

# Greenhouse gas mitigation scenarios for major emitting countries

Analysis of current climate policies and mitigation pledges  
(Update: November 2016)

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## Executive Summary

This report provides an overview of projected greenhouse gas emissions in 25 major emitting countries/regions (Argentina, Australia, Brazil, Canada, Chile, China, Colombia, Democratic Republic of the Congo, Ethiopia, the European Union, India, Indonesia, Japan, Kazakhstan, Mexico, Morocco, the Philippines, Republic of Korea, the Russian Federation, South Africa, Saudi Arabia, Thailand, Turkey, Ukraine, and the United States) up to 2030, taking into account the emission trajectories based on current policies and the implementation of intended nationally determined contributions (INDCs) and nationally determined contributions (NDCs).

Current policies scenarios assume that no additional mitigation action is taken beyond currently implemented climate policies, even if it results in 2020 pledges and 2030 targets not being achieved - or being overachieved. Whenever possible, current policies trajectories reflect all adopted and implemented policies, defined here as legislative decisions, executive orders, or their equivalent. This excludes publicly announced plans or strategies, while individual policies to implement such plans or strategies would qualify. Ultimately, however, these definitions could be interpreted differently, and therefore this assessment is bound by the interpretations that our research group uses. This definition of current policies scenario is consistent with that applied in the UNEP Emissions Gap Report (UNEP, 2015).

The findings of the current study are:

- The degree to which countries/regions are likely to achieve their self-chosen 2030 targets under current policies was found to vary: of those considered in this report, Brazil, Chile, China, India, the Russian Federation, Turkey and Ukraine are likely to - or are roughly on track to - (over) achieve their (unconditional) 2030 targets with currently implemented policies. Argentina, Australia, Canada, Colombia, Democratic Republic of the Congo, Ethiopia, the EU, Indonesia, Japan, Kazakhstan, Mexico, Morocco, Republic of Korea, Saudi Arabia, South Africa, Thailand, the Philippines and the United States require additional measures to achieve their 2030 targets.
- Currently implemented policies are projected to influence GHG emissions but do not stop emissions from increasing until 2030 (above 2010 levels) in Argentina, Australia, Chile, China, India, Indonesia, Kazakhstan, Mexico, Morocco, the Philippines, Saudi Arabia, South Africa, Thailand and Turkey, mainly due to their projected high economic growth. GHG emissions in Brazil, Canada, South Korea, the Russian Federation, Ukraine and the United States would remain stable at approximately current levels with the currently implemented policies. In Colombia, Japan and the EU, GHG emissions are projected to decrease further under current policies.

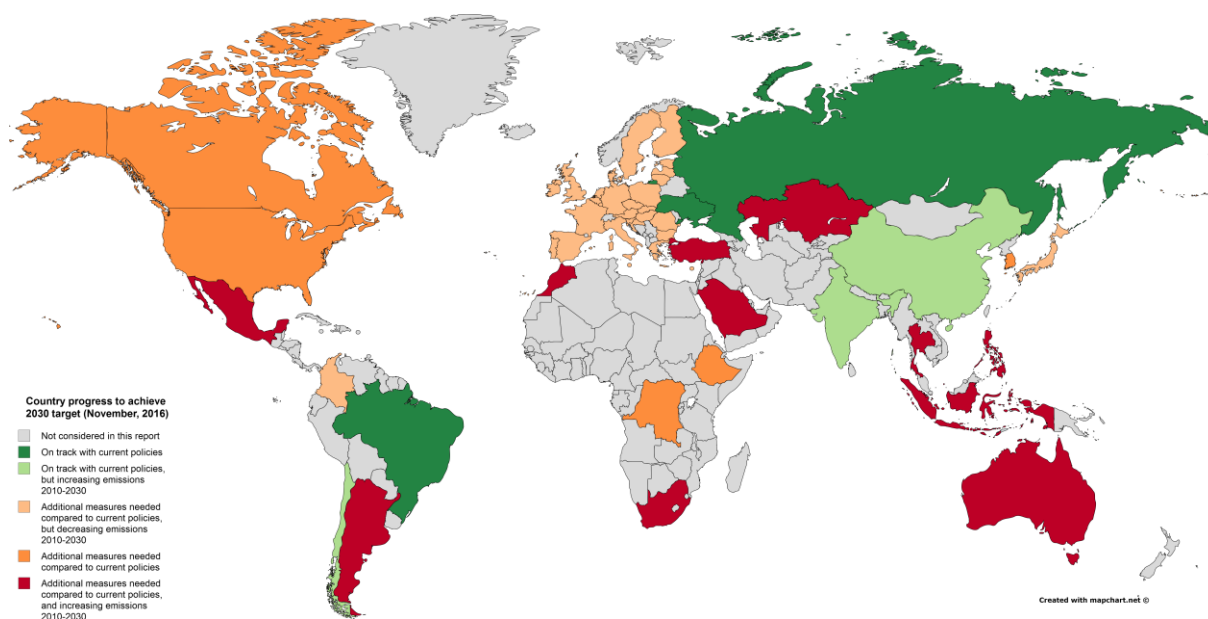


Figure ES-1: Progress of countries to achieve their self-chosen 2030 targets under current policies. Note: current policies do not include implementation measures that are under development at the time of publication.

It should be noted that a country being likely to meet its NDC/INDC does not necessarily mean that it undertakes more stringent action on mitigation than a country that is not on track due to a number of reasons. First, the targets differ in their ambition levels across countries because they are nationally determined and heterogeneous by nature. Second, it has only been less than two years since the countries formulated their NDCs/INDCs. It is not surprising to see a gap between the mitigation targets and current policies trajectories if countries pledged something above what they would have achieved anyway.

Nevertheless, it is essential that the gaps between the mitigation targets and current policies trajectories begin to close in the years to come as countries adopt implementation measures. For this reason, it is essential that this report, and similar efforts, are updated in the years to come.

Uncertainty around future estimates remains high. In Japan, for example, decisions on the future of nuclear power will strongly influence the development of emissions in the power sector. In the Republic of Korea, the enforcement of their emissions trading system may have a significant impact, even though that alone is not enough to achieve the national target. In Australia, the effect of policies replacing the carbon pricing mechanism is difficult to assess. China and India have pledges indexed to economic growth, implying that the absolute emissions target level is very uncertain. Emissions projections for Turkey and many developing countries are subject to considerable uncertainty around economic growth. In Argentina, Colombia, Democratic Republic of the Congo, Ethiopia, Indonesia and the Philippines, emissions from land use, land use change, and forestry (LULUCF), which are very uncertain, strongly determine total emission projections.

It is also worth noting that, for several countries, the GHG emissions projections under current policies have been revised considerably downward for a number of countries (Australia, China, and Japan) since our last assessment (den Elzen et al., 2015), which is partly attributable to a faster-than-expected transition towards low-carbon economy through deployment of renewable energy and energy efficiency, as well as the recent slowdown of global economic growth.

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## Acronyms

<b>AFOLU</b>	agriculture, forestry and other land use
<b>AR4</b>	IPCC's Fourth Assessment Report
<b>BAU</b>	business as usual
<b>CAT</b>	Climate Action Tracker
<b>CH<sub>4</sub></b>	methane
<b>CNG</b>	compressed natural gas
<b>CO<sub>2</sub></b>	carbon dioxide
<b>CO<sub>2</sub>e</b>	carbon dioxide equivalent
<b>COP21</b>	UNFCCC Conference of the Parties 21 <sup>st</sup> session (Paris)
<b>CPP</b>	United States of America's Clean Power Plan
<b>CSP</b>	concentrated solar power
<b>ECDDB</b>	Colombian Low-Carbon Development Strategy
<b>EDGAR</b>	Emissions Database for Global Atmospheric Research
<b>EPA</b>	United States of America's Environmental Protection Agency
<b>ERF</b>	Emissions Reduction Fund
<b>ETS</b>	emissions trading system
<b>FAIR</b>	PBL's Framework to Assess International Regimes for differentiation of commitments
<b>NF<sub>3</sub></b>	nitrogen trifluoride
<b>F-gas</b>	fluorinated greenhouse gas
<b>G4M</b>	IIASA's Global Forest Model
<b>GCF</b>	Green Climate Fund
<b>GDP</b>	gross domestic product
<b>GHG</b>	greenhouse gas
<b>GLOBIOM</b>	IIASA's Global Biosphere Management Model
<b>Gt</b>	gigatonne (billion tonnes)
<b>GTP I</b>	Ethiopia's First Growth and Transformation Plan
<b>GW</b>	gigawatt (billion watts)
<b>GWh</b>	gigawatt-hour (billionwatts per hour)
<b>GWP</b>	Global Warming Potential
<b>ha</b>	Hectare
<b>HEPS</b>	High Energy Performance Standards
<b>HFC</b>	hydrofluorocarbon
<b>IEA</b>	International Energy Agency
<b>IIASA</b>	International Institute for Applied Systems Analysis
<b>IMAGE</b>	PBL's Integrated Model to Assess the Global Environment
<b>INDC</b>	intended nationally determined contribution
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IPPU</b>	Industrial Processes and Product Use
<b>JCM</b>	Joint Crediting Mechanism
<b>km/l</b>	kilometre per litre
<b>ktoe</b>	thousand tonnes of oil equivalent
<b>kWh</b>	kilowatt-hour (thousand watts-hour)
<b>LPG</b>	liquefied petroleum gas
<b>LULUCF</b>	land use, land use change, and forestry
<b>MEPS</b>	Minimum Energy Performance Standards
<b>MJ</b>	megajoule (million joules)
<b>Mm<sup>3</sup></b>	mega cubic meters (million cubic metres)
<b>mpg</b>	miles per gallon
<b>Mt</b>	megatonne (million tonnes)
<b>Mtoe</b>	million tonnes of oil equivalent
<b>MW</b>	megawatt (million watts)
<b>N<sub>2</sub>O</b>	nitrous oxide
<b>N/A</b>	not available
<b>NAMA</b>	Nationally Appropriate Mitigation Actions
<b>NC6</b>	Sixth National Communication

<b>NDC</b>	nationally determined contribution
<b>NO<sub>x</sub></b>	nitrogen oxides
<b>NRE</b>	New and Renewable Energies
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PAT</b>	(India's) Perform Achieve and Trade scheme
<b>PBL</b>	PBL Netherlands Environmental Assessment Agency
<b>PES</b>	Payments for Ecosystem Services
<b>PFC</b>	perfluorocarbon
<b>PV</b>	photovoltaic
<b>RE</b>	renewable energy
<b>REC</b>	Renewable Energy Certificate
<b>REDD+</b>	Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
<b>REDD-PAC</b>	REDD+ Policy Assessment Centre
<b>RET</b>	Renewable Energy Target
<b>RPS</b>	renewable portfolio standards
<b>SAR</b>	Second Assessment Report
<b>SF<sub>6</sub></b>	sulphur hexafluoride
<b>SSP2</b>	Shared Socio-economic Pathways middle scenario
<b>t</b>	tonne (thousand kilograms)
<b>tce</b>	tonne coal equivalent (29.288 GJ)
<b>TIMER</b>	PBL's Targets IMage Energy Regional Model
<b>TPES</b>	total primary energy supply
<b>TWh</b>	terawatt-hour
<b>SENER</b>	Mexico's Secretariat of Energy
<b>UN</b>	United Nations
<b>UNEP</b>	United Nations Environment Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>yr</b>	year

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# 1 Introduction

The 21<sup>st</sup> session of the Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) held in 2015, adopted the Paris Agreement as the new international climate policy agreement for the post-2020 period (UNFCCC, 2015a). In the lead-up to COP21, governments were asked to put forward offers on how - and by how much - they were willing to reduce their greenhouse gas (GHG) emissions after 2020; these are so-called “intended nationally determined contributions” (INDCs).<sup>1</sup> Nearly 200 countries submitted their INDCs before the COP21 (UNFCCC, 2015c). To date,<sup>2</sup> 81 Parties covering more than 60% of global GHG emissions have ratified the Paris Agreement, when their INDCs became “nationally determined contributions” (NDCs).

This report presents an assessment of progress by 25 countries on the achievement of the mitigation part of the 2030 targets (NDCs and INDCs) presented in the context of the Paris Agreement as well as on their 2020 pledges in the UNFCCC Cancún Agreements. More specifically, it provides an overview of projected greenhouse gas (GHG) emissions in 25 major emitting countries/regions (Argentina, Australia, Brazil, Canada, Chile, China, Colombia, Democratic Republic of the Congo, Ethiopia, the European Union, India, Indonesia, Iran, Japan, Kazakhstan, Mexico, Morocco, the Philippines, Republic of Korea, the Russian Federation, South Africa, Saudi Arabia, Thailand, Turkey, Ukraine, and the United States) up to 2030, taking into account the emissions trajectories based on the most effective current climate and energy policies, as well as the full implementation of NDCs and INDCs. The 25 countries comprised 79% of total global GHG emissions in 2012 (JRC/PBL, 2014).<sup>3</sup>

It should be noted that a country being likely to meet its NDC/INDC does not necessarily mean that it undertakes more stringent action on mitigation than a country that is not on track for a number of reasons. First, the targets differ in their ambition levels across countries because they are nationally determined and heterogeneous by nature. Second, it has only been less than two years since the countries formulated their NDCs/INDCs. It is not surprising to see a gap between the mitigation targets and current policies trajectories if countries pledged something above what they would have achieved anyway. Third, countries have different policy-making approaches. Some countries use their pledges or targets as a device to drive more ambitious policies, while others use them merely to formalise the expected effect of existing measures.

Nevertheless, gaps between the mitigation targets and current policies trajectories may close in the years to come as countries adopt implementation measures. For this reason, it is essential that this report, and similar efforts, is updated in the years to come.

In this report, current policies scenarios assume that no additional mitigation action is taken beyond currently implemented climate policies, even if it results in 2020 pledges and 2030 targets not being achieved or being overachieved. Whenever possible, current policies trajectories reflect all adopted and implemented policies, which are defined here as legislative decisions, executive orders, or their equivalent. This excludes publicly announced plans or strategies, while individual policies to implement such plans or strategies would qualify. Ultimately, however, these definitions could be interpreted differently, and therefore this assessment is bound by the interpretations that our research group uses. This definition of current policies scenario is consistent with that applied in the UNEP Emissions Gap Report (UNEP, 2015).

This report builds upon our earlier studies (den Elzen et al., 2015, Fekete et al., 2015), which provide an overview of projected greenhouse gas emissions of 13 major emitting countries (Australia, Brazil, Canada, China, the European Union, India, Indonesia, Japan, Mexico, the Russian Federation, South Korea, Turkey, and the United States) out to 2030. In contrast to the earlier studies, which presented planned policies scenario and/or enhanced policies scenario projections, this report exclusively focuses on the analysis of current policies scenarios and

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<sup>1</sup> UNFCCC decision 1/CP.19, <http://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=3>

<sup>2</sup> As of 17 October, 2016.

<sup>3</sup> The emissions data from the EDGAR database excludes short-cycle biomass burning (e.g. agricultural waste burning and Savannah burning) but includes other biomass burning (e.g. forest fires, post-burn decay, peat fires and decay of drained peatlands).

NDCs/INDCs.<sup>4</sup> The NDC/INDC analysis is estimated by NewClimate Institute, as described in detail in Climate Action Tracker (CAT, 2015) and by PBL/IIASA in Admiraal et al. (2015) and Den Elzen et al. (2016a).

This report extends these earlier analyses, in several ways. First, we analyse the impact of more and updated current policies and INDCs. Second, we look at the current state of affairs with national policies.

NewClimate Institute, IIASA and PBL have estimated the impact of the most effective current policies on greenhouse gas emissions. The selection of current policies was based on literature research and expert knowledge. The calculations by NewClimate Institute are largely based on its analyses for, and informed by, the Climate Action Tracker project jointly carried out with Ecofys and Climate Analytics (CAT, 2016), and used existing scenarios from national and international studies (e.g. IEA's World Energy Outlook 2015) as well as their own calculations of the impact of individual policies in different subsectors.

PBL has updated their calculations of the impact of individual policies in different subsectors using the IMAGE integrated assessment modelling framework (Stehfest et al., 2014), including a global climate policy model (FAIR), a detailed energy-system model (TIMER), and a land-use model (IMAGE land). The starting point for the calculations of the impact of climate policies is the latest SSP2 (no climate policy) baseline as implemented in the IMAGE model (van Vuuren et al., 2016). Both NewClimate and PBL scenario calculations were supplemented with those on land-use and agricultural policies using IIASA's global land-use model GLOBIOM and global forest model G4M.

There are a number of methodological limitations related to the current assessment, which are largely attributable to the differences in the nature and characteristics of NDCs/INDCs and climate policies across countries.

- First, this report considers a wide range of effective national climate and energy policies, but does not provide a complete assessment of all policies. This has the risk of underestimating or overestimating the total impact of a country's policies on GHG emissions.
- Second, existing policies may change and/or be abandoned for a variety of reasons, and new policies may be implemented. This implies that all numbers are subject to change; this study provides the current state of play.
- Third, countries are implementing policies in various areas to a varying degree. Many countries have set renewable energy targets, which are to be achieved by national support policies. For some countries, in particular the non-OECD countries, there is not enough information about the implementation status. For some countries, we have assumed a full implementation of those targets without sufficient evidence of concrete support policies, in some cases by considering other factors (e.g. historical trends and projections from other studies), but this has the risk of overestimating the reductions.
- Fourth, for bottom-up calculations performed by NewClimate Institute using external emissions scenarios from various sources, it is not always fully clear how the impacts of existing policy measures are quantified.

The main findings for the current policies scenarios are presented in fact sheets below, followed by an Appendix with a brief description of the datasets used in this study as well as an overview table of GHG emissions under NDCs/INDCs and current policies. Detailed descriptions of the quantification of future GHG emissions under NDCs/INDCs and current policies are provided as supplementary information for each country on the NewClimate Institute website.<sup>5</sup>

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<sup>4</sup> Many countries have laid out various plans and targets related to GHG mitigation in relation to their INDCs in the lead up to COP21. Therefore, the distinction between planned policies trajectories and 2020/2030 target trajectories has become even more vague than before. NewClimate Institute, PBL and IIASA are revisiting the definition of "planned policies scenario" that can be applied consistently to all 25 countries analysed.

<sup>5</sup> <http://newclimate.org/2016/11/04/greenhouse-gas-mitigation-scenarios-for-major-emitting-countries/>

## 2 Main findings

The findings of the current study are:

- The degree to which countries/regions are likely to achieve their pledges under current policies was found to vary: of those considered in this report, Brazil, Chile, China, India, the Russian Federation, Turkey and Ukraine are likely or roughly on track to (over-) achieve their (unconditional) 2030 targets. Argentina, Australia, Canada, Colombia, Democratic Republic of the Congo, Ethiopia, the EU, Indonesia, Japan, Kazakhstan, Mexico, Morocco, Republic of Korea, Saudi Arabia, South Africa, Thailand, the Philippines and the United States require additional measures to achieve their 2030 targets.
- Currently implemented policies were projected to influence GHG emissions but do not stop emissions from increasing in Argentina, Australia, Chile, China, India, Indonesia, Kazakhstan, Mexico, Morocco, the Philippines, Saudi Arabia, South Africa, Thailand and Turkey until 2030 compared to 2010 levels, mainly due to their projected high economic growth. GHG emissions in Brazil, Canada, South Korea, the Russian Federation, Ukraine and the United States would remain stable approximately at current levels with the currently implemented policies. In Colombia, Japan and the EU, GHG emissions were projected to decrease further under current policies.

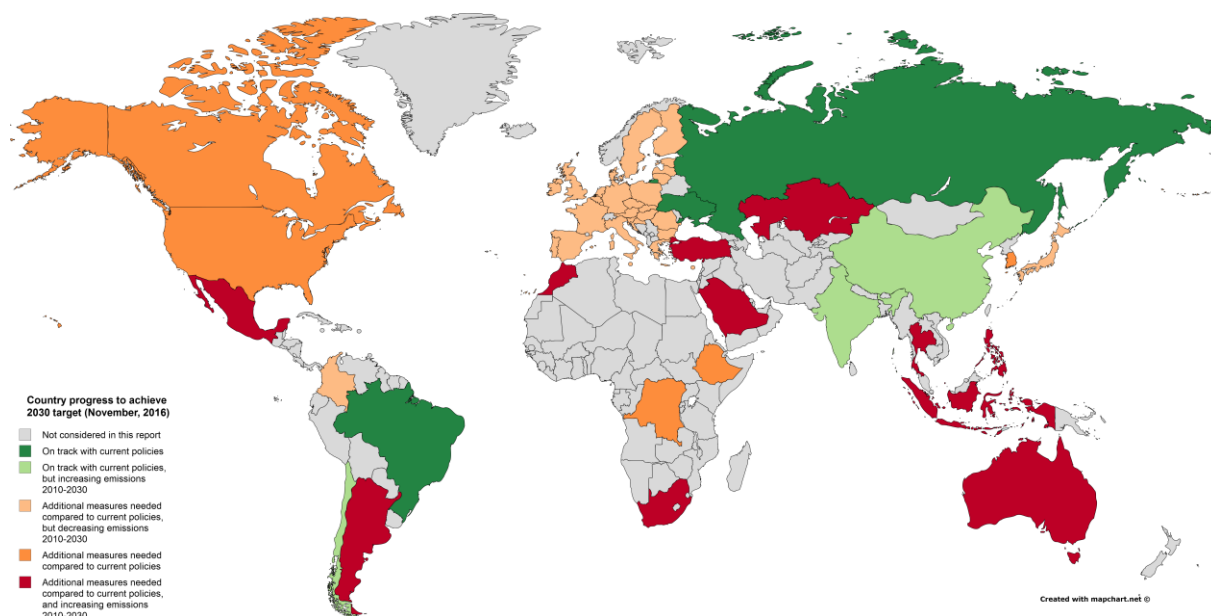


Figure 1: Progress of countries achieve their 2030 targets under current policies. Note: current policies do not include implementation measures that are under development at the time of publication.

Uncertainty around future estimates remains high:

- In Japan, for example, decisions on the future of nuclear power will strongly influence the development of emissions in the power sector.
- In the Republic of Korea, the enforcement of its emissions trading system may have significant impact, even though that alone is not enough to achieve the national target. In Australia, the effect of policies replacing the carbon pricing mechanism is difficult to assess.
- China and India have pledges indexed to economic growth, implying that the absolute emission target level is very uncertain.
- Emissions projections for Turkey and many developing countries are subject to considerable uncertainty related to economic growth.
- In Argentina, Colombia, Democratic Republic of the Congo, Ethiopia, Indonesia and the Philippines, emissions from land use, land use change, and forestry (LULUCF), which are very uncertain, strongly determine total emission projections.

It is also worth noting that, for several countries, the GHG emissions projections under current policies have been revised downward considerably for a number of countries (Australia, China, and Japan) since our last assessment

(den Elzen et al., 2015), which is partly attributable to a larger-than-expected GHG emissions reductions through deployment of renewable energy and energy efficiency as well as the recent slowdown of global economic growth.

### 3 Results per country

This section summarises the results per country for current policies, 2020 pledges, and 2030 targets (NDCs/INDCs). For each country section, the following are presented:

- Description of 2020 pledge and NDC/INDC
- Overview of key climate change mitigation policies
- Impact of climate policies on greenhouse gas emissions

Detailed explanations on the historical GHG emissions data and the population data used in this study are explained in the Appendix (sections A1 and A2). Details of NDC/INDC quantification and current policies projections are described in the Supporting Information.

### 3.1 Argentina

Argentina pledged to reduce its GHG emissions by 15% below business-as usual (BAU) levels by 2030. The current policies projection for Argentina considers its biofuels law and renewable energy law. As a result, GHG emissions in 2030 including LULUCF are projected to be about 610 MtCO<sub>2e</sub> or 36% above 2010 levels. Argentina is, therefore, not yet on track to meet its unconditional INDC.

Table 1: Description of Argentina's 2020 pledge and INDC

Indicator	INDC (submitted 1 <sup>st</sup> October, 2015)
Target: unconditional	<ul style="list-style-type: none"> <li>15% GHG reduction by 2030 from BAU levels</li> </ul>
Target: conditional	<ul style="list-style-type: none"> <li>30% GHG reduction by 2030 from BAU levels, subject to international financing, support for transfer, innovation and technology development, and capacity building</li> </ul>
Sectoral coverage	<ul style="list-style-type: none"> <li>Energy, agriculture, waste, industrial processes, LULUCF</li> </ul>
General Accounting method	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the 2<sup>nd</sup> Assessment Report</li> </ul>
GHGs covered	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub></li> </ul>
Consideration of LULUCF	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target</li> <li>Accounting approaches and methodologies are unclear</li> </ul>
Other sector-level targets	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Use of bilateral, regional and international credits	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Availability of reference scenarios in the latest UNFCCC submissions	<ul style="list-style-type: none"> <li>Yes, INDC refers to BAU scenario and gives values for emissions in 2030</li> </ul>
Last available year for GHG inventory reporting	<ul style="list-style-type: none"> <li>2012 (Government of Argentina, 2015).</li> </ul>

*Note: Argentina has not set its 2020 pledge.*

Table 2: Overview of key climate change mitigation policies in Argentina. Source: (Ministry of Economy and Public Finance, 2007, IPEEC, 2016, Ministry of Energy and Mining, 2016, The World Bank, 2015, The World Bank, 2016, IEA, 2010, Infoleg, 2016, Infoleg, 2007, CCAP, 2013, Ministry of Environment and Sustainable Development, 2008)

Sector	Policies (marked with “(+)” when mentioned in the NDC document)	Description
<b>Economy-wide</b>	National Program for Rational and Efficient Use of Energy (PRONUREE) (2007)	<ul style="list-style-type: none"> <li>10-12% of energy savings by 2016 in residential, public/private services</li> <li>Decrease electricity consumption by 6% compared to baseline scenario and energy savings of 1500 MW by 2016</li> </ul>
<b>Energy supply</b>	Renewable Energy Programme in Rural Markets (2000)	<ul style="list-style-type: none"> <li>Reduce GHG emissions by replacing small-diesel electricity generation with renewable energy systems</li> </ul>
	Renewable Energy Law 27191. National Development Scheme for the Use of Renewable Energy Sources (RenovAr) (2016)	<ul style="list-style-type: none"> <li>Total individual electric consumption to be substituted with renewable sources given the following schedule: 8% by 2017, 18% by 2023 and 20% by 2025 <sup>1)</sup></li> </ul>
	PROBIOMASA: promotion of biomass energy (2013)	<ul style="list-style-type: none"> <li>8.7 MtCO<sub>2e</sub> yearly reductions by replacing fossil fuels</li> </ul>
	Energy Efficiency Project (2009)	<ul style="list-style-type: none"> <li>USD 99.44 million to reduce 10.7 MtCO<sub>2e</sub> by the end of 2016 are the global benefits of the Energy Efficiency Project</li> </ul>
<b>Transport</b>	Biofuels Law (updated 2016)	<ul style="list-style-type: none"> <li>12% requirement of biodiesel or ethanol blend in the gasoline from 2016 <sup>1)</sup></li> </ul>
<b>Industry</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Buildings</b>	Program for Rational and Efficient use of Energy in Public Buildings (2007)	<ul style="list-style-type: none"> <li>Various measures in line with the 10% energy savings by 2016</li> </ul>

*Table 2 continued*

<b>F-gases</b>	N/A	• N/A
<b>Forestry &amp; Agriculture</b>	Minimum Budgets for Environmental Protection of Native Forest (Presupuestos Minimos de Proteccion) (2007) (+)	• Regulatory frame to control the reduction of native forest surface and achieve lasting surface over time <sup>1)</sup>
	National Forest Management Plan with Integrated Livestock (Plan Nacional de Manejo de Bosques con Ganadería Integrada) (2015)	<ul style="list-style-type: none"> <li>• To improve and maintain ecological and cultural processes in native forest and promote activities for a sustainable management of native forest <sup>2)</sup></li> <li>• Contributes to sustainable use of native forests through incorporating livestock activities in native forest area in a sustainable manner <sup>2)</sup></li> </ul>

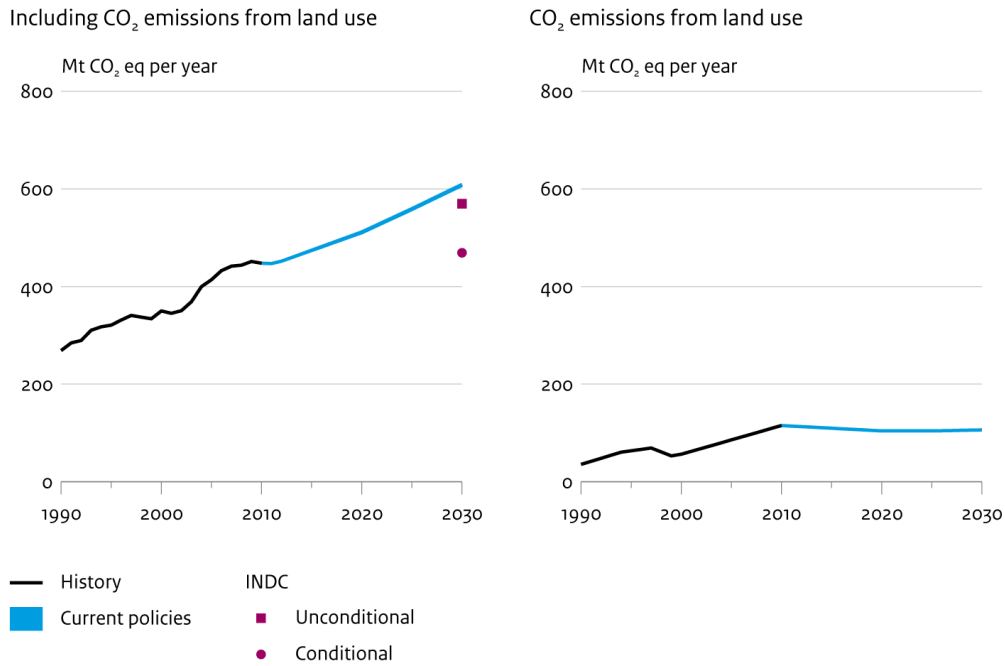
<sup>1)</sup> No information available on implementation status. For the current analysis, we have assumed full implementation.

