially critical.
	Urban and Community Forestry Program ^{1),2) 3)}	The Forest Service Urban & Community Forestry Program is a technical, financial, and educational assistance program, delivering nature-based solutions to ensure a resilient and equitable tree canopy.

¹⁾ Not quantified in PBL IMAGE model projections. ²⁾ Not quantified in NewClimate Institute projections.

³⁾ Not quantified in IIASA model projections.

Viet Nam

Table 26: Overview of key climate change mitigation policies in Viet Nam (Barnes, 2023; Massmann, 2022; MNRE, 2011; Thuy, 2021; Viet Nam Government, 2012, 2016, 2020, 2021, 2022b, 2022a)

Sector	Policies ³⁾ (marked with '(+)' when mentioned in the NDC document)	Description
Cross-cutting	Decision No. 2139/QD-TTg approving The National Climate Change Strategy (2011)	This strategy sets out a target to reduce 20% GHG emissions from agriculture; to increase forest coverage to 45%; hydropower plants' capacity reaches 20,000 MW+; to increase share of renewables to 11% by 2050; 90% of industry using cleaner production and reduction energy consumption.
	Decision 1393/QD-TTg implementing the Green Growth Strategy (2012) (+)	This strategy sets out a target to reduce intensity of GHG emissions per GDP unit by 1-1.5% per year until 2020 and between 1.5-2% between 2020 and 2050.
	Decision No. 896/QD-TTg on approving the National Strategy for Climate Change until 2050	The Strategy reiterates the 1.5°C temperature goal. It also highlights the importance of achieving net zero emissions by 2050 as an essential goal for the world.
	Decision No. 942/QD-TTg on approving Action Plan for Methane Emissions Reduction by 2030	Decision No. 942/QD-TTg on approving Action Plan for Methane Emissions Reduction by 2030
Energy supply	Power Development Plan 8 (PDP8) (+) (2021)	Under PDP8, wind, solar, hydropower and biomass will provide 48% of Vietnam's installed capacity by 2030, with this share rising to around 63% in 2050. PDP8 still allows the completion of eleven coal-fired power plants that were already included in the revised PDP7, but stipulates that by 2050, all coal plants must be converted to alternative fuels or cease operation.
	Resolution No 55NQ/TW on the orientation of the National Energy Development Strategy of Vietnam to 2030 (2020) (+) ¹⁾	This policy sets out a target to scale down coal-fired power generation. It also outlines 15-20% proportion of renewables in the energy mix by 2030 and aims to reduce 15% of GHG emissions by 2030 and 20% by 2040 from an unspecified BAU.
	Decision No. 11/2017/QD-TTg (Solar support mechanism – Feed-in tariff) (2017) ¹⁾	Although this decision has ended in 2019, it was amended in April 2020 and enter into force in July 2020 (Circular No. 18) and regulates the support mechanism (feed-in tariff) for solar installations.
Transport	Action Plan (2016-2020)	This plan sets out a target to mix at least 5% of bioethanol in gasoline and energy labelling for LDVs and motorcycles.
Buildings	National Energy Efficiency Programme (VNEEP) for the period of 2019 – 2030	This policy outlines mandatory energy labelling and minimum energy efficiency standards roadmap for equipment and appliances.
Industry	National Energy Efficiency Programme (VNEEP) for the period of 2019 – 2030	This policy sets out energy savings targets for specific sectors, such as the chemical, cement and also for the new industrial parks.
Agriculture and Forestry	Forestry Law (2017) (+) ²⁾	This law regulates the management of forests.
	Tree Planting Plan (2020) ²⁾	This plan sets out the target to plant 1 billion trees by 2025.

Sector	Policies ³⁾ (marked with '(+)' when mentioned in the NDC document)	Description
	Decision No. 523/QD-TTg dated April 01, 2021 of the Prime Minister approving Vietnam's forestry development strategy for the 2021-2030 period, with a vision toward 2050 (2021) ²⁾	This strategy sets out the following targets: The growth rate of forestry production value will be 5% to 5.5%/year; Planting of production forests will be about 340,000 ha/year by 2030; The value of incomes earned from production forests will increase 1.5 times by 2025 and twice per area unit by 2030, as compared to 2020; By 2025, the average income of ethnic minority people working in forestry will increase more than twice compared to 2020, etc.
	Sustainable forestry development programme by 2025 (2021) ²⁾	This policy sets out the following targets: Protecting the existing forest coverage in a sustainable manner and developing new areas in 2021-2025; strictly managing the transfer of forest use into other purposes, maintaining stably the national forest coverage at 42 per cent; while increasing productivity and forest quality to meet demands of materials for production and protection and environment protection, and to preserving biodiversity.

¹⁾ Not quantified in NewClimate Institute projections. ²⁾ Not quantified in IIASA model projections.

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