<sup>2)</sup> Policy not quantified in the IIASA LULUCF projections

Table 3: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Argentina. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	NewClimate estimates	Official data	NewClimate estimates
Absolute: 450 MtCO <sub>2e</sub>	469 to 570 MtCO <sub>2e</sub> in 2030	470 to 570 MtCO <sub>2e</sub> ; 5% to 27% in 2030	463 MtCO <sub>2e</sub> ; 3% in 2020 549 MtCO <sub>2e</sub> ; 23% in 2030	510 MtCO <sub>2e</sub> ; 14% in 2020 605 to 610 MtCO <sub>2e</sub> ; 36% in 2030
Per capita: 11.2 tCO <sub>2e</sub> /capita	N/A	9.5 to 11.5 tCO <sub>2e</sub> /capita in 2030	N/A	11.2 – 11.3 tCO <sub>2e</sub> /capita in 2020 12.3 tCO <sub>2e</sub> /capita in 2030

### Impact of climate policies on greenhouse gas emissions in Argentina



Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 2: Impact of climate policies in greenhouse gas emissions in Argentina (including LULUCF). Source: NewClimate Institute calculations (excluding LULUCF) based on its analysis for Climate Action Tracker (CAT, 2016) using the BAU scenario from the 2015 National GHG Inventory Report (Ministry of the Environment and Sustainable Development, 2015), adapted to include the quantification of the biofuels law and the renewable energy law. Both PBL and NewClimate projections are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions are based on the 3<sup>rd</sup> National Communication (Government of Argentina, 2015).



## 3.2 Australia

The Australian government states that it is “on track” to meet its target of 5% below 2000 levels by 2020 (Australian Government, 2015a), and that the Emissions Reduction Fund (ERF) plays a major role in lowering the abatement task. However, our current policy projections that include the abatements of the ERF result in emissions far above the pledge level (6–23% above 2000 levels). This contrasting conclusion drawn from our assessment is partly due to the accounting approach for the emissions reductions purchased through ERF. The Australian Government (2015a) counts all emissions reductions purchased in 2015 (92 MtCO<sub>2e</sub>) in the 2015/16 emissions reporting, although they occur over many years. In our analysis, we distributed the expected emissions reductions over the average contract period of 9 years.

Australia has stated that it will also meet the 2030 targets through policies that provide positive incentives to reduce emissions. At the core of Australia’s climate change policies is the Emissions Reduction Fund and linked safeguard mechanisms. Our current policies projections show a significant difference with the INDC trajectory in 2030.

Table 4: Description of Australia’s 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 11 <sup>th</sup> August, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>5% GHG reduction by 2010 from 2000 level</li> <li>Kyoto target: 108% of 1990 levels 2013-2020</li> </ul>	<ul style="list-style-type: none"> <li>26 to 28% GHG reduction by 2030 from 2005 level</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>15% and 25% GHG reduction by 2010 from 2000 level</li> </ul>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>All GHG emissions, including emissions from afforestation, reforestation and deforestation</li> </ul>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Kyoto Protocol accounting rules (Article 3.7)</li> <li>Land use credits: 27 MtCO<sub>2e</sub> by 2020 (den Elzen et al., 2015)</li> </ul>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included</li> <li>Net-net approach will be used for emission accounting</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2014 (GHG inventory report submitted to the UNFCCC)</li> </ul>	

Table 5: Overview of key climate change mitigation policies in Australia (Australian Government, 2015a). See Supporting Information for details.

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Emissions Reduction Fund (ERF) (2014) (+)	<ul style="list-style-type: none"> <li>Auctions are set up to purchase emissions reductions at the lowest available cost, thereby contracting successful bidders</li> </ul>
<b>Energy supply</b>	Renewable Energy Target (RET) (2010) (+)	<ul style="list-style-type: none"> <li>23.5% of electricity should come from renewable sources by 2020, compared to 13% in 2014. The new target<sup>1)</sup> for large-scale generation of 33,000 GWh in 2020 will double the amount of large-scale renewable energy being delivered by the scheme compared to current levels</li> </ul>
<b>Transport</b>	Fuel tax (2015)	<ul style="list-style-type: none"> <li>Fuel tax for diesel and gasoline are set at AUD 0.3814 per litre <sup>2)</sup></li> </ul>
<b>Forestry &amp; Agriculture, Waste</b>	The Carbon Farming Initiative <sup>3)</sup> (2014) (Now integrated into ERF)	<ul style="list-style-type: none"> <li>Encourages sustainable farming and thereby increase carbon storage or reducing GHG emissions from land use. 6.1 MtCO<sub>2</sub>e reduction of LULUCF emissions in 2020 from 2010 expected.</li> </ul>
	20 Million Trees Programme (2014)	<ul style="list-style-type: none"> <li>Plant 20 million trees by 2020 in order to re-establish green corridors and urban forests.</li> </ul>
	The Carbon Farming Futures (2011) (Now integrated into ERF) (+)	<ul style="list-style-type: none"> <li>Ensures that advances in land management technologies and techniques for emissions reduction and adaptation will lead to enhanced productivity and sustainable land use under a changing climate.<sup>4)</sup></li> </ul>
<b>Other</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>

<sup>1)</sup> The target was reduced in 2015 from its original 41,000 GWh (Scott, 2015)

<sup>2)</sup> OECD (2013)

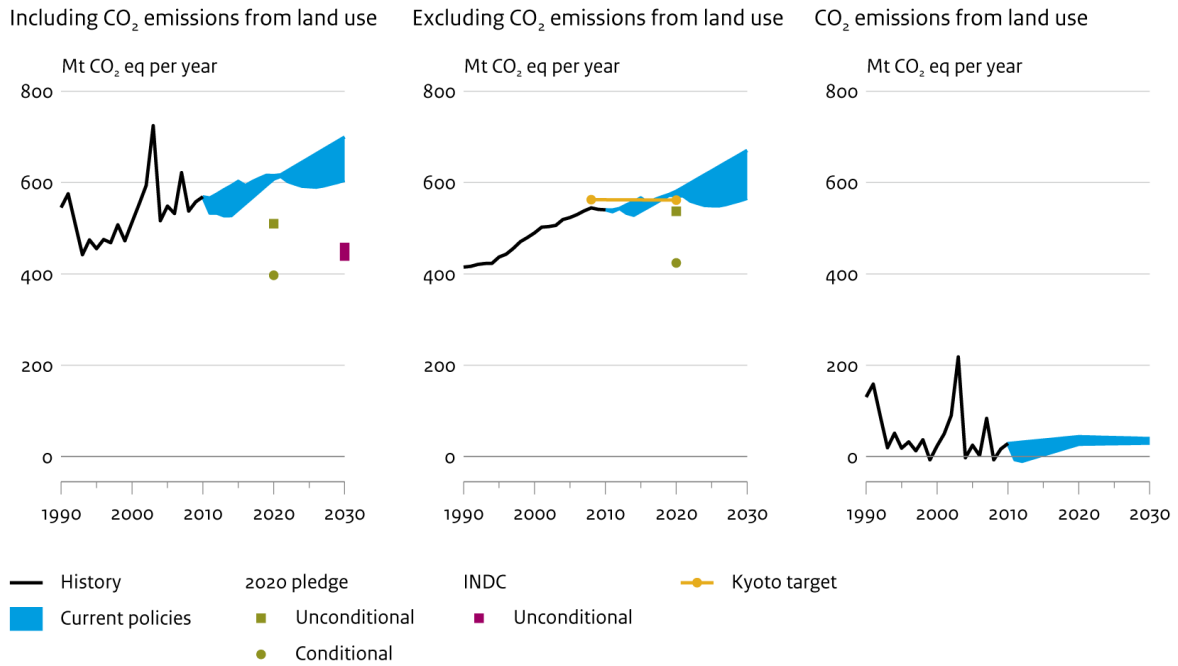
<sup>3)</sup> Australian Government (2015b)

<sup>4)</sup> Policy not quantified in the IIASA LULUCF projections

Table 6: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Australia. Absolute emission levels and emission levels relative to 2010 levels are presented. Note that the official values for 2020 and 2030 are based on GWP values from the IPCC Fourth Assessment Report. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 570 MtCO <sub>2</sub> e	530 MtCO <sub>2</sub> e in 2020	425 to 535 MtCO <sub>2</sub> e in 2020; –25% to –6% in 2020 440 to 460 MtCO <sub>2</sub> e in 2030; –23% to –20% in 2030	577 to 656 MtCO <sub>2</sub> e in 2020 724 MtCO <sub>2</sub> e in 2030	610 to 615 MtCO <sub>2</sub> e in 2020; 7% to 8% in 2020 605 to 700 MtCO <sub>2</sub> e; 6% to 23% in 2030
Per capita: 25.1 tCO <sub>2</sub> e/cap	N/A	16.3 to 20.7 tCO <sub>2</sub> e/capita in 2020 14.9 to 15.5 tCO <sub>2</sub> e/capita in 2030	N/A	23.4 to 23.7 tCO <sub>2</sub> e/capita in 2020 20.5 to 23.7 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in Australia



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 3: Impact of climate policies in greenhouse gas emissions in Australia (upper figure: all gases and sectors, lower figure: excluding LULUCF (left) and only LULUCF (right) separately). Source: PBL FAIR/TIMER model (upper bound through 2020, lower bound from 2021 onwards) and NewClimate Institute calculations adapted from Climate Action Tracker (CAT, 2015) based on the Australian Government (2015a) for non-LULUCF emissions and the Australian Government (2015b) for LULUCF emissions (lower bound through 2020, upper bound from 2021 onwards). PBL projections are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions from 2014 GHG inventory data submitted to the UNFCCC.

### 3.3 Brazil

The main GHG mitigation policies in Brazil include the policies in the LULUCF sector, i.e. the enforcement of the Brazilian Forest Code and efforts to reduce deforestation in the Amazon and Cerrado regions. The impact of the proposed measures outside of the Amazon strongly depends on the success of policy enforcement. If all implemented policies are successful, emissions (including those from LULUCF) may reach about 7% to 25% below 2010 levels by 2030. Our analysis shows that Brazil is on track to meet its NDC with currently implemented policies. In its NDC Brazil announced a 45% share of renewables in the energy mix by 2030, and a 75% share of renewables in its electricity supply by 2030, but we don't include these planned policies in our analysis.

Table 7: Description of Brazil's 2020 pledge and NDC

Indicator	2020 pledge	NDC (21 <sup>st</sup> September, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>Between 36.1 and 38.9% reduction by 2020 from a baseline scenario</li> </ul>	<ul style="list-style-type: none"> <li>37% GHG reduction by 2025 from 2005 level and indicative contribution of 43% GHG reduction by 2030 from 2005 level (equivalent to 4% to 8% below 2010 levels by 2030)</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>100-year GWPs from the IPCC Second Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fifth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>All Kyoto GHGs, excluding NF<sub>3</sub></li> </ul>	<ul style="list-style-type: none"> <li>All Kyoto GHGs, excluding NF<sub>3</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Land sector is included in the target;</li> <li>Accounting approaches and methodologies are not specified</li> </ul>	<ul style="list-style-type: none"> <li>Land sector is included in the target</li> <li>Accounting approaches and methodologies are not specified</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Possible use of market mechanisms that may be established under the Paris Agreement</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>45% share of renewables in total energy mix by 2030</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>No</li> </ul>	<ul style="list-style-type: none"> <li>No</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2012 (Ministry of Science, Technology and Innovation of Brazil, 2014)</li> <li>2014 (Observatório do Clima) <sup>1)</sup></li> </ul>	

<sup>1)</sup> SEEG (2014)

Table 8: Overview of key climate change mitigation policies in Brazil. Source: (Ministry of Mines and Energy, 2012) ; (Government of Brazil, 2008)

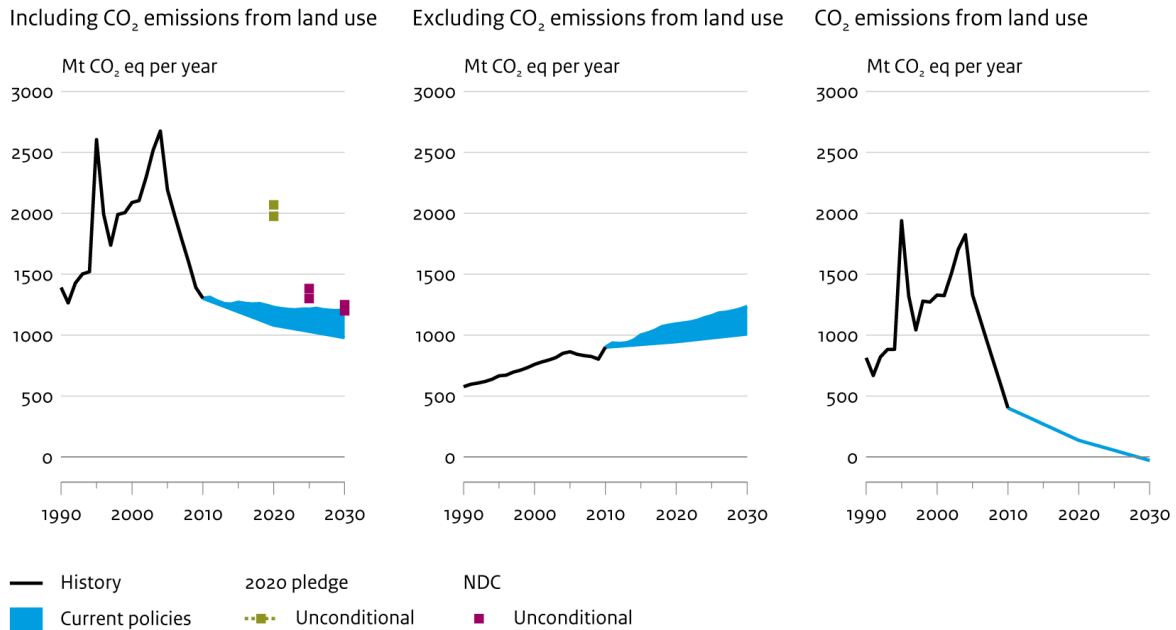
Sector	Policies (marked with “(+)” when mentioned in the NDC document) <sup>1)</sup>	Description
<b>Economy-wide</b>	2020 pledge anchored in national law (2010)	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Energy supply</b>	10-year National Energy Expansion Plan (2011)	<ul style="list-style-type: none"> <li>38 GW installed by 2022 (17.4 GW wind, 13.8 GW biomass, 6.9 GW small hydro) and 114 GW large hydro installed by 2022</li> <li>41.4% renewable share in total primary energy supply by 2022</li> </ul>
	National Plan on Climate Change (2008)	<ul style="list-style-type: none"> <li>16% renewable electricity (excl. hydro) by 2020 (supported by renewable energy auctions, Government of Brazil, 2007)</li> </ul>
<b>Transport</b>	National Plan on Climate Change (2008)	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Forestry &amp; Agriculture</b>	The Brazilian Forest Code (2012) (+)	<ul style="list-style-type: none"> <li>Enforcement of the Brazilian Forest Code for the Cerrado region and the rest of Brazil</li> <li>Restoring and reforesting 12 million hectares of forests by 2030</li> </ul>
	The Low-Carbon Agriculture (ABC) Plan (2010) (+)	<ul style="list-style-type: none"> <li>Restoring an additional 15 million hectares of degraded pasturelands by 2030 and enhancing 5 million hectares of integrated cropland-livestock-forestry systems by 2030</li> </ul>
	Plan for Prevention and Control of Deforestation in the Amazon (1996)	<ul style="list-style-type: none"> <li>Zero illegal deforestation by 2030 in the amazon and compensating for greenhouse gas emissions from legal suppression of vegetation by 2030</li> </ul>

<sup>1)</sup> The energy- and industry-related NDC policies are not quantified, but partly covered in the current policies projection

Table 9: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Brazil. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 1,300 MtCO <sub>2e</sub>	2,070 MtCO <sub>2e</sub>	1,975 to 2,070 MtCO <sub>2e</sub> in 2020; 52% to 59% in 2020 1,200 to 1,250 MtCO <sub>2e</sub> ; -4% to -8% in 2030	1,200 MtCO <sub>2e</sub> in 2020	1,080 to 1,225 MtCO <sub>2e</sub> ; -6% to -17% in 2020 980 to 1,205 MtCO <sub>2e</sub> ; -7% to -25% in 2030
Per capita: 6.7 tCO <sub>2e</sub> /capita	N/A	9.4 to 9.8 tCO <sub>2e</sub> /capita in 2020 5.4 to 5.6 tCO <sub>2e</sub> /capita in 2030	N/A	5.1 to 5.8 tCO <sub>2e</sub> /capita in 2020 4.4 to 5.4 tCO <sub>2e</sub> /capita in 2030

### Impact of climate policies on greenhouse gas emissions in Brazil



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 4: Impact of climate policies in greenhouse gas emissions in Brazil (upper figure: all gases and sectors, lower figure: excluding LULUCF (left) and only LULUCF (right) separately). Source: PBL FAIR/TIMER model (upper bound) and NewClimate Institute calculations based on Climate Action Tracker (CAT, 2015) using the IEA WEO 2015 current policies scenario (lower bound); IIASA GLOBIOM model projections of net LULUCF emissions (REDD-PAC Brazil, 2015). Historical greenhouse gas emissions (excluding LULUCF) are based on inventory data submitted to the UNFCCC (until 2005), energy-related CO<sub>2</sub> emissions from IEA (2014), non-energy-related emissions from EDGAR 4.2 (JRC/PBL, 2014). Historical LULUCF emissions are taken from the Brazilian First Biennial Update Report submitted to the UNFCCC (UNFCCC, 2015c), taking into account the same pools and sources of emissions as projection of net LULUCF emissions.

### 3.4 Canada

The policy with the largest projected effect in Canada is its fuel efficiency standard for passenger vehicles, which is harmonised with US standards and will be introduced in two phases. Another policy is the carbon standard for newly built coal-fired power plants, but this has a small impact on 2020 emission levels, as it does not affect existing power plants. Under current policies, Canada's GHG emissions are projected to be about 680 to 800 MtCO<sub>2e</sub> by 2030 excluding LULUCF, which is above 2010 levels, and Canada will therefore have to implement additional policies to achieve its NDC (17% below 2005 levels).

Table 10: Description of Canada's 2020 pledge and NDC

Indicator	2020 pledge	NDC (5 <sup>th</sup> October, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>17% GHG reduction by 2030 from 2005 level</li> </ul>	<ul style="list-style-type: none"> <li>30% GHG reduction by 2030 from 2005 level</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Land sector is included in the target; net-net accounting approach will be applied</li> <li>Canada will exclude emissions from natural disturbances</li> <li>LULUCF accounting could produce 19 MtCO<sub>2e</sub> to 28 MtCO<sub>2e</sub> of credits per year (CAT, 2015) (Government of Canada, 2014)</li> </ul>	<ul style="list-style-type: none"> <li>Land sector is included; net-net accounting approach is expected to be applied</li> <li>Canada will exclude emissions from natural disturbances</li> <li>LULUCF accounting could produce 126 MtCO<sub>2e</sub> of credits per year (CAT, 2015)</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>International mechanisms may be used</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2014 (GHG inventory report submitted to the UNFCCC)</li> </ul>	

Table 11: Overview of key climate change mitigation policies in Canada. Source: Government of Canada (2014))

Sector	Policies (marked with "(+)" when mentioned in the NDC document)	Description
<b>Energy supply</b>	CO <sub>2</sub> standard for new power plants (2012)	<ul style="list-style-type: none"> <li>420 gCO<sub>2</sub>/kWh from 1 July 2015</li> </ul>
<b>Transport</b>	Efficiency standards light commercial vehicles (2004)	<ul style="list-style-type: none"> <li>34.1 mpg (14.9 km/l) by 2017, 55 mpg (23.2 km/l) by 2025</li> </ul>
	Efficiency standards heavy-duty trucks (2013)	<ul style="list-style-type: none"> <li>Differs per type of truck (aligned with federal-level regulations in the US)</li> </ul>
<b>Forestry &amp; Agriculture</b>	The Growing Forward 2 (2013)	<ul style="list-style-type: none"> <li>Supports the initiatives to advance environmentally sustainable agriculture <sup>1)</sup></li> </ul>

<sup>1)</sup> Policy not quantified in the IIASA LULUCF projections

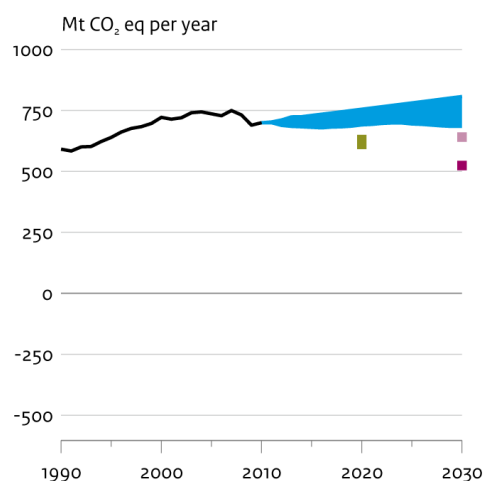
Table 12: Impact of climate policies on greenhouse gas emissions (excluding LULUCF) in Canada. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, excl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 700 MtCO <sub>2</sub> e	622 MtCO <sub>2</sub> e in 2020	610 to 630 MtCO <sub>2</sub> e by 2020; -10% to -13% in 2020 525 to 640 MtCO <sub>2</sub> e; -8% to -25% in 2030 <sup>1)</sup>	815 MtCO <sub>2</sub> e in 2030	690 to 755 MtCO <sub>2</sub> e; -1% to 8% in 2020 680 to 805 MtCO <sub>2</sub> e; -2% to 15% in 2030
Per capita: 20.5 tCO <sub>2</sub> e/capita	N/A	12.7 to 15.5 tCO <sub>2</sub> e/capita in 2030	N/A	18.3 to 20.0 tCO <sub>2</sub> e/capita in 2020 16.5 to 19.5 tCO <sub>2</sub> e/capita in 2030

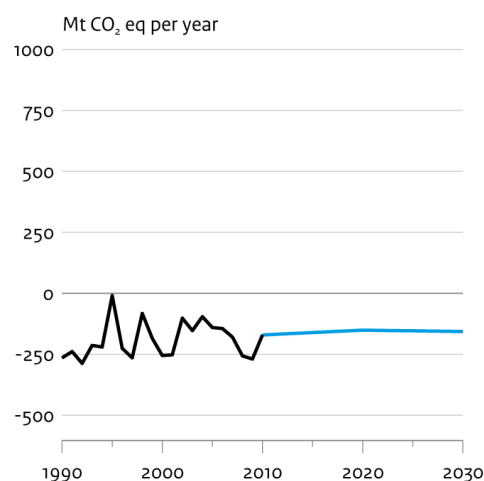
<sup>1)</sup> The range in emission projections is due to the assumed adopted land use credits, which differs more than 100 MtCO<sub>2</sub> in the PBL and NewClimate calculations. The NewClimate Institute emission levels after implementation of the NDC assumes net-net accounting and around 125 MtCO<sub>2</sub>e land use credits by 2030, whereas PBL also assumes net-net accounting but no land-use credits.

### Impact of climate policies on greenhouse gas emissions in Canada

Excluding CO<sub>2</sub> emissions from land use



CO<sub>2</sub> emissions from land use



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 5: Impact of climate policies in greenhouse gas emissions in Canada. Source: PBL FAIR/TIMER model (lower bound) and NewClimate Institute calculations based on Climate Action Tracker (CAT, 2015) using data from Canada's Emissions Trends report (Environment Canada, 2014) and the Sixth National Report on Climate Change (Government of Canada, 2014) (upper bound), and IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions from 2014 GHG inventory data submitted to the UNFCCC. Historical net LULUCF emissions have been revised downwards to be consistent with the NDC target which excludes emissions from natural disturbances.



### 3.5 Chile

By 2030 Chile aims to reduce its GHG emission intensity per unit GDP by 30% from 2007 levels under unconditional INDC and 35% to 45% under conditional INDC, which is subject international support. Under its INDC, Chile's emissions (excl. LULUCF) are estimated to reach 162 MtCO<sub>2e</sub> by 2030 under its unconditional INDC and to 127 MtCO<sub>2e</sub> under its conditional INDC. Some of its most relevant current policies are the Non-Conventional Renewable Energy Law (NCRE) Law 20698, which aims to achieve a 20% renewable energy target in 2025 and the Energy Efficiency Action Plan, which aims for a 12% reduction of the final energy demand below BAU by 2020. Under the current policies scenario, estimates show 10% emissions reduction by 2030 below 2007 levels, i.e. 161 MtCO<sub>2e</sub>, excl. LULUCF. This puts Chile on track to achieve its unconditional target.

Table 13: Description of Chile's 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 29 <sup>th</sup> September, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>30% GHG reduction per unit GDP by 2030, from 2007 levels</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>20% reduction compared to BAU emission growth trajectory (as projected from year 2007) in 2020; conditional to a relevant level of international support</li> </ul>	<ul style="list-style-type: none"> <li>Until 35% to 45% GHG reduction per unit GDP by 2030 from 2007 levels subject to a grant of international monetary funds</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Energy, agriculture, livestock and forestry, transport, mining, fishing</li> </ul>	<ul style="list-style-type: none"> <li>Energy, industrial processes, use of solvents and other products, agriculture and waste. Excluding LULUCF sector</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, HFCs and PFCs</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target</li> <li>Accounting approaches and methodologies are unclear</li> </ul>	<ul style="list-style-type: none"> <li>LULUCF sector is excluded from INDC 2030 target</li> <li>A reduction of net LULUCF emissions is expected in the order of 0.6 MtCO<sub>2e</sub> related to increased sequestration from native forest management, and 0.9 – 1.2 MtCO<sub>2e</sub> related to increased sequestration from afforestation</li> <li>Accounting approaches and methodologies are unclear</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>To be considered ("Chile does not rule out using international GHG emission transaction markets to comply with its commitments" as stated in the INDC)</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>No</li> </ul>	<ul style="list-style-type: none"> <li>Yes, scenario "Energías Renovables No Convencionales" from the MAPS Chile Project (2014), which incorporates all relevant policy measures, was used as reference scenario.</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2010 (Chile's First Biennial Update Report)</li> </ul>	

Table 14: Overview of key climate change mitigation policies in Chile. Source: (FAO, 2015, Government of Chile, 2013, Government of Chile, 2015, IEA/IRENA, 2016, Ministry of Energy, 2014, Ministry of Environment, 2015, Ministry of Environment, 2016, National Forest Corporation and Ministry of Agriculture, 2012, National Environmental Commission, 2010)

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Energy Efficiency Action Plan (2012)	<ul style="list-style-type: none"> <li>12% reduction of final energy demand below business-as-usual (BAU) by 2020 (as projected from 2010)</li> </ul>
<b>Energy supply</b>	Law 20698: Non-Conventional Renewable Energy Law (NCRE) (2013) (+)	<ul style="list-style-type: none"> <li>Utilities larger than 200MW to generate 5% of electricity from renewable sources in 2013 with continued increase to 12% in 2020, 18% in 2024 and 20% in 2025. The non-conventional renewable energy sources do not include hydro larger than 40MW.</li> </ul>
<b>Transport</b>	Law 20780: “Green tax” second stage <sup>1)2)</sup> (+) 2016	<ul style="list-style-type: none"> <li>The second stage of the “green tax” mandates: 50% tax increase of NOx emissions by 2016, this is: 10% tax increase for gasoline based vehicles and 40% increase for diesel based vehicles. By 2017, there will be another 50% tax increase for NOx emissions</li> </ul>
	Energy Efficiency Action Plan (2012)	<ul style="list-style-type: none"> <li>Vehicle labelling system and setting of minimum energy efficiency standards for vehicles to achieve a 12% of energy saving below BAU by 2020</li> </ul>
<b>Industry</b>	Energy Efficiency Action Plan (2012)	<ul style="list-style-type: none"> <li>39% of energy savings below BAU by 2020</li> </ul>
<b>Buildings</b>	Energy efficiency in public buildings (2012)	<ul style="list-style-type: none"> <li>20% of energy savings below BAU by 2020</li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Forestry</b>	National Forest and Climate Change Strategy (+) (2013)	<ul style="list-style-type: none"> <li>Recovery of 100,000 hectares of forest land, mainly native species</li> </ul>
	Forestation program	<ul style="list-style-type: none"> <li>Reforestation of 100,000 hectares of forest</li> </ul>

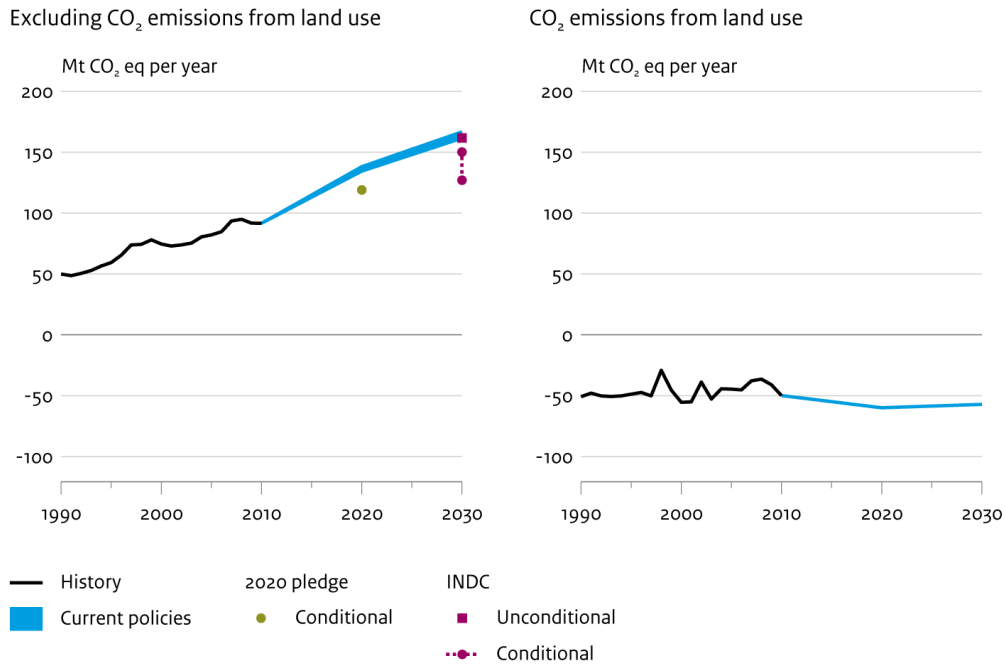
<sup>1)</sup> Exemption for public transportation for over 10 seats and cargo vans for over 2,000 kg load and closed vans of lower capacity

<sup>2)</sup> No information available on implementation status. For the current analysis, we have assumed full implementation.

Table 15: Impact of climate policies on greenhouse gas emissions (excluding LULUCF) in Chile. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, excl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	NewClimate estimates	Official data	NewClimate estimates
Absolute: 90 MtCO <sub>2</sub> e	N/A	120 MtCO <sub>2</sub> e; 30% in 2020 125 to 160 MtCO <sub>2</sub> e; 39% to 76% in 2030	N/A	135 to 140 MtCO <sub>2</sub> e; 47% to 51% in 2020 160 to 165 MtCO <sub>2</sub> e; 76% to 82% in 2030
Per capita: 5.4 tCO <sub>2</sub> e/capita	N/A	6.4 tCO <sub>2</sub> e/capita in 2020 6.5 to 8.3 tCO <sub>2</sub> e/capita in 2030	N/A	7.2 to 7.4 tCO <sub>2</sub> e/capita in 2020 8.2 to 8.5 tCO <sub>2</sub> e/capita in 2030

**Impact of climate policies on greenhouse gas emissions in Chile**



Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 6: Impact of climate policies in greenhouse gas emissions in Chile. Source: NewClimate Institute calculations (excluding LULUCF) based on its analysis for the Climate Action Tracker (CAT, 2016) using using data from the MAPS Chile Project (2014) and its “Energías Renovables No Convencionales” scenario, and IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions (1990-2010) are taken from Ministerio del Medio Ambiente (2014).

### 3.6 China

China has pledged to peak CO<sub>2</sub> emissions around 2030, to achieve 20% share of non-fossil energy sources in total primary energy consumption by 2030, and to reduce the carbon intensity of its GDP by 60-65% compared to 2005 levels. Current policy projections, which take the latest renewable capacity targets into account, as well as a cap on coal consumption, indicate that China's policies are more or less in line with what the NDC targets would mean for overall emissions, which will keep rising until 2030 but with a much slower growth rate than in the previous decade, reaching 13.0 to 14.5 GtCO<sub>2</sub>e/yr in 2030.

Table 16: Description of China's 2020 pledge and NDC

Indicator	2020 pledge	NDC (submitted 3 <sup>rd</sup> September, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>40-45% CO<sub>2</sub> emission intensity reduction by 2020; 15% non-fossil fuels in primary energy consumption and increased forest stock volume</li> </ul>	<ul style="list-style-type: none"> <li>Peaking CO<sub>2</sub> emissions around 2030; 60-65% CO<sub>2</sub> emission intensity reduction by 2030, compared to 2005 levels; 20% non-fossil fuels in primary energy consumption by 2030 and increased forest stock volume</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub> only</li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub> only</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF emissions and removals are considered. The forest stock in China will be increased by 1.3 billion m<sup>3</sup> by 2020, compared to the 2005 level</li> <li>Accounting approaches and methodologies are unclear</li> </ul>	<ul style="list-style-type: none"> <li>LULUCF emissions and removals are considered. The forest stock in China will be increased by 4.5 billion m<sup>3</sup> by 2030, compared to the 2005 level</li> <li>Accounting approaches and methodologies are unclear</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Non-fossil target</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2005 (The People's Republic of China, 2012)</li> </ul>	

Table 17: Overview of key climate change mitigation policies in China, Source: (The People's Republic of China, 2014a, The People's Republic of China, 2014b, The People's Republic of China, 2012, State Council, 2015). Note: Policy targets may change significantly under the 13th Five Year Plan (2016-2020) currently in action.

Sector	Policies (marked with “(+)” when mentioned in the NDC document)	Description
<b>Economy-wide</b>	Energy Development Strategy Action Plan (2014)	<ul style="list-style-type: none"> <li>• Cap on coal consumption in 2020 at 4.2 billion tce</li> <li>• A 10% target share of gas in primary energy supply in 2020</li> </ul>
	National Action Plan on Climate Change (2014)	<ul style="list-style-type: none"> <li>• Emission trading program to be expanded to nationwide scale by 2017</li> </ul>
	13th Five Year Plan (2016-2020)	<ul style="list-style-type: none"> <li>• Cap on total primary energy use in 2020 at 5.0 billion tce</li> </ul>
<b>Energy supply</b>	Targets for low-carbon energy supply for 2020	<ul style="list-style-type: none"> <li>• Renewable electricity: 350 GW hydropower excl. pumped storage, 200 GW wind, 100 GW solar, 30 GW biomass, 0.1 GW tidal</li> <li>• 800 million m<sup>2</sup> collector area</li> <li>• 10 million tonnes ethanol, 2 million tonnes biodiesel</li> <li>• 58 GW nuclear power (150 GW by 2030)</li> </ul>
<b>Transport</b>	Vehicle fuel economy standards (2005)	<ul style="list-style-type: none"> <li>• 5 litres/100km for new cars (20 km/l) by 2020</li> </ul>
	Biofuel targets	<ul style="list-style-type: none"> <li>• Ethanol blending mandates 10% in selected provinces</li> </ul>
<b>Industry</b>	“Made in China 2025” CO <sub>2</sub> intensity target (2013)	<ul style="list-style-type: none"> <li>• Manufacturing industries reduce their CO<sub>2</sub> emissions per unit of added value by 22% by 2020 and 40% by 2025 from 2015 levels<sup>1),2)</sup></li> </ul>
<b>Buildings</b>	Appliance standards and labelling programme	<ul style="list-style-type: none"> <li>• Supplemented with subsidies and awareness-raising campaigns<sup>1)</sup></li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Forestry</b>	Promotion of afforestation and sustainable forest management	<ul style="list-style-type: none"> <li>• Increasing the forest area by 40 million hectares and the forest stock volume by 1.3 billion m<sup>3</sup> from 2005 levels by 2020.</li> </ul>
	Program Plan of Fast Growing and High Yielding Timber Plantations (2001)	<ul style="list-style-type: none"> <li>• Establishment of at least 15 million hectares of fast-growing, high-yield plantations, of which 5.8 million hectares of fast-growing pulpwood plantations</li> </ul>
	Mid and Long-Term Plan for National Forest Management (2011)	<ul style="list-style-type: none"> <li>• Building young and mid-aged forest tending areas and transformation of low-yield forest area in the range of 35 million hectares<sup>3)</sup></li> </ul>

<sup>1)</sup> Not quantified in PBL TIMER model

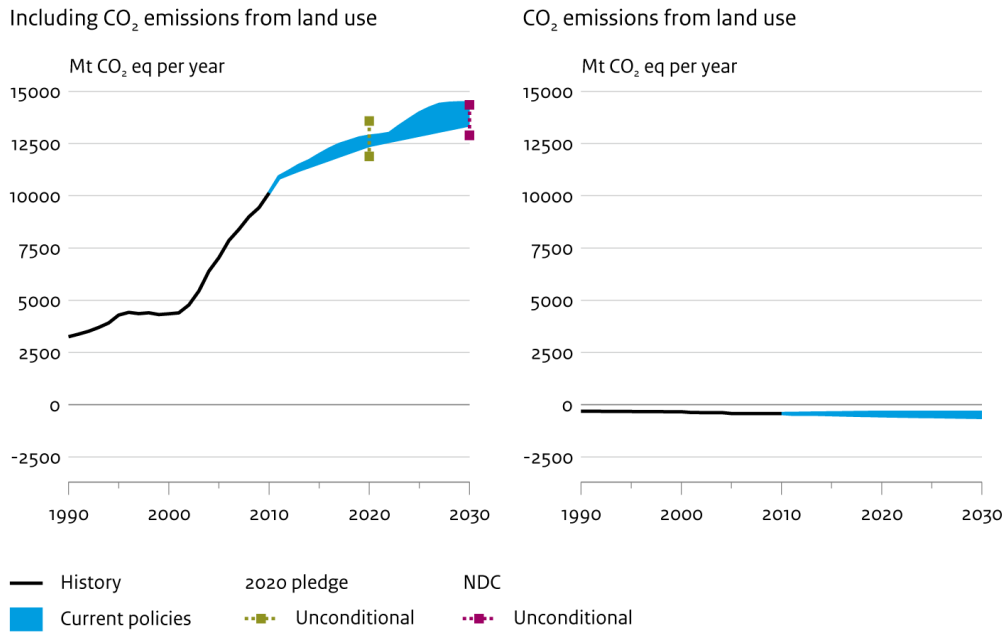
<sup>2)</sup> Not quantified by NewClimate Institute model

<sup>3)</sup> Policy not quantified in the IIASA LULUCF projections

Table 18: Impact of climate policies on greenhouse gas emissions (including LULUCF) in China. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and NDC			Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates	
Absolute: 10,130 MtCO <sub>2</sub> e	14,500 MtCO <sub>2</sub> e	11,885 to 13,580 MtCO <sub>2</sub> e; 17% to 34% in 2020 12,890 to 14,350 MtCO <sub>2</sub> e; 27% to 42% in 2030	N/A	12,410 to 12,855 MtCO <sub>2</sub> e; 20% to 27% in 2020 13,390 to 14,455 MtCO <sub>2</sub> e; 29% to 43% in 2030	
Per capita: 7.6 tCO <sub>2</sub> e/capita	N/A	8.6 to 9.8 tCO <sub>2</sub> e/capita in 2020 9.3 to 10.4 tCO <sub>2</sub> e/capita in 2030	N/A	9.0 to 9.3 tCO <sub>2</sub> e/capita in 2020 9.7 to 10.5 tCO <sub>2</sub> e/capita in 2030	

### Impact of climate policies on greenhouse gas emissions in China



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 7: Impact of climate policies in greenhouse gas emissions in China (all gases and sectors). Source: PBL FAIR/TIMER model (upper bound) and NewClimate Institute calculations (excluding LULUCF) based on its analysis for the Climate Action Tracker (CAT, 2016) using the IEA WEO 2015 current policies scenario (lower bound); both PBL and NewClimate projections are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions are based on energy-related emissions (IEA, 2015b), non-energy-related emissions (EDGAR 4.2) (JRC/PBL, 2014) and historical net LULUCF emissions (2<sup>nd</sup> National Communication) (The People's Republic of China, 2012).

### 3.7 Colombia

In its INDC, Colombia intends to reduce its GHG emissions by 20% from BAU level by 2030 and commits to increase the target to 30% subject to provision of international support. Colombia's INDC partially includes LULUCF; emissions and removals from forest plantations and permanent crops are included but removals from natural forests that remain as natural forests are excluded.

Colombia's unconditional and conditional reduction targets translate to 268 MtCO<sub>2e</sub> and 235 MtCO<sub>2e</sub>, respectively, by 2030 including LULUCF. The current policies projection estimates a range of 290 to 326 MtCO<sub>2e</sub> in 2030, thus Colombia will not yet achieve its unconditional INDC target with existing policies.

Table 19: Description of Colombia's 2020 pledge and INDC

Indicator	INDC (submitted 7 <sup>th</sup> September, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>20% GHG reduction with respect to BAU by 2030</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>30% GHG reduction with respect to BAU by 2030, subject to international support</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy-wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the 2<sup>nd</sup> IPCC Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target</li> <li>BAU calculation excludes removals from natural forests that still remain as natural forests in the target year</li> <li>Accounting approaches and methodologies are unclear</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>Colombia will explore the use of market instruments (or other economic instruments) with the objective of contributing the emissions reduction target</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes, INDC shows a BAU emissions pathway</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2012 (IDEAM et al., 2015)</li> </ul>

*Note: Colombia has not set its 2020 pledge.*

Table 20: Overview of key climate change mitigation policies in Colombia. Source: (Ministry of Environment and Sustainable Development, 2016, Ministry of External Relations, 2016, IEA, 2013, NAMA Facility, 2016, Colombian Government, 2014)

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Energy supply</b>	Colombian Low-Carbon Development Strategy (+) (ECDBC) (2012)	<ul style="list-style-type: none"> <li>Through the implementation of 8 Sectorial Mitigation Action Plans (SMAPs), approved by the relevant sectorial Ministries, the ECDBC aims to deviate from BAU emissions growth, estimated to be over 60% from current levels by 2030</li> </ul>
	Law 697: Programme for rational and efficient use of energy and other forms of non-conventional Energy (PROURE) (2010)	<ul style="list-style-type: none"> <li>PROURE plans to achieve a 20% and 30% of RE sources by 2015 and 2020, respectively</li> </ul>
<b>Buildings</b>	NAMA II Project – For the domestic refrigeration sector (2017-2021)	<ul style="list-style-type: none"> <li>GHG emissions reduction of 16.8 MtCO<sub>2</sub>e over the lifetime of the equipment, and an annual reduction of around 3.8 MtCO<sub>2</sub>e by 2030, which is a 50% reduction from BAU in the sector</li> </ul>
<b>Transport</b>	NAMA I Project – Colombia Transit Development (TOD) (2015)	<ul style="list-style-type: none"> <li>Estimated reductions of annual GHG emissions by 3.6 to 5.5 MtCO<sub>2</sub>e by 2040.</li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Forestry</b>	The National Development Plan of Colombia (+) (2015)	<ul style="list-style-type: none"> <li>Reduction of the annual deforestation rate from 121,000 hectares in 2013 to 90,000 hectares by 2018</li> </ul>
	The Amazon Vision Program (+) (2016)	<ul style="list-style-type: none"> <li>Achieve zero net deforestation by 2020 <sup>1)</sup></li> </ul>
	REDD+ Zero Deforestation in the Amazon by 2020 (2009)	<ul style="list-style-type: none"> <li>REDD+ consists of 4 phases strategy with a total of 18.5 million USD for planning and implementation <sup>11)</sup></li> </ul>

<sup>1)</sup> Policy is not implemented in the IIASA LULUCF projections

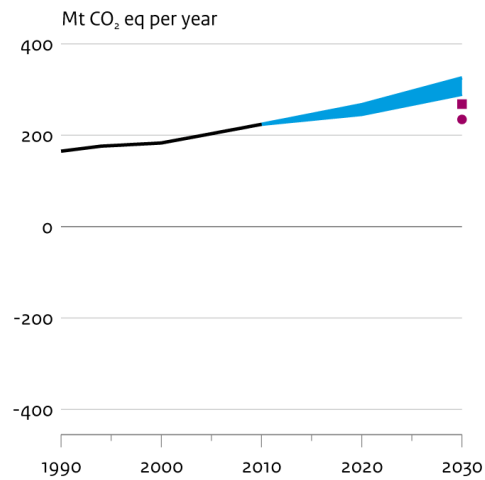
Table 21: Impact of climate policies on greenhouse gas emissions (including LULUCF but excluding net removals from natural forests) in Colombia. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	NewClimate estimates	Official data	NewClimate estimates
Absolute: 230 MtCO <sub>2</sub> e	235 to 268 MtCO <sub>2</sub> e in 2030; 1% to 16% in 2030	235 to 270 MtCO <sub>2</sub> e; 5% to 20% in 2030	N/A	245 to 265 MtCO <sub>2</sub> e; 10% to 19% in 2020 290 to 325 MtCO <sub>2</sub> e; 29% to 45% in 2030
Per capita: 5.0 tCO <sub>2</sub> e/capita	4.4 to 5.0 tCO <sub>2</sub> e/capita in 2030	4.4 to 5.0 tCO <sub>2</sub> e/capita in 2030	N/A	4.9 to 5.3 tCO <sub>2</sub> e/capita in 2020 5.5 to 6.1 tCO <sub>2</sub> e/capita in 2030

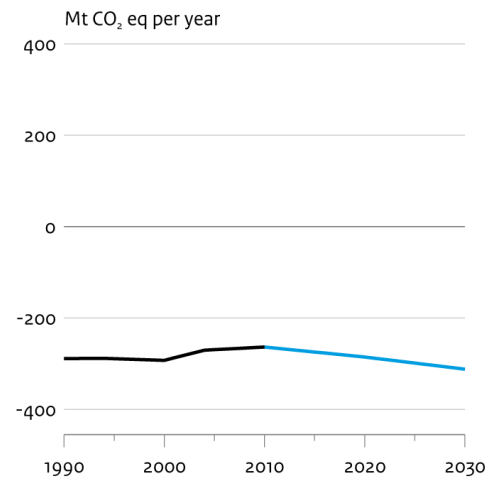


### Impact of climate policies on greenhouse gas emissions in Colombia

Including CO<sub>2</sub> emissions from land use, excluding net removals from natural forests



CO<sub>2</sub> emissions from land use, including net removals from natural forests



— History  
 ■ INDC Unconditional  
 ■ INDC Conditional

Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 8: Impact of climate policies on greenhouse gas emissions in Colombia (left: including LULUCF, right: only LULUCF). Source: NewClimate Institute calculations done for this study and based on a list of mitigation measures highly probable of being implemented and proposed by Universidad de los Andes (Cadena et al., 2016), which the MAPS Colombia Project cited upon formulating the country's INDC; supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions are based on the 1<sup>st</sup> Biennial Update Report (IDEAM et al., 2015).

Note: the BAU emission projection in Colombia's INDC excludes removals from natural forests, which accounted for 263 MtCO<sub>2</sub>e/yr in 2010. Therefore, net removals from natural forests are excluded from the current policies scenario and INDC analysis (figure on the left) but included in the figure on the right.

### 3.8 Democratic Republic of the Congo (DRC)

In its INDC, the Democratic Republic of the Congo pledges to reduce emissions by 17% by 2030 compared to a status quo emissions scenario. The target is estimated to represent roughly around 73 MtCO<sub>2e</sub>, covers the agriculture, forestry and energy sectors and it is conditional on international financial support.

Under its INDC, LULUCF emissions (~80% of country's emissions), would increase from 146 MtCO<sub>2e</sub> in 2010 up to 256 MtCO<sub>2e</sub> by 2030. Current policy projections for LULUCF emissions, based on the recent country's REDD-PAC project report, are projected to increase up to 360 MtCO<sub>2e</sub> by 2030. This means the DRC is not on track to achieve its INDC in the LULUCF sector.

Table 22: Description of the Democratic Republic of the Congo's INDC

Indicator	INDC (submitted 18 <sup>th</sup> August, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>The INDC is partially conditional, see below</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>17% reduction compared to BAU emission levels (430 MtCO<sub>2e</sub>, i.e. slightly more than 70 MtCO<sub>2e</sub> reduction) by 2030; actions conditional to the provision of adequate support in terms of financial resources, technology transfer and the reinforcement of national capacity (mix of domestic and international resources not specified)</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Agriculture, forestry and energy</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC 1996 (revised) and 2006 guidelines; GWP values not specified</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF sector is covered</li> <li>Accounting approaches and methodologies are not specified</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>The INDC refers to the emissions level under a BAU scenario by 2030 (430 MtCO<sub>2e</sub>) and provides a graph showing the pathways of the emissions development.</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2010 (Third National Communication, 2015) (Democratic Republic of the Congo, 2015)</li> </ul>

*Note: D.R. Congo has not set its 2020 pledge.*

Table 23: Overview of key climate change mitigation policies in the Democratic Republic of the Congo (only LULUCF policies were assessed). Source: (REDD-PAC DRC, 2016). References for official emission data are provided in Table A – 1 in the Appendix.

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Not assessed	<ul style="list-style-type: none"> <li>Not assessed</li> </ul>
<b>Energy supply</b>	Not assessed	<ul style="list-style-type: none"> <li>Not assessed</li> </ul>
<b>Transport</b>	Not assessed	<ul style="list-style-type: none"> <li>Not assessed</li> </ul>
<b>Industry</b>	Not assessed	<ul style="list-style-type: none"> <li>Not assessed</li> </ul>
<b>Buildings</b>	Not assessed	<ul style="list-style-type: none"> <li>Not assessed</li> </ul>
<b>F-gases</b>	Not assessed	<ul style="list-style-type: none"> <li>Not assessed</li> </ul>
<b>Forestry &amp; Agriculture</b>	Protection of permanent forest domains (Plan de convergence COMIFAC) (2015)	<ul style="list-style-type: none"> <li>No expansion of agriculture into protected forest areas</li> <li>No expansion of agriculture into forest concessions</li> </ul>
	Afforestation and reforestation measures (Plan de convergence COMIFAC) (2015) (+)	<ul style="list-style-type: none"> <li>Increase the national forest cover<sup>1)</sup></li> </ul>
	Sustainable timber management (Plan de convergence COMIFAC) (2015)	<ul style="list-style-type: none"> <li>Sustainable timber harvests in existing forest concessions following management plans</li> </ul>

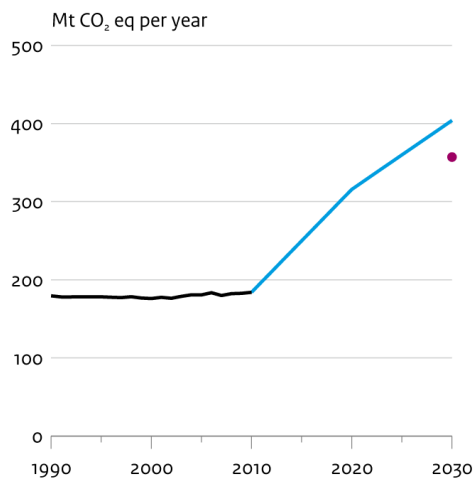
<sup>1)</sup> Policy not quantified in the IIASA LULUCF projections

Table 24: Impact of LULUCF policies on greenhouse gas emissions (including LULUCF) in the Democratic Republic of the Congo. Absolute emission levels and emission levels relative to 2010 levels are presented.

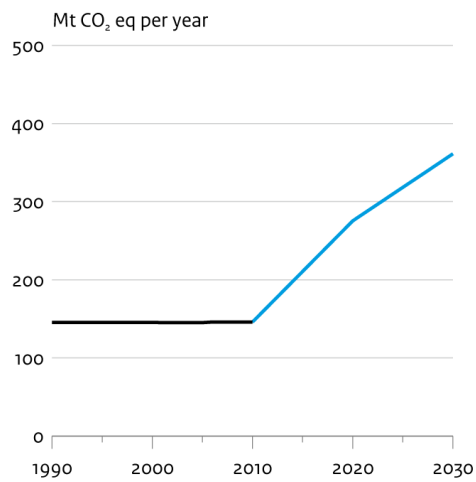
2010 GHG emissions, incl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	NewClimate estimates	Official data	NewClimate estimates
Absolute: 185 MtCO <sub>2</sub> e	357 MtCO <sub>2</sub> e in 2030; 94% in 2030	355 MtCO <sub>2</sub> e; 94% in 2030	N/A	315 MtCO <sub>2</sub> e; 72% in 2020 405 MtCO <sub>2</sub> e; 119% in 2030
Per capita: 2.8 tCO <sub>2</sub> e/capita	N/A	3.0 tCO <sub>2</sub> e/capita in 2030	N/A	3.5 tCO <sub>2</sub> e/capita in 2020 3.4 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in Republic of the Congo

Including CO<sub>2</sub> emissions from land use



CO<sub>2</sub> emissions from land use



— History      INDC  
■ Current policies      ● Conditional

Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 9: Impact of climate policies on greenhouse gas emissions (upper figure: incl. LULUCF, lower figure: LULUCF only) in the Democratic Republic of the Congo. Source: NewClimate Institute calculations based on historical emissions growth rate (1990-2010); supplemented with IIASA GLOBIOM model projections of net LULUCF emissions (REDD-PAC DRC, 2016). Historical greenhouse gas emissions are based on FAO (2014).

### 3.9 Ethiopia

Ethiopia pledged an INDC target to reduce GHG emissions by 64% below BAU by 2030, which constitutes a total reduction of at least 255 MtCO<sub>2e</sub>. The current policies projection mainly considers the Growth and Transformation Plan (GTP) phase I (2010-2015) and some initiatives under the Climate Resilience and Green Economy Strategy. Ethiopia's GHG emissions are projected to be 310 MtCO<sub>2e</sub> by 2030 (including LULUCF) under the current policies projection. Ethiopia would, therefore, need to implement additional policies to achieve its INDC target by 2030 - including LULUCF - by 164 MtCO<sub>2e</sub>. The current policy projection currently does not consider the second phase of the Growth and Transformation Plan (GTP II) (2016-2020) due to uncertainty on how the Climate Resilience and Green Economy Strategy shall be fully implemented until 2025.

Table 25: Description of Ethiopia's 2020 pledge and INDC

Indicator	INDC (submitted 10 <sup>th</sup> June, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>64% GHG reduction (255 MtCO<sub>2e</sub> reduction) from the BAU scenario in 2030 (partially conditional on international financial resources)</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Agriculture, Forestry, Industry (including mining), Transport, Buildings (including Waste and Green Cities), Electric power</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC 2006 guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF sector is included</li> <li>A reduction of net LULUCF emissions is expected in the range of 90 MtCO<sub>2e</sub> from agriculture and 130 MtCO<sub>2e</sub> from forestry by 2030 as compared to projected BAU levels</li> <li>Accounting approaches and methodologies are unclear</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>Yes. Expected amount not quantified.</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes. BAU scenario until 2030 (Federal Democratic Republic of Ethiopia, 2015).</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2013 (Federal Democratic Republic of Ethiopia, 2015)</li> </ul>

*Note: Ethiopia has not set its 2020 pledge.*

Table 26: Overview of key climate change mitigation policies in Ethiopia. Source: (Federal Democratic Republic of Ethiopia, 2011, Federal Democratic Republic of Ethiopia, 2016, Federal Democratic Republic of Ethiopia, 2015, Federal Democratic Republic of Ethiopia, 2010, Federal Democratic Republic of Ethiopia - Ministry of Water and Energy, 2012, Ethiopia Rural Energy Development and Promotion Centre (EREDPC), 2007)

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Climate Resilience and Green Economy Strategy (CRGE) (2011) (+) <sup>1) 2)</sup>	<ul style="list-style-type: none"> <li>Strategy with various mitigation initiatives to limit economy-wide GHG emissions in 2030 to 150 MtCO<sub>2e</sub> (250 MtCO<sub>2e</sub> below BAU)</li> <li>Development of up to 25 GW in renewable power capacity by 2030 (hydro 22 GW, geothermal 1 GW and wind 2 GW)</li> </ul>
<b>Energy supply</b>	Scaling-Up Renewable Energy Program for Ethiopia (SREP Investment Plan) (2012) <sup>1)</sup>	<ul style="list-style-type: none"> <li>Increase power generation capacity from the present level of 2 GW to 10 GW by 2015 and to 25 GW by 2030</li> <li>Focus on five major investment projects of wind, geothermal and hydroelectric energy generation</li> </ul>
	National Biogas Programme (2007) <sup>1)</sup>	<ul style="list-style-type: none"> <li>Construction of 20,000 biogas plants by 2017 (2nd phase: 2014-2017)</li> </ul>
<b>Transport</b>	Intra-Urban Electric Rail NAMA (2012) <sup>3)</sup>	<ul style="list-style-type: none"> <li>Replace 50% of the cargo transport with electric rail transport</li> <li>Expected emissions reduction of 8.9 MtCO<sub>2e</sub>/yr by 2030</li> </ul>
<b>Industry</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Buildings</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Forestry</b>	Afforestation and reforestation actions (part of the CRGE) (2011) (+)	<ul style="list-style-type: none"> <li>Target is 7 million hectares of afforestation and reforestation by 2030.<sup>1)</sup></li> <li>17,000 hectares of forest to be brought under protection and natural regeneration over a 30 years planning period.</li> </ul>

<sup>1)</sup> See Supporting Information for detailed assumptions on the policies and measures under the First Growth and Transformation Plan (GTP I) quantified in the current policy scenario.

<sup>2)</sup> The Second Growth and Transformation Plan (GTP II) aims for the full implementation of Climate Resilience and Green Economy Strategy (CRGE) until 2025 (Federal Democratic Republic of Ethiopia, 2016), however, the policy framework does not specifically outline policies and access to international financial support for its full implementation. For this reason, the current policy scenario does not consider the GTP II. See Supporting Information for detailed assumptions on the policies and measures quantified.

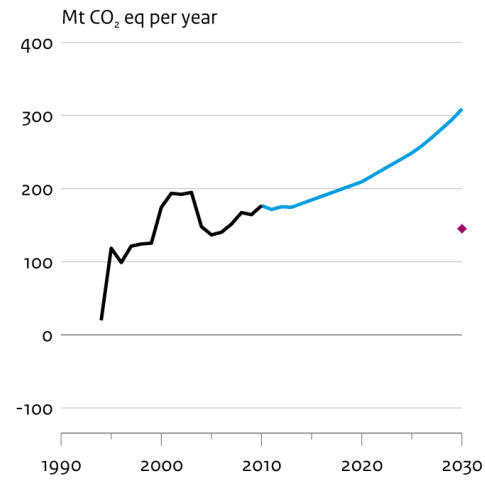
<sup>3)</sup> Target is quantified in the analysis but only achieved by 2040 (see Supporting Information for details).

Table 27: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Ethiopia. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

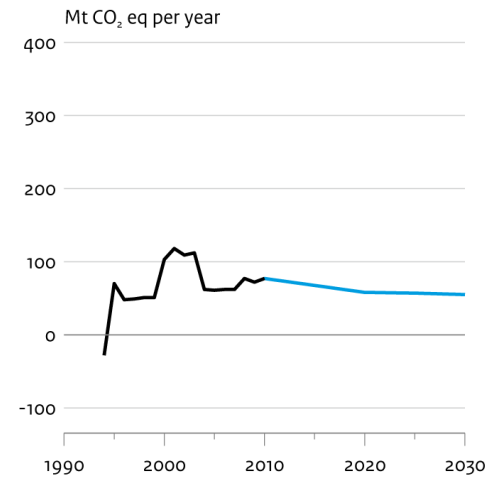
2010 GHG emissions, incl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	NewClimate estimates	Official data	NewClimate estimates
Absolute: 175 MtCO <sub>2e</sub>	145 MtCO <sub>2e</sub> ; -18% in 2030	145 MtCO <sub>2e</sub> ; -18% in 2030	N/A	210 MtCO <sub>2e</sub> ; 12% in 2020 310 MtCO <sub>2e</sub> ; 63% in 2030
Per capita: 2.0 tCO <sub>2e</sub> /capita	N/A	1.2 tCO <sub>2e</sub> /capita in 2030	N/A	2.1 tCO <sub>2e</sub> /capita in 2020 2.6 tCO <sub>2e</sub> /capita in 2030

### Impact of climate policies on greenhouse gas emissions in Ethiopia

Including CO<sub>2</sub> emissions from land use



CO<sub>2</sub> emissions from land use



— History      INDC  
 ■ Current policies      ◆ Partially conditional

Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 10: Impact of climate policies on greenhouse gas emissions (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O) including LULUCF in Ethiopia. Source: NewClimate Institute calculations are based on its analysis for Climate Action Tracker (CAT, 2016), using BAU scenario projections until 2030 reported in the 2nd National Communication (Federal Democratic Republic of Ethiopia, 2015), supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions are based on the 2nd National Communication.

### 3.10 European Union

The EU's NDC aims to reduce its GHG emissions by at least 40% by 2030 from 1990 levels. For 2020, the EU made unconditional and conditional pledges of reducing its GHG emissions by 20% and 30% from 1990 levels, respectively. Under current policies, the EU is likely to overachieve its unconditional 2020 pledge but will be short of its NDC target.

Table 28: Description of EU's 2020 pledge and NDC

Indicator	2020 pledge	NDC (5 October, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>20% GHG reduction by 2020 from 1990 level</li> <li>Kyoto target: 20% GHG reduction by 2020 from base year averaged over the second commitment period 2013-2020</li> </ul>	<ul style="list-style-type: none"> <li>At least 40% greenhouse gas reduction by 2030 from 1990 level</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>30% GHG reduction by 2020 from 1990 level</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Land sector is not included in the target</li> </ul>	<ul style="list-style-type: none"> <li>Land sector is included;</li> <li>A decision on how to include land use is specified to be taken at a later stage <sup>1)</sup></li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>No</li> </ul>	<ul style="list-style-type: none"> <li>No</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2014 (GHG inventory report submitted to the UNFCCC)</li> </ul>	

<sup>1)</sup> A legislative proposal has since then been presented by the European Commission (European Commission, 2016)

Table 29: Overview of key climate change mitigation policies in the EU.

Sector	Policies (marked with “(+)” when mentioned in the NDC document)	Description
<b>Economy/state wide</b>	EU ETS Directive (2003/87/EC revised by Directive 2009/29/EC)	<ul style="list-style-type: none"> <li>Emission cap on emissions from electricity/heat and industry of 21% below 2005 levels, by 2020</li> </ul>
<b>Energy supply</b>	Renewable Energy Roadmap/ Directive (2009/28/EC)	<ul style="list-style-type: none"> <li>Target of 20% renewable energy by 2020</li> </ul>
	Energy Efficiency Directive (2012/27/EC)	<ul style="list-style-type: none"> <li>Target of 20% energy efficiency improvement by 2020</li> </ul>
<b>Buildings – Appliances</b>	Eco-design Framework Directive (Directive 2009/125/EC)	<ul style="list-style-type: none"> <li>Specific standards for a wide range of appliances</li> </ul>
<b>Transport</b>	Regulation of CO <sub>2</sub> emissions from passenger vehicles (443/2009)	<ul style="list-style-type: none"> <li>Passenger vehicle emission standard of 95 g CO<sub>2</sub>/km, phasing in for 95% of vehicles by 2020 with 100% compliance by 2021</li> </ul>
		<ul style="list-style-type: none"> <li>Light commercial vehicle standards of 147 g CO<sub>2</sub>/km by 2020</li> </ul>

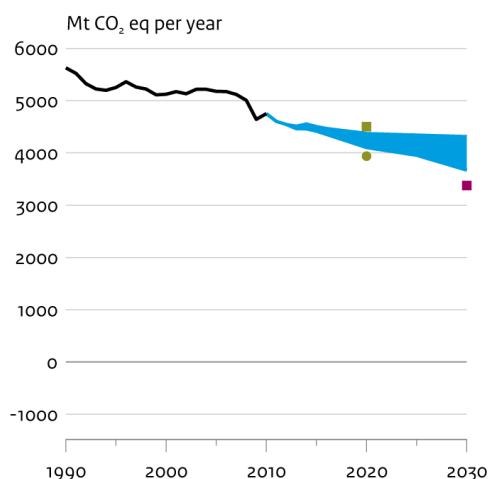
Table 30: Impact of climate policies on greenhouse gas emissions (excluding LULUCF) in the EU. Absolute emission levels and emission levels relative to 2010 levels are presented. Note that the official values for 2020 and 2030 are based on GWP values from the IPCC Fourth Assessment Report. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, excl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	NewClimate estimate	Official data	NewClimate estimate
Absolute: 4,751 MtCO <sub>2</sub> e	4,354 MtCO <sub>2</sub> e in 2020 (unconditional)	3,940 to 4,500 MtCO <sub>2</sub> e in 2020; -17% to -5% in 2020 3,375 MtCO <sub>2</sub> e; -29% in 2030	4,358 MtCO <sub>2</sub> e; -9% in 2020 4,183 MtCO <sub>2</sub> e; -13% in 2030	4,100 to 4,370 MtCO <sub>2</sub> e; -14% to -8% in 2020 3,670 to 4,310 MtCO <sub>2</sub> e; -23% to -9% in 2030
Per capita: 9.5 tCO <sub>2</sub> e/capita	N/A	7.7 to 8.8 tCO <sub>2</sub> e/capita in 2020 6.6 tCO <sub>2</sub> e/capita in 2030	N/A	8.1 to 8.6 tCO <sub>2</sub> e/capita in 2020 7.2 to 8.4 tCO <sub>2</sub> e/capita in 2030

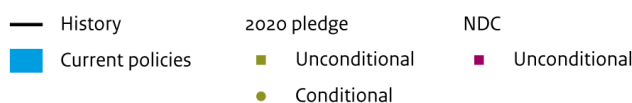
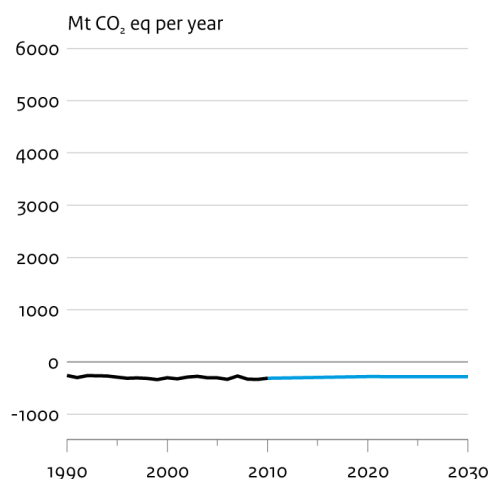
Note: NewClimate Institute estimates based on the Climate Action Tracker analysis. They differ from the official estimates due to the Climate Action Tracker uses older projections from the European Environment Agency (2014) and also considers uncertainty of mitigation impact from existing policies.

### Impact of climate policies on greenhouse gas emissions in EU28

Excluding CO<sub>2</sub> emissions from land use



CO<sub>2</sub> emissions from land use



Source: NewClimate Institute calculations

Figure 11: Impact of climate policies in greenhouse gas emissions in the EU. Source: NewClimate Institute calculations (excluding LULUCF) based on Climate Action Tracker (CAT, 2015) using the “With Existing Measures” scenario from EEA (2014) and den Elzen et al. (2015). Net LULUCF emission projections from IIASA GLOBIOM/G4M model. All projections harmonised to historical greenhouse gas emissions from 2014 GHG inventory data submitted to the UNFCCC.



### 3.11 India

India has pledged to reduce its emissions intensity per unit GDP by 33 to 35 % below 2005 by 2030 and create an additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub>. The country further sets a new target to increase its share of non-fossil-based power capacity from 30 % today to about 40 % by 2030 (with the help of international support). The main mitigation-related policies implemented in India include the market-based mechanism Perform Achieve and Trade (PAT) scheme for energy efficiency, Clean Energy Cess (coal tax), renewable energy targets and a range of support schemes laid out under the 12<sup>th</sup> Five Year Plan.

Under current policies, India's emissions (incl. LULUCF) are estimated to be between 3.3 and 4.0 GtCO<sub>2</sub>e by 2020 (42 to 70% above 2010 levels) and 4.6 to 5.8 GtCO<sub>2</sub>e by 2030 (97% to 148% above 2010 levels). For 2020, we project that India is likely to achieve its pledge with currently implemented policies. India is roughly on track to achieve its NDC for 2030, but it is not possible to make definitive conclusions because emission projections for current policies depend heavily on future economic growth.

Table 31: Description of India's 2020 pledge and NDC

Indicator	2020 pledge	NDC (2 <sup>nd</sup> October, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>Reduce emissions per unit of GDP by 20% to 25% below 2005 level by 2030 (excluding agriculture emissions)</li> </ul>	<ul style="list-style-type: none"> <li>Reduce emissions per unit of GDP by 33% to 35% below 2005 levels by 2030</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Non-fossil fuel energy to increase to about 40% of total power capacity with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF);</li> <li>Additional forest carbon stock of 2.5 to 3 GtCO<sub>2</sub>e through additional forest and tree cover by 2030</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Excluding agriculture</li> </ul>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Unclear whether land sector is included</li> <li>Accounting approaches and methodologies are not specified</li> <li>Additional carbon sink in NDC</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Yes. Expected amount not quantified.</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>(various existing policies and targets are described)</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2010 (First Biennial Update Report, 2015) (Government of India, 2015a)</li> </ul>	

Table 32: Overview of key climate change mitigation policies in India. Source: (BEE, 2015, Government of India, 2015a, Government of India, 2015b, Ministry of Consumer Affairs Food and Public Distribution, 2015, MNRE, 2009)

Sector	Policies (marked with “(+)” when mentioned in the NDC document)	Description
<b>Economy-wide</b>	Clean energy cess (coal tax) (2010)	<ul style="list-style-type: none"> <li>Implemented in 2010; currently a tax of INR 200/tonne is imposed on coal, lignite and peat</li> </ul>
<b>Energy supply</b>	Renewable energy targets and support schemes (12 <sup>th</sup> Five Year Plan (2013), National Solar and Wind Missions (2010)) (+)	<ul style="list-style-type: none"> <li>Previous capacity targets for 2022 to be overachieved (20 GW solar, 38.5 GW wind) <sup>1)</sup></li> <li>Budgetary support for solar power under the National Solar Mission <sup>2)</sup></li> <li>Renewable Purchase Obligations scheme (2003)<sup>2)</sup></li> <li>Renewable Energy Certificate (REC) mechanism (2011) <sup>2)</sup></li> </ul>
<b>Transport</b>	Support for biofuels (2007)	<ul style="list-style-type: none"> <li>5% blending target for ethanol with petrol (no timeline set)</li> </ul>
<b>Industry</b>	Energy efficiency in industry (PAT scheme) (2011)	<ul style="list-style-type: none"> <li>The first phase was expected to save 6.6 Mtoe (4.8% energy reduction in the industries covered, representing around 60% of primary energy consumption) and to reduce 26 MtCO<sub>2</sub>e over the 2012-2015 period</li> </ul>
<b>Forestry</b>	Green India Mission (2011) <sup>3)</sup>	<ul style="list-style-type: none"> <li>Increase the forest/tree cover in moderately dense forests: 5 million hectares</li> <li>Improve forest/tree cover on forest areas: 5 million hectares</li> </ul>
<b>Agriculture</b>	National Mission on Sustainable Agriculture (2012) (+) <sup>3), 4)</sup>	<ul style="list-style-type: none"> <li>Enhancing food security and protection of resources such as land, water, biodiversity and genetics</li> </ul>

<sup>1)</sup> Based on: Planning Commission Government of India (2011). Although the Indian government implements a number of support policies to meet the targets, it is highly uncertain that these targets will be met. The assumptions for current policies projections are described in detail in the Supporting Information.

<sup>2)</sup> Not quantified separately

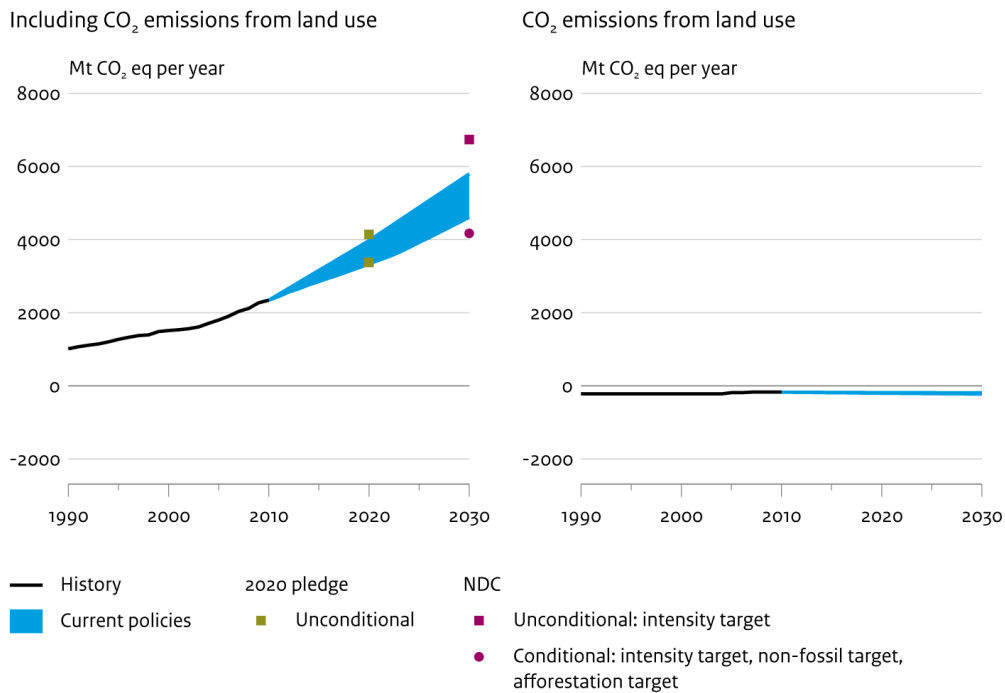
<sup>3)</sup> Not quantified by NewClimate Institute in current policies projection

<sup>4)</sup> Policy not quantified in IIASA LULUCF projections.

Table 33: Impact of climate policies on greenhouse gas emissions (including LULUCF) in India. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 2,340 MtCO <sub>2</sub> e	3,815 MtCO <sub>2</sub> e	3,375 to 4,140 MtCO <sub>2</sub> e in 2020; 44% to 77% in 2020 4,170 to 6,735 MtCO <sub>2</sub> e in 2030; 78% to 188% in 2030	N/A	3,335 to 3,970 MtCO <sub>2</sub> e; 42% to 70% in 2020 4,610 to 5,795 MtCO <sub>2</sub> e; 97% to 148% in 2030
Per capita: 1.9 tCO <sub>2</sub> e/capita	N/A	2.4 to 3.0 tCO <sub>2</sub> e/capita in 2020 2.7 to 4.4 tCO <sub>2</sub> e/capita in 2030	N/A	2.4 to 2.9 tCO <sub>2</sub> e/capita in 2020 3.0 to 3.8 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in India



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 12: Impact of climate policies in greenhouse gas emissions in India (including LULUCF). Source: PBL FAIR/TIMER model supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions (lower bound) and NewClimate Institute calculations adapted from Climate Action Tracker (CAT, 2015) using the IEA WEO 2015 current policies scenario (IEA, 2015b) (upper bound) for energy-related CO<sub>2</sub> emissions and Planning Commission (Planning Commission Government of India, 2014) for LULUCF emissions. Historical greenhouse gas emissions are based on energy-related emissions (IEA, 2014), non-energy-related emissions (EDGAR 4.2) (JRC/PBL, 2014) and historical LULUCF emissions (2<sup>nd</sup> National Communication) (Ministry of Environment & Forests, 2012). For reporting reasons, the emission projections excluding LULUCF are not presented, as these are similar to those including LULUCF.

### 3.12 Indonesia

Uncertainty surrounds Indonesia's INDC target of a 29% emissions reduction by 2030 relative to a baseline scenario, as newly revised estimates of this baseline indicate that emissions may be much lower in 2030 than would be expected from the INDC submission. The newest estimates indicate that while emissions from land use, land use change and forestry (LULUCF) may stabilise if efforts to reduce illegal logging and reduce deforestation are effective, other emissions might roughly double by 2030 compared to current levels. Despite this, Indonesia would likely reach its INDC target under current policies, with overall emission levels in the range 1,795 to 2,220 MtCO<sub>2e</sub>/year by 2030.

Table 34: Description of Indonesia's 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 24 <sup>th</sup> September, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>26% GHG reduction by 2020 from baseline scenario</li> </ul>	<ul style="list-style-type: none"> <li>29% GHG reduction by 2030 from baseline scenario</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>41% GHG reduction by 2030 from baseline scenario</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Not Specified</li> </ul>	<ul style="list-style-type: none"> <li>Energy including transport, industrial processes and product use, agriculture, LULUCF, waste</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>Not Specified</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>Not Specified</li> </ul>	<ul style="list-style-type: none"> <li>All IPCC sectors CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Land sector is included in the target;</li> <li>Accounting approaches and methodologies are not specified</li> </ul>	<ul style="list-style-type: none"> <li>Land sector is included in the target;</li> <li>Accounting approaches and methodologies are not specified</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>International market mechanisms will not be used to meet the INDC, but Indonesia "welcomes bilateral, regional and international market mechanisms that facilitate and expedite technology development and transfer, payment for performance, technical cooperation, and access to financial resources to support Indonesia's climate mitigation and adaptation efforts towards a climate resilient future".</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2012 (Republic of Indonesia, 2015)</li> </ul>	

Table 35: Overview of key climate change mitigation policies in Indonesia.

Sector	Policies (marked with "(+)" when mentioned in the INDC document)	Description
<b>Energy supply</b>	Renewable energy targets (2014) (+)	<ul style="list-style-type: none"> <li>15%-23% share of renewable energy in primary energy supply by 2025 (supported by feed-in tariffs, Government of Indonesia, 2012)</li> </ul>
<b>Transport</b>	Biofuel targets (2013)	<ul style="list-style-type: none"> <li>15% share of biofuels in all transportation fuels by 2025</li> </ul>
<b>Forestry</b>	Forest Law Enforcement National Strategy (FLENS) (2014) <sup>1)</sup>	<ul style="list-style-type: none"> <li>Curb illegal logging to reduce the current deforestation rate by 20–50 Mm<sup>3</sup> per year</li> </ul>

<sup>1)</sup> Not quantified by NewClimate Institute in current policy projection.

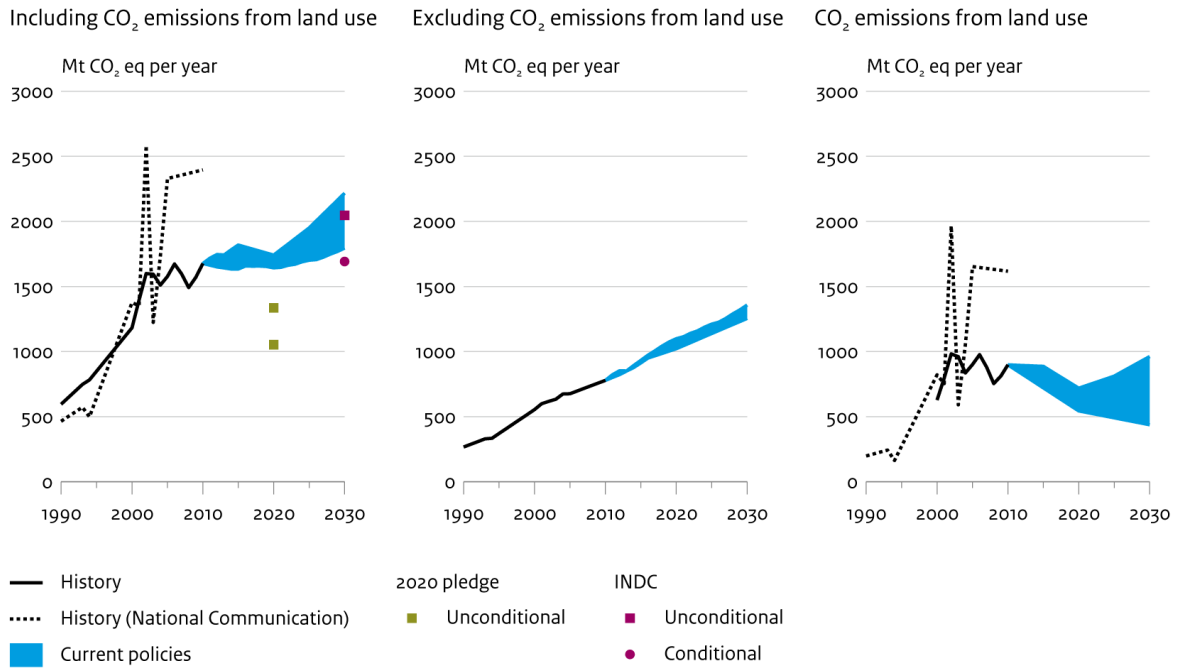
Table 36: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Indonesia. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and INDC <sup>1)</sup>		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 1,677 MtCO <sub>2</sub> e <sup>2)</sup>	2,050 MtCO <sub>2</sub> e by 2030 (1700 MtCO <sub>2</sub> conditional) <sup>2)</sup>	1,065 to 1,335 MtCO <sub>2</sub> e in 2020; -37% to -20% in 2020 1,700 to 2,050 MtCO <sub>2</sub> e in 2030; 1% to 22% in 2030	N/A	1,645 to 1,730 MtCO <sub>2</sub> e; -2% to 3% in 2020 1,795 to 2,220 MtCO <sub>2</sub> e; 7% to 32% in 2030
Per capita: 7.0 tCO <sub>2</sub> e/capita	N/A	4.1 to 5.1 tCO <sub>2</sub> e/capita in 2020; 6.1 to 7.4 tCO <sub>2</sub> e/capita in 2030	N/A	6.3 to 6.6 tCO <sub>2</sub> e/capita in 2020 6.5 to 8.0 tCO <sub>2</sub> e/capita in 2030

<sup>1)</sup> Conditional INDC

<sup>2)</sup> The 2010 emissions are based on energy-related emissions (IEA, 2012), non-energy-related emissions (EDGAR 4.2) (JRC/PBL, 2014) and LULUCF emissions (IIASA), and revised emission estimates from peat oxidation and peat fires by IIASA. The revised 2010 estimates of peat oxidation and peat fires are based on the revised estimates of BAPPENAS (2015) of 559 MtCO<sub>2</sub>e, which are much lower compared to 1442 MtCO<sub>2</sub>e estimate in the Second National communication (SNC) (see sheet 19 of BAPPENAS (2015)). BAPPENAS (2015) has reduced the 2010 net AFOLU emissions estimates from 2,505 (SNC) to 1,460 MtCO<sub>2</sub>e, and the BAU 2020 projection from 2,949 to 1,804 MtCO<sub>2</sub>e. BAPPENAS (2015) has a BAU projection of net AFOLU emissions in the range of 2,877 MtCO<sub>2</sub>e by 2030, which is also used in the INDC submission.

**Impact of climate policies on greenhouse gas emissions in Indonesia**



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 13: Impact of climate policies in greenhouse gas emissions in Indonesia. Upper figure: Total emissions including LULUCF, lower figure: total emissions excluding LULUCF (left), LULUCF emissions only (right). Source: PBL FAIR/TIMER model (lower bound) and NewClimate Institute calculations (excluding LULUCF) based on its analysis for Climate Action Tracker (CAT, 2016) using future projections up to 2030 from the (IEA, 2015a) combined with LULUCF emission projections from BAPPENAS (2015) (upper bound). PBL calculations are supplemented with IIASA GLOBIOM/G4M model projection of net LULUCF emissions. Historical emissions are based on energy-related emissions (IEA, 2012), non-energy-related emissions (EDGAR 4.2) (JRC/PBL, 2014) and LULUCF emissions including emissions from peat oxidation from deforestation (BAPPENAS (2015)). Dotted lines show the historical data based on the Second National Communication. For comparison, the CAIT Indonesia tool (WRI, 2016) gives a higher estimate of 1,805 MtCO<sub>2</sub>e for the projected national 2020 emissions, based on the same historical emissions. BAPPENAS (2015) has a BAU 2030 projection of about 1,100 MtCO<sub>2</sub>e for the land use emissions, which is in the upper limit of the range shown in Figure 6b.

### 3.13 Japan

Japan proposes in its INDC to reduce GHG emissions by 26% by 2030 compared to 2013 levels, equivalent to a 25.4 % reduction from 2005 levels and 3% increase from 2010 levels. The main GHG mitigation policies currently implemented in Japan include the renewable feed-in tariff scheme, 2014 Basic Energy Plan, Top Runner Standards programme and the global warming tax.

Under current policies, the latest calculations by PBL and NewClimate Institute estimate Japan's emissions (excluding LULUCF) to be between 1,160 to 1,260 MtCO<sub>2</sub>e by 2020 (0% to 7% below 2010 levels) and 1,070 to 1,180 MtCO<sub>2</sub>e by 2030 (9% to 19% below 2010 levels). The current policy emissions projections indicate that Japan would overachieve its current 2020 pledge (3.8% below 2005 levels by 2020) even with full nuclear phase-out. For 2030, however, our results also show that Japan will need to strengthen mitigation policies to achieve the INDC target (26% below 2013 levels), as restarting existing nuclear fleets would not provide sufficient mitigation impact. The large range of projections is caused by the uncertainty about the future role of nuclear energy, as it is not yet fully clear whether this restarting will occur and which energy carriers will replace nuclear electricity capacity.

Table 37: Description of Japan's 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 17 <sup>th</sup> July, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>3.8% reduction by 2020 from 2005 level</li> </ul>	<ul style="list-style-type: none"> <li>26% GHG reduction by 2030 from 2013 level</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target;</li> <li>Accounting approach is specified as Kyoto Protocol approach (gross-net accounting)</li> </ul>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target;</li> <li>Accounting approach is specified as Kyoto Protocol approach (gross-net accounting)</li> <li>A reduction of net LULUCF emissions is expected in the range of 37 MtCO<sub>2</sub>e <sup>1)</sup></li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>Yes. Expected amount not specified.</li> </ul>	<ul style="list-style-type: none"> <li>Yes. Cumulative 50-100 MtCO<sub>2</sub>e through the Joint Crediting Mechanism (JCM).</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>No</li> </ul>	<ul style="list-style-type: none"> <li>No</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2014 (GHG inventory report submitted to the UNFCCC)</li> </ul>	
<b>Other information</b>	<ul style="list-style-type: none"> <li>2020 pledge assumes zero nuclear power generation following the Fukushima nuclear disaster</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>

<sup>1)</sup> The reduction of LULUCF emissions/removals corresponds to 2.6% reduction of total emissions in 2013.

Table 38: Overview of key climate change mitigation policies in Japan. Source: (Kuramochi, 2014, Government of Japan, 2013, IEA, 2015b, Government of Japan, 2015)

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Global warming countermeasures tax (2012)	<ul style="list-style-type: none"> <li>An upstream tax of 289 JPY/tCO<sub>2</sub> (around 2.3€) is imposed on fossil fuels on top of existing petroleum and coal tax</li> </ul>
<b>Energy supply</b>	2014 Basic Energy Plan <sup>1)</sup> and the long-term energy demand and supply outlook (+)	<ul style="list-style-type: none"> <li>Renewable electricity (incl. large hydro): at least 13.5% by 2020 and 22-24% by 2030 (supported by FIT scheme), nuclear electricity: 20-22%.</li> </ul>
	Renewable Energy Act (feed-in tariff) (2012)	<ul style="list-style-type: none"> <li>Electric utility operators required to purchase all electricity generated at designated prices; applicable to most renewable technologies</li> </ul>
<b>Buildings</b>	Energy Conservation Act (2007)	<ul style="list-style-type: none"> <li>Energy reduction of 1%/year and annual reports to the government by large operators<sup>2)</sup></li> <li>Energy efficiency standards for buildings and houses larger than 300 m<sup>2</sup> <sup>2)</sup></li> </ul>
<b>Transport</b>	Top Runner Programme: vehicle efficiency standards (1999)	<ul style="list-style-type: none"> <li>16.8 km/l by 2015, 20.3 km/l by 2020</li> </ul>
<b>F-gases</b>	Act on Rational Use and Proper Management of Fluorocarbons (2013)	<ul style="list-style-type: none"> <li>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)</li> </ul>
<b>Forestry</b>	Basic Plan for Forest and Forestry (2011)	<ul style="list-style-type: none"> <li>Maintain and strengthen the CO<sub>2</sub> absorption of forests through appropriate management of forests<sup>3)</sup></li> </ul>

<sup>1)</sup> Due to the large uncertainty regarding the feasibility of the 2014 Basic Energy Plan on 2030 electricity mix, NewClimate Institute performed independent calculations on a possible 2030 electricity mix.

<sup>2)</sup> Not quantified in PBL TIMER model and NewClimate Institute model

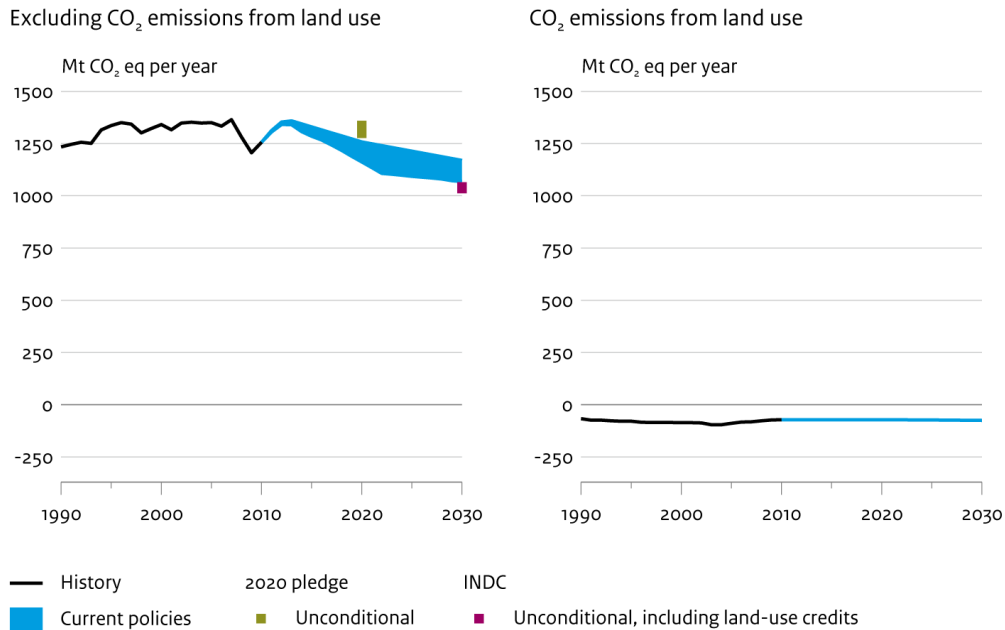
<sup>3)</sup> Policy not quantified in the IIASA LULUCF model projections

Table 39: Impact of climate policies on greenhouse gas emissions (excluding LULUCF, including credits) in Japan. Absolute emission levels and emission levels relative to 2010 levels are presented. Note that the official values for 2020 and 2030 are based on GWP values from the IPCC Fourth Assessment Report. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, excl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 1,256 MtCO <sub>2</sub> e	1,343 MtCO <sub>2</sub> e; 3% in 2020; 1,042 MtCO <sub>2</sub> e; -20% in 2030	1,300 to 1,335 MtCO <sub>2</sub> e; 3% to 6% in 2020 1,035 to 1,040 MtCO <sub>2</sub> e; -17% to 18% in 2030	N/A	1,160 to 1,260 MtCO <sub>2</sub> e; -0% to -7% in 2020 1,070 to 1,170 MtCO <sub>2</sub> e; -7% to -15% in 2030
Per capita: 9.9 tCO <sub>2</sub> e/capita	N/A	10.4 to 10.7 tCO <sub>2</sub> e/capita in 2020 8.6 to 8.7 tCO <sub>2</sub> e/capita in 2030	N/A	9.3 to 10.1 tCO <sub>2</sub> e/capita in 2020 8.9 to 9.7 tCO <sub>2</sub> e/capita in 2030



### Impact of climate policies on greenhouse gas emissions in Japan



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 14: Impact of climate policies in greenhouse gas emissions in Japan. 2020 and 2030 targets exclude LULUCF but includes LULUCF credits (in line with the accounting rules under the Kyoto Protocol) as well as overseas credits. Source: PBL FAIR/TIMER model (upper bound through 2012, lower bound from 2013 through 2016 and from 2021 through 2023) and NewClimate Institute calculations (lower bound through 2012, from 2017 through 2020, and from 2024 through 2030; upper bound from 2013 onwards) based on its analysis for Climate Action Tracker (CAT, 2016) using the IEA WEO 2015 current policies scenario (IEA, 2015b). Net LULUCF emission projections from IIASA GLOBIOM/G4M model. Historical greenhouse gas emissions from 2014 GHG inventory data submitted to the UNFCCC.

### 3.14 Kazakhstan

Kazakhstan pledged an unconditional INDC target to reduce GHG emissions by 15% below 1990 levels by 2030, and a conditional target to reduce emissions by 25% below 1990 by 2030. The current policies projection includes the Action Plan for the development of alternative and renewable energy in Kazakhstan for 2013–2020. Kazakhstan's GHG emissions are projected to be 390–410 MtCO<sub>2</sub>e/yr by 2030 (including LULUCF) under the current policies projection. Kazakhstan would, therefore, fail to achieve its unconditional INDC target by 2030 (265–305 MtCO<sub>2</sub>e/yr including LULUCF).

Table 40: Description of Kazakhstan's 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 28 <sup>th</sup> September, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>15% reduction from 1990 levels <sup>1)</sup></li> <li>7% reduction from 1990 base year levels <sup>1)</sup></li> </ul>	<ul style="list-style-type: none"> <li>15% reduction in GHG emissions by December 2030 compared to the 1990 base year<sup>2)</sup></li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>25% reduction in GHG emissions by December 2030 compared to the 1990 base year, conditional on international investments, the transfer of low carbon technologies, green climate funds and flexible mechanisms for transition economy countries</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>All sectors, incl. LULUCF</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>IPCC 2006 guidelines, IPCC 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol, IPCC 2013 Wetlands Supplement; 100-year GWPs from the Fourth Assessment Report (Decision 24/CP.19)</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Option to use market-based mechanisms</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes, scenarios 'with measures', 'with additional measures' and 'without measures' are available (UNFCCC, 2016a)</li> </ul>	<ul style="list-style-type: none"> <li>Yes, scenarios 'with measures', 'with additional measures' and 'without measures' are available (UNFCCC, 2016a). The 'without measures' scenario provides the BAU emissions projection under the assumption that no additional measures to reduce GHG emissions are taken. The scenario considers several measures implemented by Kazakhstan before 2015.</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2014 (GHG inventory report submitted to the UNFCCC)</li> </ul>	

<sup>1)</sup> Kazakhstan's Copenhagen pledge was to reduce emissions by 15% below 1992 levels incl. LULUCF by 2020, with the base year changed to 1990 later in 2012. For the 2<sup>nd</sup> commitment period of the Kyoto Protocol, Kazakhstan submitted a target of 7% reduction below 1990 levels (Government of the Republic of Kazakhstan, 2015, page 3)(Government of the Republic of Kazakhstan, 2015, page 3)(Government of the Republic of Kazakhstan, 2015, page 3)(Government of the Republic of Kazakhstan, 2015, page 3).

<sup>2)</sup> Under 'Fair and ambitious targets, taking into account national circumstances,' the INDC states that "under a revised and conservative business as usual scenario which takes into account potentially lower GDP growth rates the target proposed by Kazakhstan amounts to a 22% reduction in GHG emissions by 2030 compared to BAU projected emissions. Under favourable economic conditions and an increase in oil prices, the unconditional target proposed by Kazakhstan would amount to a 34% reduction in GHG emissions by 2030 compared to BAU projected emissions."

Table 41: Overview of key climate change mitigation policies in Kazakhstan. Source: (Ministry of Environment and water resources of the Republic of Kazakhstan, 2013, UNFCCC, 2016a, Decree of the President of the Republic of Kazakhstan, 2013, Republic of Kazakhstan, 2012, Republic of Kazakhstan, 2009, Braliyev, 2007)

Sector	Policies (marked with “(+)” when mentioned in the INDC document) <sup>1)</sup>	Description
<b>Economy-wide</b>	Concept for Kazakhstan’s Transition to Green Economy: Energy efficiency targets (2015) (+) <sup>2)</sup>	<ul style="list-style-type: none"> <li>Reduction of energy intensity per GDP of 25% by 2020, of 30% by 2030 and of 50% by 2050 compared to 2008 levels</li> <li>Share of renewable energy production by wind and solar in total electricity production of not less than 3% in 2020 and 30% by 2030</li> </ul>
	Strategic Development Plan before 2020 (Decree No. 922) (2010)	<ul style="list-style-type: none"> <li>Aim to increase renewable energy share in total energy consumption to 1.5% by 2015 and 3% by 2020</li> <li>Reduction of energy intensity by at least 10% by 2015 and by at least 25% by 2025 as compared to 2008<sup>8)</sup></li> </ul>
	Concept of Transition of the Republic of Kazakhstan to Sustainable Development for the Period 2007-2024 (Presidential Decree No. 216 of 2006) (2006)	<ul style="list-style-type: none"> <li>5% of national energy consumption<sup>3)</sup> provided by renewable sources by 2024</li> </ul>
<b>Energy supply</b>	Support scheme for renewable energy (2014) <sup>4)</sup>	<ul style="list-style-type: none"> <li>Feed-in-tariff for wind, solar, small hydro and biogas plants</li> </ul>
	Action Plan for the development of alternative and renewable energy in Kazakhstan for 2013-2020 (2013) <sup>5)</sup>	<ul style="list-style-type: none"> <li>Plan to build around 106 renewable energy installations with a total installed capacity of 3054.55 MW into operation by 2020 (including 1,787 MW wind; 539 MW hydro; 713.5 MW solar; 15.05 MW biomass)</li> </ul>
<b>Transport</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Industry</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Buildings</b>	Program on modernization of housing and communal services (2012) <sup>6)</sup>	<ul style="list-style-type: none"> <li>Reduction of emissions associated with housing and communal services by 10% by 2030</li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Forestry</b>	Strategic Plan of the Ministry of Environment and Water Resources (2011)	<ul style="list-style-type: none"> <li>Plan to reforest and afforest a total of 5,000 hectares of land</li> </ul>
	Carbon sequestration activities	<ul style="list-style-type: none"> <li>An increase of the carbon sink through appropriate management <sup>7)</sup></li> </ul>

<sup>1)</sup> Kazakhstan’s ETS (phase III: 2016-2020) is suspended until 2018 (ICAP, 2016).

<sup>2)</sup> Policy considered as overarching strategy without substantial plan for implementation as of today.

Therefore, this policy is excluded in the current policy scenario. However, the energy intensity target of this strategy is already met in PBL’s business-as-usual scenario. For NewClimate Institute calculations the achievement of the target could not be verified due to the lack of energy balance data.

<sup>3)</sup> Assumed as total primary energy supply.

<sup>4)</sup> There is limited information on the expected mitigation impact from the support scheme for renewable energy.

<sup>5)</sup> Based on most recent available information only 25% to 50% of the projects will be implemented by 2020 (Kazeurope, 2016) (slide 7)

<sup>6)</sup> Buildings policies were not included in PBL’s TIMER model.

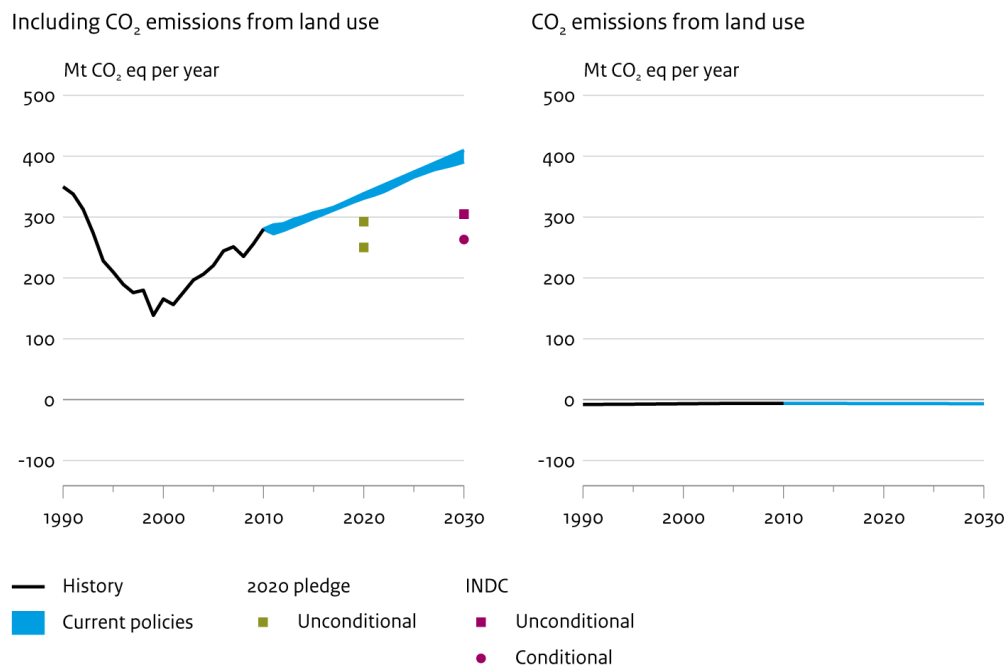
<sup>7)</sup> Policy not quantified in the IIASA LULUCF model projections.

<sup>8)</sup> No information available on implementation status. For the current analysis we have assumed full implementation.

Table 42: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Kazakhstan. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 280 MtCO <sub>2</sub> e	N/A	250 to 290 MtCO <sub>2</sub> e; -2% to 15% in 2020 265 to 305 MtCO <sub>2</sub> e; 3% to 20% in 2030	N/A	330 to 340 MtCO <sub>2</sub> e; 18% to 21% in 2020 390 to 410 MtCO <sub>2</sub> e; 39% to 46% in 2030
Per capita: 17.5 tCO <sub>2</sub> e/capita	N/A	14.2 to 16.6 tCO <sub>2</sub> e/capita in 2020 14.1 to 16.3 tCO <sub>2</sub> e/capita in 2030	N/A	18.8 to 19.2 tCO <sub>2</sub> e/capita in 2020 20.9 to 21.9 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in Kazakhstan



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 15: Impact of climate policies in greenhouse gas emissions in Kazakhstan (all gases; including LULUCF). Source: PBL FAIR/TIMER model (upper bound through 2015, lower bound from 2017 onwards) and NewClimate Institute calculations are based on its analysis for Climate Action Tracker (CAT, 2016), using the 'without measures' scenario provided in the 2nd Biennial Update Report (Ministry of Energy of the Republic of Kazakhstan, 2016b) and additional policies currently under implementation (lower bound through 2016, upper bound from 2016 onwards). Both PBL and NewClimate projections are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions excluding LULUCF from 2014 GHG inventory data submitted to the UNFCCC, and historical LULUCF emissions from (Ministry of Environment and water resources of the Republic of Kazakhstan, 2013).

### 3.15 Mexico

Mexico aims, in its NDC, to reduce its GHG emissions by 22% (unconditional), and by 36% (conditional) from BAU by 2030. An assessment of the new Energy Transition Law (24/12/2015) that provides a framework for clean energy, energy efficiency and GHG emissions reductions, reveals that this target is less ambitious compared to what was proposed by previous renewable energy laws and the Secretariat of Energy (SENER) projections. Under its current policies, Mexico is not on track to meet its NDC target.

Table 43: Description of Mexico's 2020 pledge and NDC

Indicator	2020 pledge	NDC (21 <sup>st</sup> September, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>22% GHG reduction by 2030 from baseline scenario</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>30% GHG reduction by 2030 from baseline scenario</li> </ul>	<ul style="list-style-type: none"> <li>36% GHG reduction by 2030 from baseline scenario</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy-wide</li> </ul>	<ul style="list-style-type: none"> <li>Economy-wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>Not-specified</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the 5th IPCC Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>Not-specified</li> </ul>	<ul style="list-style-type: none"> <li>All Kyoto GHGs, excluding NF<sub>3</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target</li> <li>Accounting approaches and methodologies are unclear</li> </ul>	<ul style="list-style-type: none"> <li>Land sector is included in the target;</li> <li>Accounting approaches and methodologies are not specified</li> <li>Activity-based approach will be used</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Mexico's unconditional NDC commitment will be met regardless of these mechanisms. However, robust, global, market-based mechanisms will be essential to achieve rapid and cost efficient mitigation</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>NDC provides a baseline scenario</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2013 (1<sup>st</sup> Biennial Update Report)</li> </ul>	

Table 44: Overview of key climate change mitigation policies in Mexico. Source: (Cámara de Diputados, 2015, IEA, 2015b)

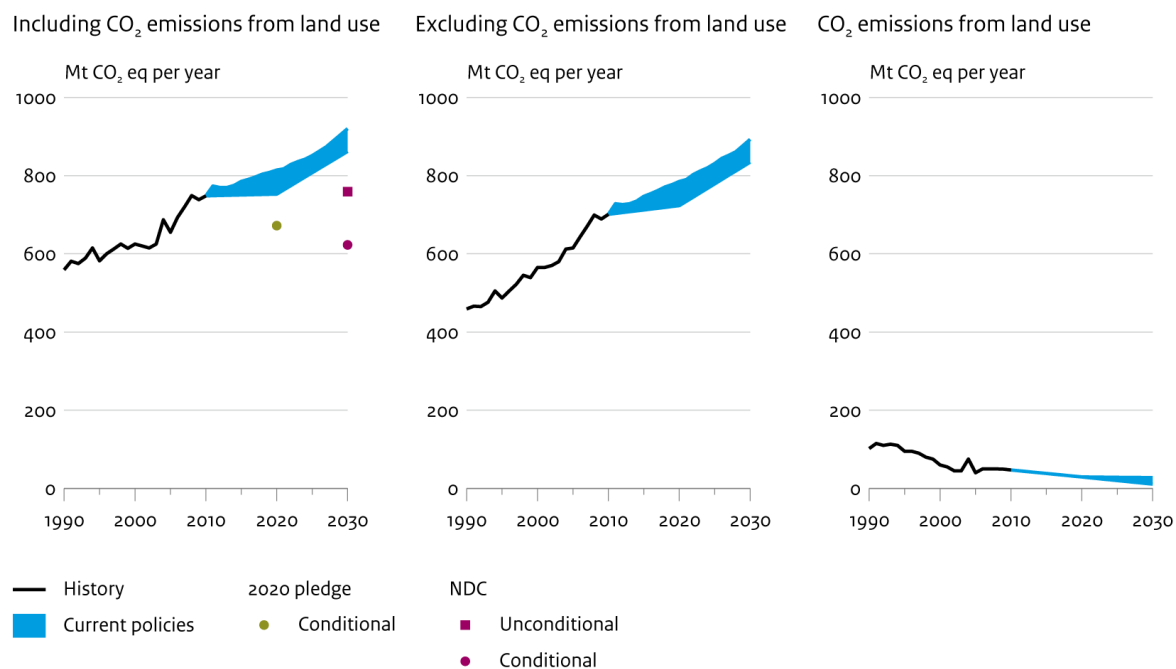
Sector	Policies (marked with “(+)” when mentioned in the NDC document)	Description
<b>Energy supply</b>	Energy Transition Law (2015)	<ul style="list-style-type: none"> <li>Provides a framework for clean energy, energy efficiency and greenhouse gas emissions reductions</li> <li>Sets targets for clean energy of 25% in 2018, 30% in 2021 and 35% by 2024, which is supported by policy instruments, such as power auctions for wind and solar energy (IEA, 2016)</li> </ul>
<b>Forestry</b>	National Forestry Programme 2025 (2001)	<ul style="list-style-type: none"> <li>Protected areas according to the payments for Ecosystem Services (PES) scheme for promoting conservation, restoration and sustainable forest use <sup>1)</sup></li> </ul>
	National Forestry Programme - PRONAFOR (2014)	<ul style="list-style-type: none"> <li>Reduction of the annual deforestation rate from 0.24% of total forest area in 2010, to 0.2% by 2018</li> </ul>
	REDD+ projects	<ul style="list-style-type: none"> <li>Continued reduction of LULUCF emissions <sup>1)</sup></li> </ul>

<sup>1)</sup> Policy not quantified in the IIASA LULUCF model projections

Table 45: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Mexico. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 749 MtCO <sub>2</sub> e	N/A	670 MtCO <sub>2</sub> e; -10% in 2020 625 to 760 MtCO <sub>2</sub> e; -17% to 1% in 2030	N/A	755 to 815 MtCO <sub>2</sub> e; 1% to 9% in 2020 860 to 920 MtCO <sub>2</sub> e; 15% to 23% in 2030
Per capita: 6.6 tCO <sub>2</sub> e/capita	N/A	5.3 tCO <sub>2</sub> e/capita in 2020 4.6 to 5.6 tCO <sub>2</sub> e/capita in 2030	N/A	6.0 to 6.5 tCO <sub>2</sub> e/capita in 2020 6.3 to 6.7 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in Mexico



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 16: Impact of climate policies in greenhouse gas emissions in Mexico (upper figure: including LULUCF, lower figure: excluding LULUCF (left) and only LULUCF (right) separately). Source: PBL FAIR/TIMER model (upper bound) and NewClimate Institute calculations (lower bound) based on its analysis for Climate Action Tracker (CAT, 2016) using the the most recent SENER projections. Both PBL and NewClimate calculations are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions harmonized to 2010 levels from the 5<sup>th</sup> National Communication to the UNFCCC (Government of Mexico, 2012). Historical emissions are based on inventory data of the 5<sup>th</sup> National Communication to the UNFCCC (Government of Mexico, 2012).

### 3.16 Morocco

Morocco pledged an unconditional NDC target to reduce GHG emissions by 17% below BAU by 2030, and a conditional target to reduce emissions by 42% below BAU by 2030. The current policies projection considers the National Energy Strategy, including the Morocco Solar Plan, as well as the Morocco Integrated Wind Energy Program. Morocco's GHG emissions are projected to be 151 to 157 MtCO<sub>2e</sub> by 2030 (including LULUCF) under current policy projections. Morocco would, therefore, almost achieve its unconditional NDC target of 141 MtCO<sub>2e</sub> by 2030 including LULUCF.

Table 46: Description of Morocco's NDC. Note: Morocco has not set its 2020 pledge.

Indicator	NDC (submitted 19 <sup>th</sup> September, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>17% reduction in GHG emissions by 2030 compared to BAU scenario (4% coming from AFOLU actions)</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>42% reduction in GHG emissions compared to BAU scenario conditional on international financial support of USD 35 billion (8% coming from AFOLU actions)</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy-wide (Electricity production, Housing, Agriculture, Industry, Transportation, Waste, Forestry)</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>1996 IPCC Guidelines; GWP values of Fourth IPCC Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF is included in target;</li> <li>Morocco's Green Plan (PMV) and Preservation and Sustainable Forest Management Strategy are part of NDC as key sectoral strategies</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>NDC outlines key sectoral policy strategies and respective sectoral emission targets</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>Yes. Expected amount not quantified.</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes. BAU scenario until 2030 (Kingdom of Morocco, 2015)</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2012</li> </ul>



Table 47: Overview of key climate change mitigation policies in Morocco. Source: (Kingdom of Morocco, 2016b, Kingdom of Morocco, 2016a, Kingdom of Morocco - Ministry Delegate of the Minister of Energy Mines Water and Environment, 2014, Kingdom of Morocco - Ministry Delegate of the Minister of Energy Mines Water and Environment, 2013, Kingdom of Morocco Ministry of Equipment and Transport, 2010, Schinke and Klawitter, 2016)

Sector	Policies (marked with “(+)” when mentioned in the NDC document)	Description
<b>Economy-wide</b>	Moroccan Climate Change Policy (MCCP) (2014)	<ul style="list-style-type: none"> <li>Overarching coordination and alignment of various sectoral and cross-sectoral national policies tackling climate change</li> </ul>
<b>Energy supply</b>	National Energy Strategy (2009, updated 2012) (+) <ul style="list-style-type: none"> <li>Morocco Integrated Wind Energy Program (2010)</li> <li>Morocco Solar Plan (2009) <sup>1)</sup></li> <li>Morocco Hydro-Electric Plan (continuation of plan started in 1970s) <sup>1)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Aim for an installed renewable electricity capacity of 42% by 2020 (14% wind, 14% solar and 14% hydro) and 52% by 2030</li> <li>Energy savings of 12-15% in 2020 and 20% in 2030</li> <li>Supply 10-12% of the country's primary energy demand with renewable energy sources by 2020 and 15-20% by 2030</li> <li>Extension of national wind farms to total 2,000 MW by 2020</li> <li>Extension of solar power capacity to 2,000 MW (both concentrated solar power plants &amp; photovoltaic systems)</li> <li>Extension of hydro power capacity with 775 MW by 2020</li> </ul>
<b>Transport</b>	Extension of Rabat and Casablanca tramways (2016)	<ul style="list-style-type: none"> <li>Extension of Rabat tramway by 20 km by 2019</li> <li>Extension of Casablanca tramway by 45 km by 2025</li> </ul>
<b>Industry</b>	Energy efficiency program in the industry sector (2011)	<ul style="list-style-type: none"> <li>Energy efficiency program for industry, buildings and transport sector (excluding large energy consuming industries)</li> </ul>
<b>Buildings</b>	Energy efficiency program in the building sector (2009)	<ul style="list-style-type: none"> <li>Minimum requirements for new residential and commercial buildings</li> </ul>
	Energy efficiency program for public lighting (2009)	<ul style="list-style-type: none"> <li>Installation of new public lighting technologies</li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Forestry</b>	Preservation and Sustainable Forest Management Strategy (+)	<ul style="list-style-type: none"> <li>Afforestation and regeneration of approximately 50,000 hectares of forest per year</li> </ul>
	Morocco Green Plan (PMV) (2008) (+)	<ul style="list-style-type: none"> <li>Promotion of natural resources and sustainable management <sup>2)</sup></li> <li>Modernization of the agricultural sector <sup>2)</sup></li> </ul>

<sup>1)</sup> See Supporting Information for the implementation status

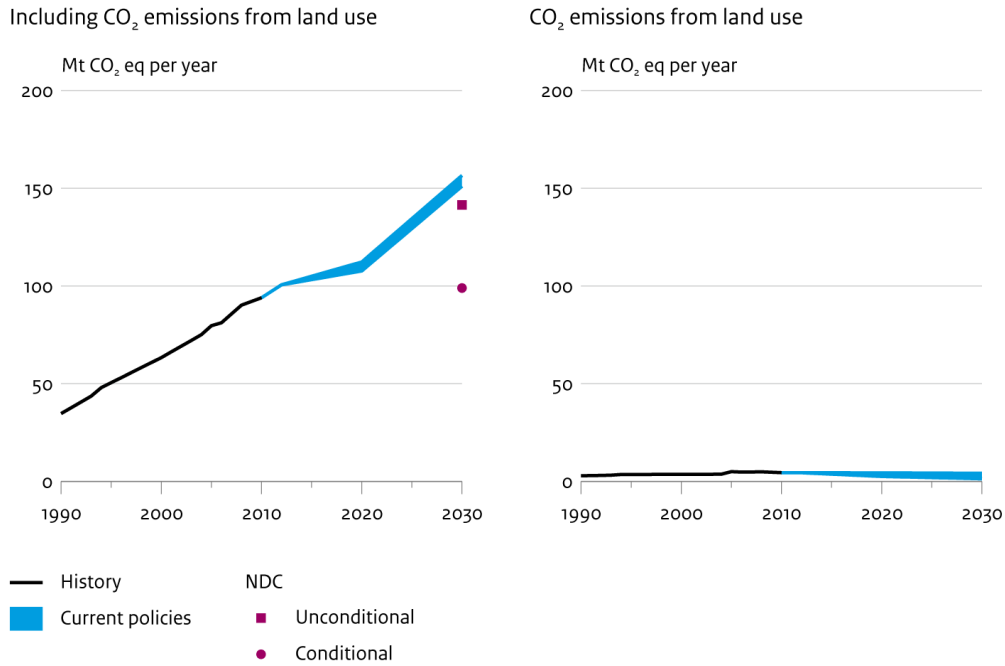
<sup>2)</sup> Policy not quantified in the IIASA model projections

Table 48: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Morocco. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	NewClimate estimates	Official data	NewClimate estimates
Absolute: 94 MtCO <sub>2e</sub>	99 to 141 MtCO <sub>2e</sub> in 2030	100 to 140 MtCO <sub>2e</sub> ; 5% to 50% in 2030	N/A	110 MtCO <sub>2e</sub> ; 15% to 19% in 2020 150 to 155 MtCO <sub>2e</sub> ; 61% to 67% in 2030
Per capita: 2.9 tCO <sub>2e</sub> /capita	N/A	2.6 to 3.7 tCO <sub>2e</sub> /capita in 2030	N/A	3.1 to 3.2 tCO <sub>2e</sub> /capita in 2020 4.0 to 4.1 tCO <sub>2e</sub> /capita in 2030



### Impact of climate policies on greenhouse gas emissions in Morocco



Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 17: Impact of climate policies in greenhouse gas emissions in Morocco (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O; including LULUCF). Source: NewClimate Institute calculations (including LULUCF) are based on its analysis for Climate Action Tracker (CAT, 2016), using the BAU emissions trajectory provided by the 3<sup>rd</sup> National Communication as basis and additionally consider several sectoral policies currently under implementation (Kingdom of Morocco, 2016b, Kingdom of Morocco, 2016a). NewClimate calculations are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions (including LULUCF emissions) are taken from Morocco's first Biennial Update Report (Kingdom of Morocco, 2016a).

### 3.17 Philippines

Philippines' INDC includes a conditional GHG reduction target of 70% below BAU levels by 2030. Calculations for 2030 emissions levels under the INDC show 38% below 2010 levels (excl. LULUCF). The INDC emissions level excluding LULUCF is estimated to be about 95 MtCO<sub>2e</sub> in 2030. Under current policies, the Philippines' emissions level is projected to reach 215 MtCO<sub>2e</sub> in 2020 and 315 MtCO<sub>2e</sub> in 2030, excluding LULUCF. Due to the uncertainty related to LULUCF emissions, and the lack of data on the BAU scenario mentioned in the country's INDC, it is not possible to judge whether the Philippines is on track to meet its INDC target.

Table 49: Description of The Philippines' 2020 pledge and INDC

Indicator	INDC (submitted 1 <sup>st</sup> October, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>70% GHG reduction by 2030 relative to its BAU scenario 2000-2030. Conditioned to financial resources, technology development &amp; transfer, and capacity building</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Energy, transport, waste, forestry and industry</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth IPCC Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Land sector is included in the target;</li> <li>Agriculture and Land Use software</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2000 (Philippines's Second National Communication)</li> </ul>

*Note: The Philippines has not set its 2020 pledge.*

Table 50: Overview of key climate change mitigation policies in The Philippines. Source: (Asia-Pacific Economic Cooperation, 2016, Department of Energy, 2015c, Department of Energy, 2015b, The London School of Economics and Political Science, 2015, Philippine Institute for Development Studies, 2014)

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Energy Efficiency and Conservation Roadmap (EE&C) (2014) Energy Efficiency and Conservation Action Plan (2016)	<ul style="list-style-type: none"> <li>• 20.2% energy saving by 2030 compared to BAU, from 2005 levels</li> <li>• 3% per year economy-wide improvement in energy intensity compared to BAU</li> <li>• 21 MtCO<sub>2</sub> reduction by 2030, compared to BAU</li> <li>• Savings of c.a. 10,665 ktoe (1/3 of current demand) by 2030</li> </ul>
<b>Energy supply</b>	Sitio Electrification Program (SEP) of the National Electrification Administration (2012)	<ul style="list-style-type: none"> <li>• Aims to energize sitios<sup>1)</sup> through on-grid electrification</li> <li>• 2015 target: 100% sitios energized; covering at least 648,820 households<sup>2)</sup></li> </ul>
	Household Electrification Program (HEP) of the DOE (2012)	<ul style="list-style-type: none"> <li>• Targets to provide electricity at least 2,000 households every year using renewable energy technologies; 90% households electrified by 2017</li> </ul>
	National Renewable Energy Program (NREP) (2012)	<ul style="list-style-type: none"> <li>• Increase renewable energy capacity of the country to an estimated 15,304 MW by 2030 (almost triple its 2010 level)</li> <li>• The aimed installed capacity by 2030 is broken down as follows: 3,461 MW from geothermal; 8,724 from small hydropower (&lt;50 MW); 316 from biomass; 2,378 from wind; 285 from solar; 71 from ocean.</li> </ul>
<b>Transport</b>	EE&C Roadmap (2014) and Action Plan (2016)	<ul style="list-style-type: none"> <li>• 14.3% energy savings in transport sector compared to BAU by 2020</li> <li>• 25% energy savings compared to BAU by 2030</li> </ul>
<b>Industry</b>	EE&C Roadmap (2014) and Action Plan (2016) <ul style="list-style-type: none"> <li>• Industry Energy Management and Opportunity Identification</li> </ul>	<ul style="list-style-type: none"> <li>• 8.7% energy savings in industrial sector by 2020 compared to BAU <ul style="list-style-type: none"> <li>◦ 15% energy saving by 2030</li> </ul> </li> </ul>
<b>Buildings</b>	EE&C Roadmap (2014) and Action Plan (2016) <ul style="list-style-type: none"> <li>• Appliance Standards and Labelling Program</li> <li>• Government Buildings Efficiency Program</li> </ul>	<ul style="list-style-type: none"> <li>• 10% energy savings in commercial buildings by 2020 and 25% by 2030, compared to BAU by 2030</li> <li>• 6.6% energy savings in residential buildings by 2020 and 20% by 2030, compared to BAU by 2030</li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Forestry</b>	National Greening Program (2011)	<ul style="list-style-type: none"> <li>• Plant 1.5 billion trees by 2016 covering 1.5 million hectares</li> </ul>
	The Philippine National REDD+ Strategy (2010) (+)	<ul style="list-style-type: none"> <li>• Continued reduction deforestation and forest degradation<sup>3)</sup></li> </ul>

<sup>1)</sup> A “sitio” is defined as territorial enclave within a barangay (smallest administrative division in the Philippine, equivalent to town or district) which may be distant from the barangay centre.

<sup>2)</sup> A sitio is considered energized if it is successfully connected to the grid and at least 20 households are given electricity connections.

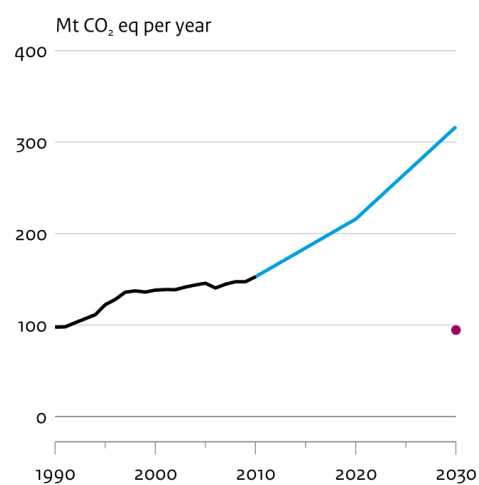
<sup>3)</sup> Policy not quantified in the IIASA LULUCF model projections

Table 51: Impact of climate policies on greenhouse gas emissions (excluding LULUCF) in The Philippines. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

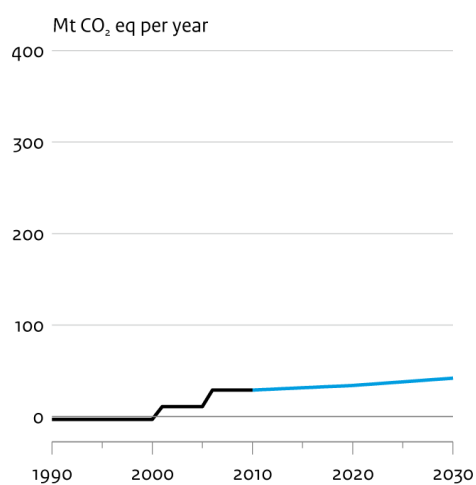
2010 GHG emissions, excl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	NewClimate estimates	Official data	NewClimate estimates
Absolute: 155 MtCO <sub>2</sub> e	N/A	95 MtCO <sub>2</sub> e; -38% in 2030	N/A	215 MtCO <sub>2</sub> e; 42% in 2020 315 MtCO <sub>2</sub> e; 105% in 2030
Per capita: 1.6 tCO <sub>2</sub> e/capita	N/A	0.7 tCO <sub>2</sub> e/capita in 2030	N/A	2.0 tCO <sub>2</sub> e/capita in 2020 2.5 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in the Philippines

Excluding CO<sub>2</sub> emissions from land use



CO<sub>2</sub> emissions from land use



— History  
 — INDC  
 ■ Current policies  
 ● Conditional

Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 18: Impact of climate policies in greenhouse gas emissions in the Philippines. Source: NewClimate Institute calculations (excluding LULUCF) based on its analysis for Climate Action Tracker (CAT, 2016) ; Non-LULUCF emissions projections are based on the BAU scenario from the 2016 APERC Energy Demand and Supply Outlook (APERC, 2016), which reflects current policies and trends within the APEC energy sector; and by IIASA GLOBIOM/G4M projections of net LULUCF emissions. The historical dataset excluding LULUCF is based on the IEA CO<sub>2</sub> Emissions from Fuel Combustion (IEA, 2015b); other CO<sub>2</sub> and non-CO<sub>2</sub> emissions are taken from EDGAR (JRC/PBL, 2014). Historical LULUCF emissions data is taken from FAO (2014).

### 3.18 Republic of Korea

The Republic of Korea's INDC aims to reduce GHG emissions by 37% below BAU levels by 2030. The government also pledged internationally to reduce its GHG emissions by 30% below BAU levels by 2020, but this target has been abandoned domestically through the amended Green Growth Act.

Current policies considered here are renewable energy targets for 2020 and 2030 and the national emissions trading system (ETS). According to our assessment, the ETS and the renewable energy targets could result in stabilisation of South Korea's emission levels (excluding LULUCF) at 730 to 805 MtCO<sub>2e</sub> by 2020 and 720 to 835 MtCO<sub>2e</sub> by 2030. This is a deviation from the historical trend of strongly increasing emissions, and is an important step towards achieving the pledge. However, it is not expected to be sufficient to achieve the pledged emissions levels by 2020 and 2030.

Table 52: Description of the Republic of Korea's 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 30 <sup>th</sup> June, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>30% GHG reduction by 2030 from BAU scenario <sup>1)</sup></li> </ul>	<ul style="list-style-type: none"> <li>37% GHG reduction by 2030 from baseline scenario</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy-wide</li> </ul>	<ul style="list-style-type: none"> <li>Economy-wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>Not-specified</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Second IPCC Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>Not-specified</li> </ul>	<ul style="list-style-type: none"> <li>All Kyoto GHGs, excluding NF<sub>3</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Land sector is included in the target</li> <li>Accounting approaches and methodologies are unclear</li> </ul>	<ul style="list-style-type: none"> <li>A decision on whether to include land use will be made at a later stage</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Carbon credits from international market mechanisms will be partly used to achieve the 2030 target</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>No</li> </ul>	<ul style="list-style-type: none"> <li>Yes: baseline scenario for INDC target provided and quantified</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2012 (Republic of Korea, 2014)</li> </ul>	

<sup>1)</sup> In the amended Green Growth Act (Presidential Decree no.27180, 24 May, 2016), the 2020 pledge was abandoned domestically and was replaced by the 2030 INDC target, but to date there is no report that the Republic of Korea abandoned its 2020 pledge made under the UNFCCC.

Table 53: Overview of key climate change mitigation policies in the Republic of Korea. Source: (Republic of Korea, 2014, Republic of Korea, 2012, Ministry of Trade, 2015, Hwang, 2014)

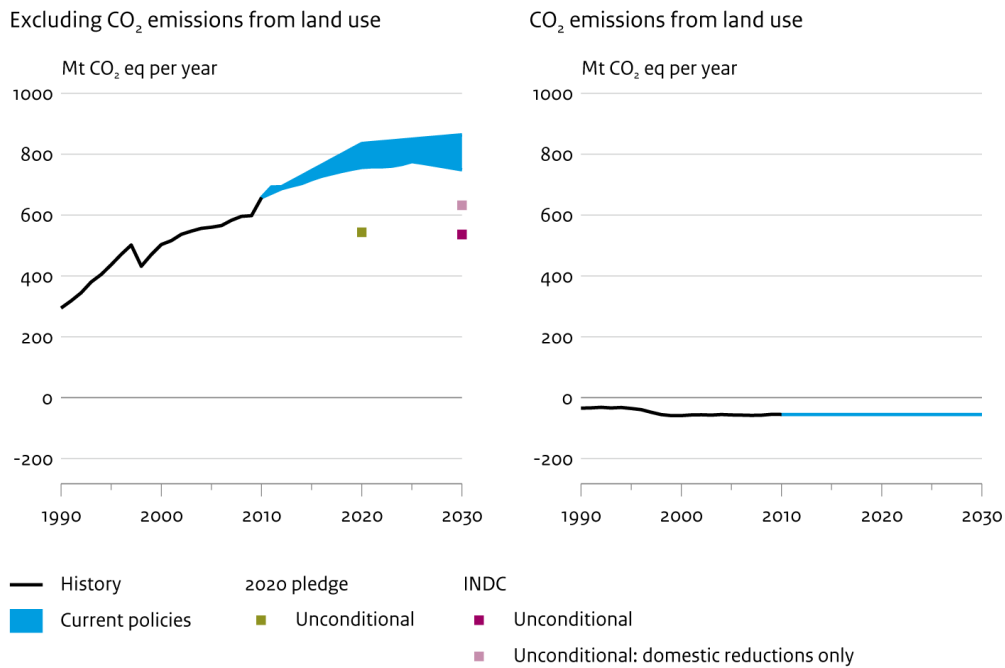
Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Emissions Trading System (2015)	<ul style="list-style-type: none"> <li>Emission cap is in line with the 30% reduction below baseline</li> </ul>
<b>Energy supply</b>	Renewable energy targets (4 <sup>th</sup> Basic Plan on New and Renewable Energies, 7 <sup>th</sup> Basic Plan for Long-term Electricity Supply and Demand) (2014)	<ul style="list-style-type: none"> <li>11% share of NRE in TPES by 2035 (5% by 2020, 9.7% by 2030);</li> <li>13.4% of total electricity supplied by NRE by 2035 (4<sup>th</sup> Basic Plan on NRE), 11.7% by 2029 (7<sup>th</sup> Basic Plan for Long-term Electricity Supply and Demand);</li> <li></li> </ul>
	Renewable portfolio standards (2012)	<ul style="list-style-type: none"> <li>10% supply of NRE in total electricity generation by 2024</li> </ul>
<b>Buildings</b>	Renewable energy targets (4 <sup>th</sup> Basic Plan on New and Renewable Energies, 7 <sup>th</sup> Basic Plan for Long-term Electricity Supply and Demand) (2014)	<ul style="list-style-type: none"> <li>Budgetary support for one million green homes (which covers various renewable energy resources such as solar PV, solar thermal, geothermal, small wind and bioenergy) by 2020 <sup>1)</sup></li> </ul>
<b>Transport</b>	Fuel efficiency standard (2005) (+)	<ul style="list-style-type: none"> <li>140 g/km (16.7 km/l) by 2015, 97 g/km (24.1 km/l) by 2020</li> </ul>
<b>Forestry</b>	Act on the Sustainable use of Timber (2012)	<ul style="list-style-type: none"> <li>The forest harvest level will increase by 2.3 million m<sup>3</sup> by 2020, compared to the 2014 level</li> </ul>
	Act on the Management and Improvement of Carbon Sink (2013)	<ul style="list-style-type: none"> <li>Increase the forest carbon stocks by 200 million t-CO<sub>2</sub> by 2019, compared to the 2014 level</li> </ul>

<sup>1)</sup> Not quantified separately

Table 54: Impact of climate policies on greenhouse gas emissions (excluding LULUCF) in South Korea. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, excl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 657 MtCO <sub>2e</sub>	N/A	545 MtCO <sub>2e</sub> in 2020; -14% in 2020 535 to 630 MtCO <sub>2e</sub> ; -15% to 0% in 2030	N/A	755 to 835 MtCO <sub>2e</sub> ; 15% to 27% in 2020 750 to 865 MtCO <sub>2e</sub> ; 14% to 31% in 2030
Per capita: 13.6 tCO <sub>2e</sub> /capita	N/A	9.9 to 16.0 tCO <sub>2e</sub> /capita in 2030	N/A	15.3 to 16.9 tCO <sub>2e</sub> /capita in 2020 15.1 to 17.4 tCO <sub>2e</sub> /capita in 2030

## Impact of climate policies on greenhouse gas emissions in Republic of Korea



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 19: Impact of climate policies in greenhouse gas emissions in South Korea. Source: PBL FAIR/TIMER model (lower bound from 2013 through 2025); NewClimate Institute calculations adapted from Climate Action Tracker (CAT, 2015) using the U.S. Department of Energy's International Energy Outlook 2013 (upper bound, and lower bound through 2012 and from 2026 through 2030). Both PBL and NewClimate calculations are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. The INDC emission level is shown for cases with (blue plot) and without the use of international market mechanisms. Historical greenhouse gas emissions (excluding LULUCF) are based on national inventories submitted to UNFCCC, the Third National Communication (Republic of Korea, 2012). The emission projection does not include emissions from LULUCF, as a decision on the inclusion of these emissions is yet to be made for South Korea's INDC.

### 3.19 Russian Federation

Russia's INDC aims to limit GHG emissions to 70–75% of 1990 levels by 2030. The current policies analysed here include the Russian State Programme's targets for energy efficiency and renewable electricity generation. Russia's gas flaring policy could lead to additional emission reductions, but it is unclear whether this policy will be fully implemented. The current policies are projected to lead to an emission level of 2,365 to 2,440 MtCO<sub>2</sub>e/yr by 2020 (6% to 10% above 2010 levels) and 2,560 to 2,640 MtCO<sub>2</sub>e/yr by 2030 (15% to 19% above 2010 levels), excluding LULUCF. Russia is, therefore, likely to reach its 2020 pledge, and reach the lower half of its 2030 INDC range (2,355 to 3,165 MtCO<sub>2</sub>e/yr).

Table 55: Description of The Russian Federation's 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 1 <sup>st</sup> April, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>15-25% GHG reduction by 2030 from 1990 level</li> </ul>	<ul style="list-style-type: none"> <li>Limiting anthropogenic greenhouse gases in Russia to 70-75% of 1990 levels by 2030</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>All Kyoto GHGs</li> </ul>	<ul style="list-style-type: none"> <li>All Kyoto GHGs</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Acknowledges the need for an appropriate accounting for the potential of its LULUCF sector in meeting its target</li> </ul>	<ul style="list-style-type: none"> <li>LULUCF sector is included</li> <li>Actual accounting approaches and methodologies for forestry are unclear <sup>1)</sup></li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>No use of international market mechanisms</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Not assessed</li> </ul>	<ul style="list-style-type: none"> <li>Not assessed</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2014 (GHG inventory report submitted to the UNFCCC)</li> </ul>	

<sup>1)</sup> Russian's INDC states that target is "subject to the maximum possible account of absorbing capacity of forests."

Table 56: Overview of key climate change mitigation policies in the Russian Federation. Source: (Nachmany et al., 2015)

Sector	Policies (marked with "(+)" when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Energy intensity targets (2008)	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Energy supply</b>	Renewable energy targets (2013)	<ul style="list-style-type: none"> <li>2.5% renewable energy in the power sector by 2020 (excluding hydro larger than 25MW) (supported by regulated capacity prices for renewable energy, Government of the Russian Federation, 2013)</li> </ul>
<b>Industry</b>	Decrease flaring in oil (2009)	<ul style="list-style-type: none"> <li>5% limit on associated gas flaring for 2012 and subsequent years <sup>2)</sup></li> </ul>
<b>Forestry</b>	National Strategy of Forestry Development by 2020 (2008)	<ul style="list-style-type: none"> <li>Increase in forest intensification and harvest of wood by 5.8% per year compared to 2007</li> </ul>

<sup>1)</sup> Not quantified

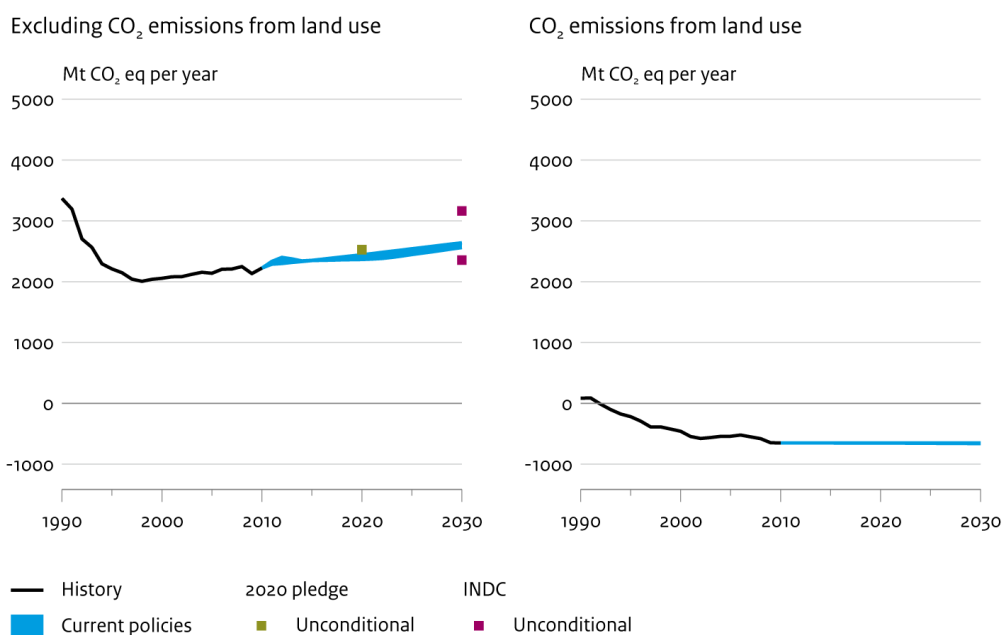
<sup>2)</sup> Not quantified in PBL TIMER model



Table 57: Impact of climate policies on greenhouse gas emissions (excluding LULUCF) in the Russian Federation. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, excl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 2,224 MtCO <sub>2</sub> e	N/A	2,525 MtCO <sub>2</sub> e; 13% to 14% in 2020 2,355 to 3,165 MtCO <sub>2</sub> e; 6% to 42% in 2030	2,590 MtCO <sub>2</sub> e in 2030	2,365 to 2,440 MtCO <sub>2</sub> e; 6% to 10% in 2020 2,560 to 2,640 MtCO <sub>2</sub> e; 15% to 19% in 2030
Per capita: 15.5 tCO <sub>2</sub> e/capita	N/A	17.8 tCO <sub>2</sub> e/capita in 2020 16.9 to 22.7 tCO <sub>2</sub> e/capita in 2030	N/A	16.7 to 17.2 tCO <sub>2</sub> e/capita in 2020 18.3 to 18.9 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in Russian Federation



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 20: Impact of climate policies in greenhouse gas emissions in the Russian Federation. Source: PBL FAIR/TIMER model (upper bound through 2014, lower bound from 2016 onwards); NewClimate Institute calculations based on Climate Action Tracker (CAT, 2015) using the IEA WEO 2015 Current Policies Scenario (lower bound through 2015, upper bound from 2015 onwards); IIASA GLOBIOM/G4M projections of net LULUCF emissions. Historical greenhouse gas emissions (excluding LULUCF) from 2014 GHG inventory data submitted to the UNFCCC, and historical net LULUCF emissions from the sixth national communication (Government Russian Federation, 2010).

### 3.20 Saudi Arabia

In its INDC submitted on 22<sup>nd</sup> of October 2015, Saudi Arabia pledged to reduce up to 130 MtCO<sub>2e</sub> by 2030 through actions that contribute to economic diversification and adaptation. The Saudi government has not yet defined a baseline scenario, however the INDC states that a dynamic baseline will be developed on basis of a combination of two scenarios. The King Abdullah City for Atomic and Renewable Energy (K.A. CARE) strategy was established in 2010 to diversify Saudi Arabia's sources of national income, and reduce dependence on revenues from a single source. In 2013, the government announced its plan to build 54 GW of renewable power and 17 GW of nuclear power by 2032 to cover 40-45% of future electricity production. In 2015, the government announced an eight-year delay of its implementation. In 2016, the government further downscaled the target to only 9.5 GW of renewable electricity capacity until 2023 without specifying any additional capacity extension targets for the time after 2023. Due to the lack of data available and uncertainty around the effective implementation of the existing policies, it is not possible judge whether Saudi Arabia is on track to meet its INDC target.

Table 58: Description of Saudi Arabia's INDC <sup>1)</sup>

Indicator	INDC (submitted 22 <sup>nd</sup> October, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>Emissions reduction of up to 130 MtCO<sub>2e</sub> annually in 2030</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Mostly energy focused</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF sector is not covered by INDC's emission reduction target</li> <li>Accounting approaches and methodologies are not specified</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>No</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2000 (Saudi Arabia's Second National Communication)</li> </ul>
<b>Other information</b>	<ul style="list-style-type: none"> <li>Achievement of this goal is not conditional on international financial support, but is contingent on the continuation of economic growth, and "a robust contribution from oil export revenues to the national economy." Additionally, it is stated that technology cooperation and capacity building for INDC implementation will play a key role in the process.</li> <li>Baseline not yet defined: "dynamic baseline will be developed on a basis of a combination of two scenarios, which are scenarios based on whether more oil is locally consumed, or exported".</li> </ul>

<sup>1)</sup> Saudi Arabia has no mitigation pledge for 2020.

Table 59: Overview of key climate change mitigation policies in Saudi Arabia. Source: (KSA, 2015, Al-Ghabban, 2013, Kingdom of Saudi Arabia, 2016, Borgmann, 2016) .

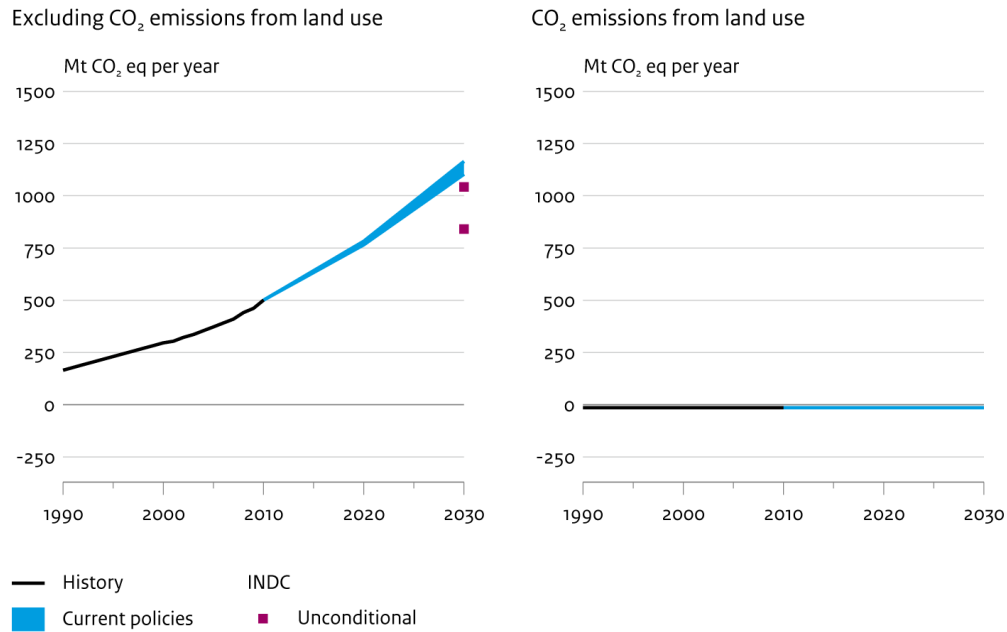
Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	King Abdullah City for Atomic and Renewable Energy (K.A.CARE) (+) (2010)	The K.A.CARE strategy was established in 2010 with the fundamental aim of building a sustainable future for Saudi Arabia by developing a substantial alternative energy capacity. Initially aiming to deploy 54 GW of renewable electricity by 2032 (41 GW of solar, 9 GW of wind, 3 GW of waste-to-energy and 1 GW of geothermal), the government first announced an eight-year delay of these plans in 2015 and further revised the renewables energy targets in 2016. In Saudi Arabia’s “Vision 2030”, the target to expand renewable electricity capacity is downward revised to 9.5 GW for an initial phase until 2023. No additional targets have been announced for the time after 2023. In addition, the “Vision 2030” does not mention a nuclear power capacity target anymore.

Table 60: Impact of climate policies on greenhouse gas emissions (excluding LULUCF) in Saudi Arabia. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, excl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	NewClimate estimates <sup>1)</sup>	Official data	NewClimate estimates <sup>1)</sup>
Absolute: 489 MtCO <sub>2</sub> e	N/A	840 to 1,040 MtCO <sub>2</sub> e; 72% to 113% in 2030	N/A	755 to 770 MtCO <sub>2</sub> e in 2020; 54% to 58% in 2020 1,090 to 1,155 MtCO <sub>2</sub> e; 123% to 136% in 2030
Per capita: 18.2 tCO <sub>2</sub> e/capita	N/A	24.5 tCO <sub>2</sub> e/capita in 2020 30.1 tCO <sub>2</sub> e/capita in 2030	N/A	23.4 tCO <sub>2</sub> e/capita in 2020 30.2 tCO <sub>2</sub> e/capita in 2030

<sup>1)</sup> Only the results from NewClimate Institute are presented.

### Impact of climate policies on greenhouse gas emissions in Saudi Arabia



Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 21: Impact of climate policies in greenhouse gas emissions (including LULUCF) in Saudi Arabia. Source: NewClimate Institute calculations (excl. LULUCF) are based on Climate Action Tracker (CAT, 2016), which uses the baseline scenario of the King Abdullah City for Atomic and Renewable Energy and (K.A.CARE) and takes into account the policy of economic diversification and the K.A. CARE targets on renewable power (Al-Ghabban, 2013, Borgmann, 2016, Kingdom of Saudi Arabia, 2016), supplemented with IIASA GLOBIOM/G4M projections of net LULUCF emissions.

### 3.21 South Africa

South Africa's INDC submission consists of a peak, plateau and decline (PPD) greenhouse gas emissions trajectory range, with a range of 398–614 MtCO<sub>2</sub>e by 2025 and 2030, a peak between 2020 and 2025, a plateau for the following decade, and absolute declines thereafter. The current policies projection includes the Integrated Resource Plan for electricity, the most important policy affecting South Africa's GHG emissions. Under current policies, South Africa's GHG emissions are projected to be 710–855 MtCO<sub>2</sub>e by 2030 (including LULUCF), thus higher than the upper range of the PPD trajectory.

Table 61: Description of South Africa's 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 25 <sup>th</sup> September, 2015)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>398–614 MtCO<sub>2</sub>e by 2025 and 2030 (Peak, plateau and decline trajectory)</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>34% reduction below BAU by 2020</li> </ul>	<ul style="list-style-type: none"> <li>"South Africa's INDC is premised on the adoption of a comprehensive, ambitious, fair, effective and binding multilateral rules-based agreement under the UNFCCC at the 21st Conference of the Parties (COP21) in Paris"</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Economy-wide, all sectors</li> <li>IPCC: energy, IPPU, waste and AFOLU</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>IPCC 2006 guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Six GHGs, material focus on CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O</li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Agriculture, forestry and other land use (AFOLU) are included as one of the major IPCC categories</li> <li>Accounting approaches and methodologies to be used are unclear</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes: "With Existing Measures (WEM)" scenario developed for South Africa's Greenhouse Gas Mitigation Potential Analysis Report (Department of Environmental Affairs, 2014b)</li> </ul>	<ul style="list-style-type: none"> <li>Yes: "With Existing Measures (WEM)" scenario developed for South Africa's Greenhouse Gas Mitigation Potential Analysis Report (Department of Environmental Affairs, 2014b)</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2010 (Department of Environmental Affairs, 2014c)</li> </ul>	

Table 62: Overview of key climate change mitigation policies in South Africa. Source: (Department of Energy South Africa, 2011, Department of Energy South Africa, 2013, Department of Minerals and Energy, 2007, Republic of South Africa, 2015, Government of South Africa, 2012, National Planning Commission, 2012, Department of Environmental Affairs, 2014b)

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	National Development Plan (2012) (+)	<ul style="list-style-type: none"> <li>Among other targets: eliminate poverty, reduce inequality, increase access to water and electricity <sup>1)</sup></li> </ul>
	National Climate Change Response Policy (2011) (+)	<ul style="list-style-type: none"> <li>Objectives: effectively manage climate change impacts and make a fair contribution to the global effort to stabilise GHG concentrations <sup>1)</sup></li> </ul>
<b>Energy supply</b>	Integrated Resource Plan for electricity (supported by REIPP, Renewable Energy Independent Power Producer Programme) (2011) (+)	<ul style="list-style-type: none"> <li>Additional renewable electricity generation capacity to be built between 2010 and 2030 in the policy-adjusted plan<sup>2)</sup>: 8.4 GW solar PV, 8.4 GW wind (plus 800 MW already committed), 9.6 GW nuclear<sup>3)</sup>, 1 GW CSP; resulting total capacity<sup>4)</sup> 8.4 GW solar PV, 9.2 GW wind, 11.4 GW nuclear, 1 GW CSP</li> </ul>
<b>Transport</b>	Mandatory blending of biofuels under the Petroleum Products Act (Biofuels Industrial Strategy) (2007)	<ul style="list-style-type: none"> <li>Concentration for blending: 2%-10% for bio-ethanol and minimum 5% for biodiesel</li> </ul>
<b>Industry</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Buildings</b>	National Building Regulation (2011)	<ul style="list-style-type: none"> <li>Building codes and standards <sup>1)</sup></li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Forestry</b>	Long term mitigation scenarios	<ul style="list-style-type: none"> <li>Establishment of 760,000 hectares of commercial forest by 2030</li> </ul>
	National Forest Act (1998)	<ul style="list-style-type: none"> <li>Securing ecologically sustainable development and use of natural resources while promoting justifiable economic and social development <sup>5)</sup></li> <li>Facilitate improved timber availability and secure supply of timber to ensure sustainability of entire timber value chain <sup>5)</sup></li> </ul>
	Strategic Plan for the Development of Agriculture, Forestry and Fisheries (2013)	<ul style="list-style-type: none"> <li>Promote conservation of forest biological diversity, ecosystems and habitats, while promoting the fair and equitable distribution of their economic, social, health and environmental benefits <sup>5)</sup></li> </ul>

<sup>1)</sup> Not included in current policies scenario

<sup>2)</sup> Based on Table 1 in the IRP update report of 2013 (Department of Energy South Africa, 2013). Targets for hydropower are excluded from the current policies scenario, because they concern imports. See Supporting Information for more details.

<sup>3)</sup> The decision to install nuclear capacity might be delayed, but the target is included in the current policies scenario (see Supporting Information).

<sup>4)</sup> Based on Table 4 in the promulgated IRP (Department of Energy South Africa, 2011)

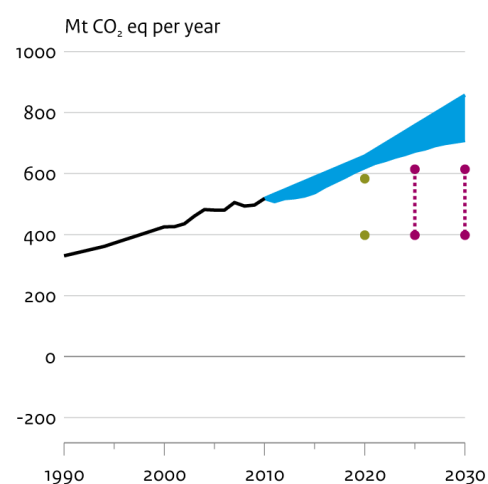
<sup>5)</sup> Policy not quantified in the IIASA LULUCF model projections.

Table 63: Impact of climate policies on greenhouse gas emissions (including LULUCF) in South Africa. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

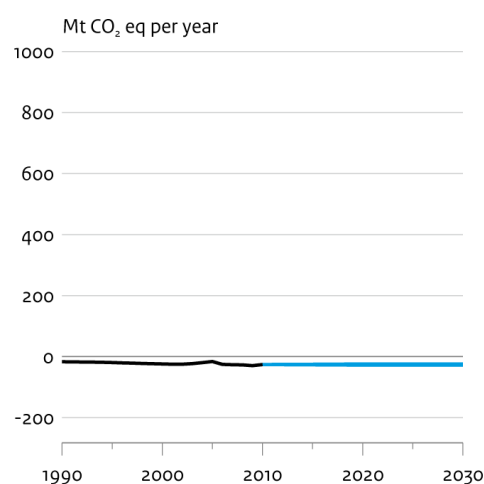
2010 GHG emissions, incl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 520 MtCO <sub>2</sub> e	398 to 614 MtCO <sub>2</sub> e in 2025-2030	400 to 585 MtCO <sub>2</sub> e; -23% to 12% in 2020 398 to 614 MtCO <sub>2</sub> e; -23% to 18% in 2030	N/A	620 to 655 MtCO <sub>2</sub> e; 20% to 27% in 2020 710 to 855 MtCO <sub>2</sub> e; 37% to 65% in 2030
Per capita: 10.3 tCO <sub>2</sub> e/capita	N/A	7.3 to 10.6 tCO <sub>2</sub> e/capita in 2020 6.8 to 10.5 tCO <sub>2</sub> e/capita in 2030	N/A	11.3 to 12.0 tCO <sub>2</sub> e/capita in 2020 12.1 to 14.6 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in South Africa

Including CO<sub>2</sub> emissions from land use



CO<sub>2</sub> emissions from land use



— History      2020 pledge      INDC  
 ■ Current policies      ● Conditional      ● Conditional

Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 22: Impact of climate policies in greenhouse gas emissions in South Africa (all gases and sectors). Source: PBL FAIR/TIMER model (lower bound) and NewClimate Institute calculations (upper bound) based on Climate Action Tracker (CAT, 2015) using the “With Existing Measures (WEM)” scenario developed for South Africa’s Greenhouse Gas Mitigation Potential Analysis Report (Department of Environmental Affairs, 2014b). Both PBL and NewClimate projections are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions are based on UNFCCC inventory data (1990-2000) and the GHG emissions Inventory for South Africa (2000-2010) from the Department of Environmental Affairs (Department of Environmental Affairs, 2014a).

## 3.22 Thailand

Thailand pledged an unconditional NDC target to reduce GHG emissions by 20% below BAU by 2030, and a conditional target to reduce emissions by 25% below BAU by 2030. The current policies projection includes the Thailand Integrated Energy Blueprint, comprising policies on alternative energy development, energy efficiency, smart grid, oil and gas. Thailand's GHG emissions are projected to be 520 MtCO<sub>2e</sub> by 2030 (including LULUCF) under current policy projections. Thailand would, therefore, fail to achieve its NDC target by 2030 including LULUCF by 75-105 MtCO<sub>2e</sub>.

Table 64: Description of Thailand's 2020 pledge and NDC

Indicator	2020 pledge	NDC (21 <sup>st</sup> September, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>GHG reduction of 20% by 2030 compared to BAU level</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>7-20% GHG emission reduction by 2020 below BAU in the energy and transport sectors, conditional on the level of international support</li> </ul>	<ul style="list-style-type: none"> <li>GHG reduction of 25% by 2030 compared to BAU level, conditional on adequate and enhanced access to technology development and transfer, financial resources and capacity building</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Energy and transport sectors</li> </ul>	<ul style="list-style-type: none"> <li>Economy-wide, excl. LULUCF</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>IPCC inventory methodology not specified; GWP values of the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Inclusion of LULUCF in NDC emissions reduction targets decided at later point</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Yes, intention to use different market mechanisms. Expected amount not quantified. (Office of Natural Resources and Environmental Policy and Planning of the Kingdom of Thailand, 2015b)</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>20% share of power generation from renewable sources in 2036</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2011 (Office of Natural Resources and Environmental Policy and Planning of the Kingdom of Thailand, 2015)</li> </ul>	



Table 65: Overview of key climate change mitigation policies in Thailand. Source: (Office of Natural Resources and Environmental Policy and Planning of the Kingdom of Thailand, 2015a, Ministry of Energy of the Kingdom of Thailand, 2015b, Ministry of Energy of the Kingdom of Thailand, 2015a, Ministry of Energy of the Kingdom of Thailand, 2016, National Economic and Social Development Board of the Kingdom of Thailand, 2012, Asia Pacific Energy Research Centre (APERC), 2016, APERC, 2016)

Sector	Policies (marked with “(+)” when mentioned in the NDC document)	Description
<b>Economy-wide</b>	Climate Change Master Plan (2015-2050) (2015) (+) <sup>1)</sup>	<ul style="list-style-type: none"> <li>7-20% GHG emission reduction by 2020 below BAU in the energy and transport sectors</li> <li>Share of at least 25% of the total energy consumption from renewable energy sources by 2021</li> <li>Reduction of energy intensity by at least 25% compared to BAU by 2030</li> </ul>
<b>Energy supply</b>	<u>Thailand Integrated Energy Blueprint (2015)</u> <sup>1)</sup>	
	<ul style="list-style-type: none"> <li>Alternative Energy Development Plan (2015-36) (2015) (+) and Power Development Plan (2015-36) (+)</li> </ul>	<ul style="list-style-type: none"> <li>Increase of renewable energy shares by 2036 to: 30% of total energy consumption, 20% of power generation (plus additional 15% from imported hydro), 35% of heat generation and 35% of transport fuels</li> </ul>
	<ul style="list-style-type: none"> <li>Energy Efficiency Plan (2015-36) (+)</li> </ul>	<ul style="list-style-type: none"> <li>Reduction of energy intensity per GDP by 30% by 2036, as compared to 2010 baseline, with total savings of 90 TWh by 2036<sup>3)</sup></li> </ul>
	<ul style="list-style-type: none"> <li>Oil Plan (2015-2036)</li> </ul>	<ul style="list-style-type: none"> <li>Support measures to save fuel in the transportation sector and enhance ethanol and biodiesel consumption</li> </ul>
	<ul style="list-style-type: none"> <li>Smart Grid Development Master Plan (2015-36) (+)</li> </ul>	<ul style="list-style-type: none"> <li>Aims for high penetration of renewable energy, mainly mini-hydro and solar PV</li> </ul>
<b>Transport</b>	Environmentally Sustainable Transport System Plan (2013-30) (2012) (+)	<ul style="list-style-type: none"> <li>Improvement of rail infrastructure to reduce annual logistics costs and the annual energy bill by about 2% and 1% of GDP respectively</li> </ul>
<b>Industry</b>	Energy Conservation and Promotion Act (1992, amended 2007)	<ul style="list-style-type: none"> <li>Stabilise share of energy demand for the three most energy-intensive sectors at 40% by 2030</li> </ul>
<b>Buildings</b>	Minimum Energy and High Energy Performance Standards (MEPS/HEPS) (2011)	<ul style="list-style-type: none"> <li>Mandatory MEPS for air conditioners, refrigerators, self-ballasted compact fluorescent lamps and double-capped fluorescent lamps</li> <li>HEPS for 28 appliances and types of equipment</li> </ul>
	Building energy code (2009)	<ul style="list-style-type: none"> <li>Reduce electricity use for large commercial buildings by more than 50% by 2030 compared with BAU projections</li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Forestry</b>	National Economic and Social Development Plan (2012)	<ul style="list-style-type: none"> <li>Several not quantifiable long-term targets to reduce GHG emissions in the agriculture and land transport sector <sup>2)</sup></li> <li>Expansion of conservation areas to at least 19% of total area, expansion of forest reserves up to 40%, and annual mangrove coastal reforestation of at least 800 hectares <sup>2)</sup></li> </ul>

<sup>1)</sup> See Supporting Information for detailed assumptions on the policies and measures quantified.

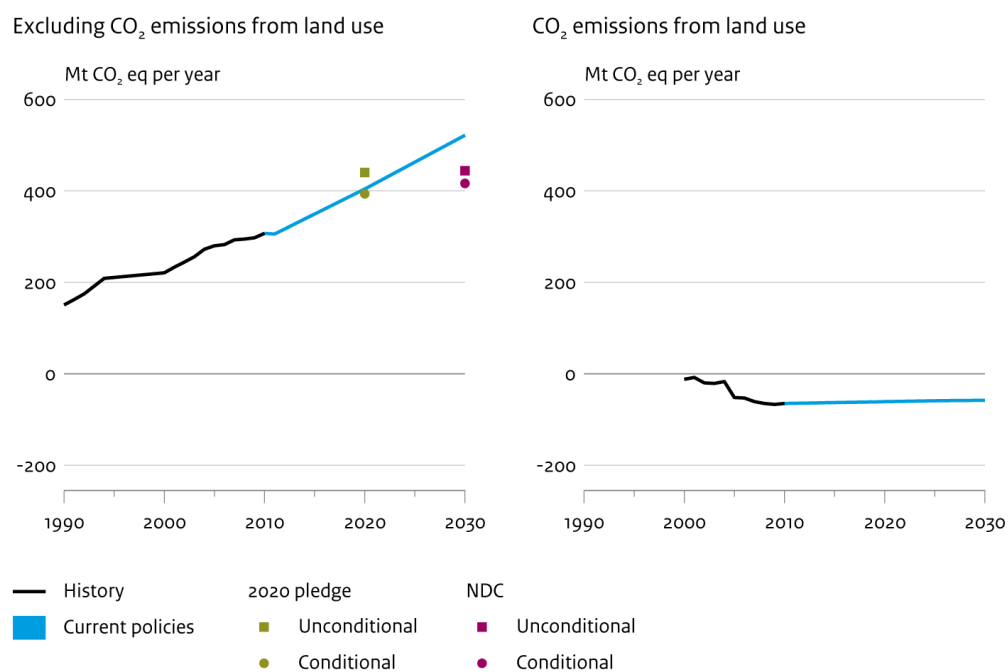
<sup>2)</sup> Policy not quantified in the IIASA LULUCF model projections

<sup>3)</sup> No information available on implementation status. For the current analysis we have assumed full implementation.

Table 66: Impact of climate policies on greenhouse gas emissions (excluding LULUCF) in Thailand. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, excl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	NewClimate estimates	Official data	NewClimate estimates
Absolute: 305 MtCO <sub>2</sub> e	N/A	395 to 440 MtCO <sub>2</sub> e; 36% to 51% in 2020 415 to 445 MtCO <sub>2</sub> e; 36% to 45% in 2030	N/A	405 MtCO <sub>2</sub> e; 32% in 2020 520 MtCO <sub>2</sub> e; 70% in 2030
Per capita: 4.6 tCO <sub>2</sub> e/capita	N/A	5.9 to 6.6 tCO <sub>2</sub> e/capita in 2020 5.7 to 6.1 tCO <sub>2</sub> e/capita in 2030	N/A	5.7 tCO <sub>2</sub> e/capita in 2020 7.2 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in Thailand



Source: NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 23: Impact of climate policies in greenhouse gas emissions in Thailand. Source: NewClimate Institute calculations based on projections of energy-related CO<sub>2</sub> emissions from (APEREC, 2016), harmonized projections of non-energy CO<sub>2</sub> emissions from several sources (IEA, 2015b, IEA, 2015a, Office of Natural Resources and Environmental Policy and Planning of the Kingdom of Thailand, 2015a, US EPA, 2012), and net LULUCF emissions from IIASA GLOBIOM/G4M projections. Historical greenhouse gas emissions, including LULUCF, are based on Thailand's First Biennial Updated Report (Office of Natural Resources and Environmental Policy and Planning of the Kingdom of Thailand, 2015a).

### 3.23 Turkey

In its INDC submission, Turkey established an economy-wide greenhouse gas reduction target of up to 21% below business as usual (BAU) in 2030. The government provides a BAU scenario in the INDC, against which the target is estimated to result in a reduction of 246 MtCO<sub>2e</sub>. The current policies projection includes renewable energy and energy intensity targets. If effective policies are implemented to achieve these targets, they could lead to emission levels of 525–1,050 MtCO<sub>2e</sub> by 2030 (51% to 204% above 2010 levels). This large range means the INDC could be either easily achieved, or not met.

Table 67: Description of Turkey's 2020 pledge and INDC

Indicator	2020 pledge	INDC (submitted 30 <sup>th</sup> September, 2015)
<b>Target: unconditional</b>	• N/A	• 21% GHG reduction by 2030 from baseline scenario
<b>Target: conditional</b>	• N/A	• N/A
<b>Sectoral coverage</b>	• N/A	• Economy-wide
<b>General Accounting method</b>	• N/A	• IPCC guidelines; 100-year GWPs from the Fourth Assessment Report
<b>GHGs covered</b>	• N/A	• All Kyoto GHGs
<b>Consideration of LULUCF</b>	• N/A	• LULUCF emissions and removals are included in the target
<b>Use of bilateral, regional and international credits</b>	• N/A	• Carbon credits from international market mechanisms will be used to achieve the 2030 target
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	• N/A	• Yes, INDC refers to a BAU scenario and gives values for the emissions pathway until 2030
<b>Last available year for GHG inventory reporting</b>	• 2014 (GHG inventory report submitted to the UNFCCC)	

Table 68: Overview of key climate change mitigation policies in Turkey. Source: (Ministry of Energy and Natural Resources, 2014, Ministry of Environment and Urbanization, 2011, Ministry of Environment and Urbanization, 2010, Ministry of Energy and Natural Resources, 2009)

Sector	Policies (marked with “(+)” when mentioned in the INDC document)	Description
<b>Economy-wide</b>	Energy intensity target (Energy Efficiency Law) (2012)	• Reduce primary energy intensity by 20% by 2023, compared to the 2008 level
<b>Energy supply</b>	Renewable energy target (Law for the Utilisation of the Renewable Energy Resources for the Electricity Energy Production) (2005)	• 13% to 30% share of renewable energy resources in electricity production by 2023 (supported by feed-in tariffs, IEA, 2011)
	Renewable capacity target (Renewable Energy Action Plan) (2014)	• 61 GW renewable capacity by 2023: 34 GW of hydro, 20 GW wind, 5 GW solar, 1 GW geothermal, 1 GW biomass <sup>2)</sup>
<b>Transport</b>	Targets for share of railroads and highways in passenger and freight transport (National Climate Change Action Plan) (2011)	<ul style="list-style-type: none"> <li>• Increasing the share of railroads in passenger transportation to 10% by 2023<sup>1)</sup></li> <li>• Decreasing the share of highways in freight transportation below 60%, and in passenger transport to 72% as of 2023<sup>1)</sup></li> </ul>
<b>Forestry</b>	National Climate Change Action Plan (2011)	<ul style="list-style-type: none"> <li>• Decreasing deforestation by 20% by 2020, compared to the 2007 level</li> <li>• Increasing carbon sequestered in forested areas by 15% until 2020, compared with 2007</li> </ul>

<sup>1)</sup> Not quantified by NewClimate Institute

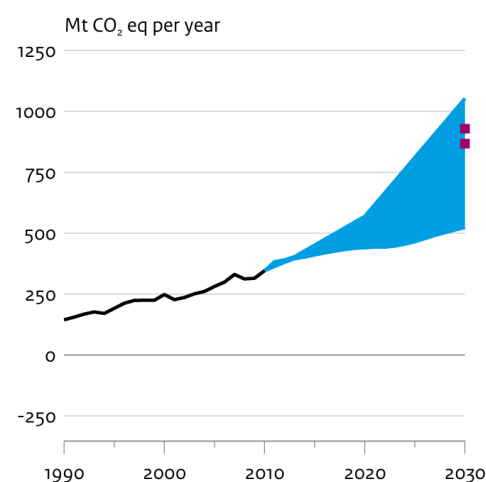
<sup>2)</sup> No information available on implementation status. For the current analysis we have assumed full implementation.

Table 69: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Turkey. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

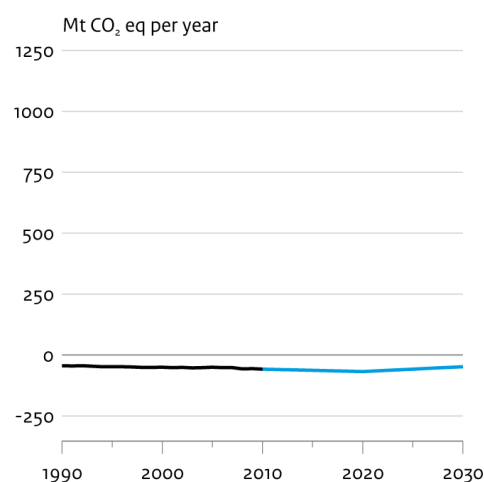
2010 GHG emissions, incl. LULUCF	2020 pledge and INDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 345 MtCO <sub>2</sub> e	N/A	No pledge submitted for 2020 865 to 930 MtCO <sub>2</sub> e in 2030; 151% to 168% in 2030	N/A	440 to 570 MtCO <sub>2</sub> e; 27% to 65% in 2020 525 to 1,050 MtCO <sub>2</sub> e; 51% to 204% in 2030
Per capita: 4.8 tCO <sub>2</sub> e/capita	N/A	9.9 to 10.6 tCO <sub>2</sub> e/capita in 2030	N/A	5.4 to 7.0 tCO <sub>2</sub> e/capita in 2020 6.0 to 12.0 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in Turkey

Including CO<sub>2</sub> emissions from land use



CO<sub>2</sub> emissions from land use



— History      INDC  
■ Current policies      ■ Unconditional

Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 24: Impact of climate policies in greenhouse gas emissions (including LULUCF) in Turkey. Source: PBL FAIR/TIMER model (upper bound through 2012, lower bound from 2014 onwards) and NewClimate Institute calculations (lower bound through 2012, upper bound from 2013 onwards) based on Climate Action Tracker (CAT, 2015) which takes into account targets outlined in the Renewable Energy Action Plan (Ministry of Energy and Natural Resources, 2014); Both PBL and NewClimate calculations are supplemented with IIASA GLOBIOM/G4M projections of net LULUCF emissions. Historical greenhouse gas emissions are based on national inventories submitted to UNFCCC.

### 3.24 United States of America

The United States of America submitted its NDC to reduce its GHG emissions by 26-28% from 2005 levels (20-24% from 2010 levels) by 2025, and ratified the Paris Agreement in September 2016. The government also sets a 2020 pledge of a 17% reduction from 2005 levels (13% from 2010 levels). The main federal level mitigation-related policies implemented to date include the Clean Air Act, vehicle fuel efficiency standards (CAFE), and the Clean Power Plan (the legal status of which is under dispute in the courts). There are also various state or regional-level policies such as renewable portfolio standards (RPS) and regional emissions trading schemes.

PBL and NewClimate calculations indicate that the United States is not on track to meet its 2020 and 2030 targets with currently implemented policies alone, excluding the impact of the Clean Power Plan. 2020 emission levels are projected to be 4% below to 5% above 2010 levels, and 2025 emissions levels to be 4% below to 6% above 2010 levels. The successful implementation of the Clean Power Plan will be key to achieving the 2020 and 2030 targets.

Table 70: Description of the United States' 2020 pledge and NDC

Indicator	2020 pledge	NDC (submitted 3 <sup>rd</sup> September, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>GHG reduction in the range of 17% by 2020 below 2005 levels</li> </ul>	<ul style="list-style-type: none"> <li>26-28% GHG reduction by 2025 from 2005 levels</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>	<ul style="list-style-type: none"> <li>Economy wide</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target;</li> <li>Net-net accounting is specified</li> </ul>	<ul style="list-style-type: none"> <li>LULUCF emissions/removals are included in the target;</li> <li>Net-net accounting is specified</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>Yes: Current Measures scenario presented in the 2nd Biennial Report reflects the impacts of only existing policies and measures</li> </ul>	<ul style="list-style-type: none"> <li>Yes: Current Measures scenario presented in the 2nd Biennial Report reflects the impacts of only existing policies and measures</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2014 (GHG inventory report submitted to the UNFCCC)</li> </ul>	

Table 71: Overview of key climate change mitigation policies in the United States. Source: (N.C. Clean Energy Technology Center, 2016, United States of America, 2015, United States of America, 2014, NewClimate Institute, 2016, Executive Office of the President, 2013, IEA, 2015b). State-level policies are presented in Supporting Information.

Sector	Policies (marked with “(+)” when mentioned in the NDC document)	Description
<b>Economy-wide</b>	Clean Air Act (1963) (+)	<ul style="list-style-type: none"> <li>Act governed by the EPA that is implemented through actions such as the Clean Power Plan (CPP)</li> </ul>
<b>Energy supply</b>	Clean Power Plan (CPP) (2014) (+) <sup>1)</sup>	<ul style="list-style-type: none"> <li>CPP aims to reduce emissions from the power sector by 32% below 2005 levels by 2030</li> <li>CO<sub>2</sub> standard for new and existing power plants</li> </ul>
	Reduction in CH <sub>4</sub> emissions from oil and gas production	<ul style="list-style-type: none"> <li>40% to 45%, from 2012 levels, by 2025</li> </ul>
<b>Transport</b>	Efficiency standards light commercial vehicles (CAFE) (+)	<ul style="list-style-type: none"> <li>34.1 mpg (14.9 km/l) by 2016, 55 mpg (23.2 km/l) by 2025</li> </ul>
	Efficiency standards heavy-duty trucks until 2018	<ul style="list-style-type: none"> <li>Differentiated standards per truck type</li> </ul>
	Renewable fuel standard (2015)	<ul style="list-style-type: none"> <li>Volume of renewable fuel required to be blended into transportation fuel from 9 billion gallons in 2008 to 36 billion gallons by 2022</li> </ul>
<b>Buildings</b>	Better buildings Challenge (commercial buildings)	<ul style="list-style-type: none"> <li>Help American commercial and industrial buildings become at least 20% more energy efficient by 2020<sup>2)</sup></li> </ul>
	Energy Star Tax credits for buildings	
	Federal Appliance standards	<ul style="list-style-type: none"> <li>Appliance standards for a large number of appliances<sup>2)</sup></li> </ul>
<b>Industry</b>	Curbing emissions of hydrofluorocarbons (HFCs) (+)	<ul style="list-style-type: none"> <li>Mix of actions to reduce HFCs use and encouraging the use of alternatives</li> </ul>
<b>Forestry</b>	Forest Ecosystem Restoration and Hazardous Fuels Reduction Programs (2000)	<ul style="list-style-type: none"> <li>Mix of actions to increase forest resilience, reduce wildfire, and increase the area of set aside forests<sup>3)</sup></li> </ul>

<sup>1)</sup> Although the Clean Power Plan is being implemented, the analysis did not consider its impact under current policies due to its legal status being uncertain.

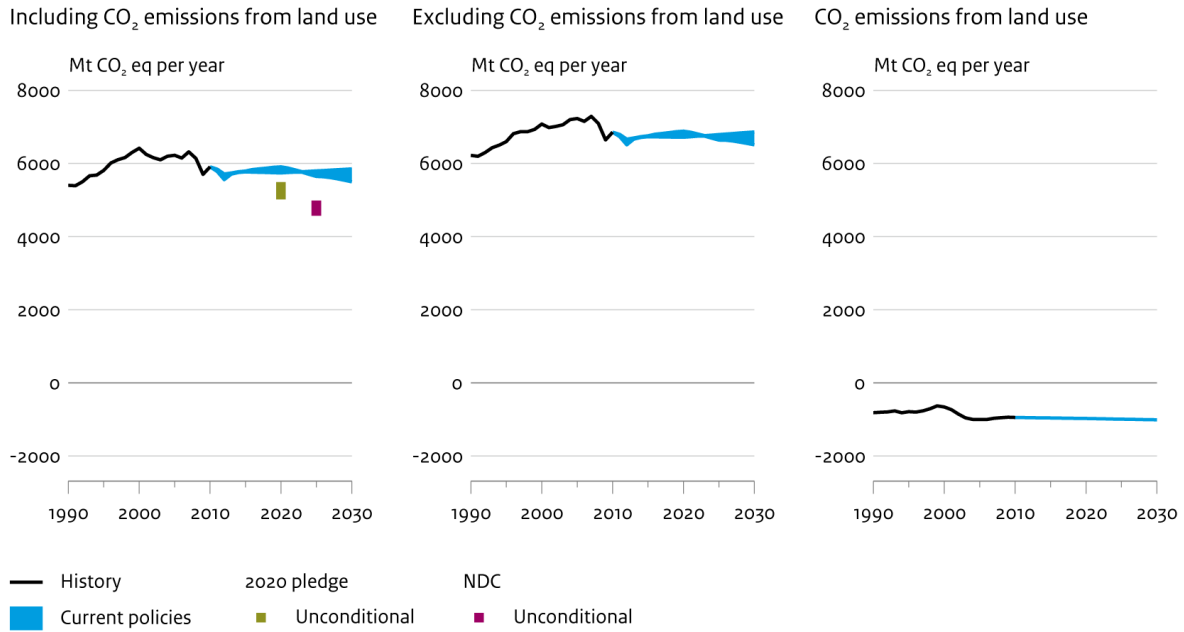
<sup>2)</sup> Not quantified in PBL TIMER model

<sup>3)</sup> Policy not quantified in the IIASA LULUCF model projections

Table 72: Impact of climate policies on greenhouse gas emissions (including LULUCF) in the United States. Absolute emission levels and emission levels relative to 2010 levels are presented. Note that the official values for 2020 and 2030 are based on GWP values from the IPCC Fourth Assessment Report. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
<b>Absolute: 5,905 MtCO<sub>2</sub>e</b>	5,344 MtCO <sub>2</sub> e; -11% by 2020	5,145 to 5,360 MtCO <sub>2</sub> e in 2020; -13 to -9% in 2020 4,700 to 4,855 MtCO <sub>2</sub> e; -18% to -20% in 2025	5,451 to 5,597 MtCO <sub>2</sub> e; -10% to -7% in 2020 5,379 to 5,672 MtCO <sub>2</sub> e; -11% to -6% in 2025	5,740 to 5,905 MtCO <sub>2</sub> e; -3% to 0% in 2020 5,645 to 5,795 MtCO <sub>2</sub> e; -4% to -2% in 2025
<b>Per capita: 19.0 tCO<sub>2</sub>e/capita</b>	N/A	15.3 to 16.0 tCO <sub>2</sub> e/capita in 2020 13.5 to 13.9 tCO <sub>2</sub> e/capita in 2025	N/A	17.1 to 17.6 tCO <sub>2</sub> e/capita in 2020 16.2 to 16.6 tCO <sub>2</sub> e/capita in 2025

**Impact of climate policies on greenhouse gas emissions in United States of America**



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 25: Impact of climate policies in greenhouse gas emissions in the United States (upper figure: all gases and sectors, including LULUCF, lower figure: excluding LULUCF (left) and only LULUCF (right) separately). Source: PBL FAIR/TIMER model (upper bound through 2015, lower bound from 2024 through 2030) and NewClimate Institute calculations (excluding LULUCF) (lower bound through 2023, upper bound from 2016 through 2030) based on its analysis for Climate Action Tracker (CAT, 2016). Both PBL and NewClimate projections are supplemented with IIASA GLOBIOM/G4M model projections of net LULUCF emissions. Historical greenhouse gas emissions from 2014 GHG inventory data submitted to the UNFCCC.

### 3.25 Ukraine

Ukraine's NDC aims to limit GHG emissions to less than 60% of the 1990 levels by 2030. The NewClimate Institute's current policies projection was based on the 'with measures' scenario from Ukraine's Sixth National Communication, most importantly accounting for the National Renewable Energy Action Plan 2020. No current policies were included in the PBL projection because of the political circumstances as well as administrative and bureaucratic barriers in Ukraine, leading to uncertainties about the policy implementation status. The current policy projection still suggests that Ukraine is on track to achieve its NDC (510–530 MtCO<sub>2</sub>e/yr by 2030), with estimated emission levels of 405–520 MtCO<sub>2</sub>e/yr by 2030 (15-48% increase from 2010 levels), including LULUCF.

Table 73: Description of Ukraine's 2020 pledge and NDC

Indicator	2020 pledge	NDC (submitted 19 <sup>th</sup> September, 2016)
<b>Target: unconditional</b>	<ul style="list-style-type: none"> <li>20% emissions reductions below 1990 levels. Update Kyoto target: 76% of 1990 levels 2013-2020 (not yet ratified)</li> </ul>	<ul style="list-style-type: none"> <li>Not exceed 60% of 1990 GHG emission level in 2030</li> </ul>
<b>Target: conditional</b>	<ul style="list-style-type: none"> <li>30% emissions reductions below 1990 levels</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Sectoral coverage</b>	<ul style="list-style-type: none"> <li>Economy-wide</li> </ul>	<ul style="list-style-type: none"> <li>Energy, industrial processes and product use, agriculture, LULUCF, waste</li> </ul>
<b>General Accounting method</b>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Second Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>IPCC guidelines; 100-year GWPs from the Fourth Assessment Report</li> </ul>
<b>GHGs covered</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, NF<sub>3</sub>, HFCs, PFCs and SF<sub>6</sub></li> </ul>	<ul style="list-style-type: none"> <li>CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, NF<sub>3</sub>, HFCs, PFCs and SF<sub>6</sub></li> </ul>
<b>Consideration of LULUCF</b>	<ul style="list-style-type: none"> <li>LULUCF excluded in the target</li> <li>The impact of LULUCF credits is expected to be small (Grassi et al., 2012))</li> </ul>	<ul style="list-style-type: none"> <li>LULUCF sector is covered under NDC target</li> <li>Approach to be used for including LULUCF to be defined not later than 2020</li> </ul>
<b>Other sector-level targets</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Use of bilateral, regional and international credits</b>	<ul style="list-style-type: none"> <li>Condition: "To keep the existing flexible mechanisms of the Kyoto Protocol"</li> </ul>	<ul style="list-style-type: none"> <li>Ukraine will participate in development and implementation of market mechanisms, but the 2030 GHG target does not account for this participation.</li> </ul>
<b>Availability of reference scenarios in the latest UNFCCC submissions</b>	<ul style="list-style-type: none"> <li>'With measures' scenario from Ukraine's Sixth National Communication (NC6) (Government of Ukraine, 2013)</li> </ul>	<ul style="list-style-type: none"> <li>'With measures' scenario from Ukraine's Sixth National Communication (NC6) (Government of Ukraine, 2013)</li> </ul>
<b>Last available year for GHG inventory reporting</b>	<ul style="list-style-type: none"> <li>2014 (GHG inventory report submitted to the UNFCCC)</li> </ul>	



Table 74: Overview of key climate change mitigation policies in Ukraine. Source: (Energy Community Secretariat, 2015, Energy in Central and Eastern Europe, 2014, International Carbon Action Partnership, 2016, Supreme Council of Ukraine, 2015, State Agency on Energy Efficiency and Energy Saving of Ukraine, 2014).

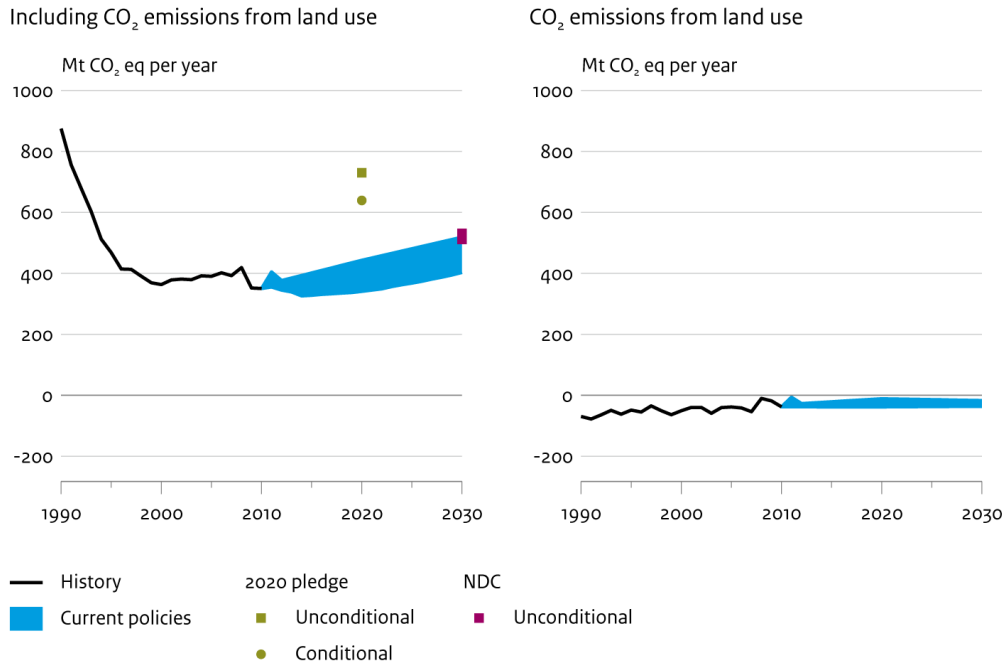
Sector	Policies (marked with “(+)” when mentioned in the NDC document) <sup>1)</sup>	Description
<b>Economy-wide</b>	National Renewable Energy Action Plan 2020 (2014)	<ul style="list-style-type: none"> <li>20% reduction of CO<sub>2</sub> emissions per final consumption of fuel by 2035 from 2010 levels (5% by 2020, 10% by 2025, 15% by 2030)</li> <li>11% share of renewable energy sources in gross final energy consumption by 2020 to achieve 78080 ktoe in heating and cooling, electricity and transport</li> </ul>
<b>Energy supply</b>	Green Tariff (renewables feed-in-tariff) (2015 amendment)	<ul style="list-style-type: none"> <li>5% premium for 30% of domestic equipment</li> <li>10% premium when using 50% of domestic equipment</li> </ul>
<b>Transport</b>	Law on Alternative Liquid and Gaseous Fuels (2012 amendment)	<ul style="list-style-type: none"> <li>Gradual increase in the share of production and use of biofuels and blended motor fuels of: 5% by 2013; 5% by 2014-2015; 7% by 2016; 10% by 2020</li> </ul>
<b>Industry</b>	Corporate income tax exemptions for Renewable Energy Sector (2011)	<ul style="list-style-type: none"> <li>Reduction of 80% in corporate profit tax for 5 years for the sale of equipment that operates on renewable energy sources and/or that is used for producing alternative fuels</li> </ul>
<b>Buildings</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>F-gases</b>	N/A	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Forestry</b>	Enhancement of forest cover	<ul style="list-style-type: none"> <li>Increase of the forest area up to 17% of total land cover by 2020</li> </ul>
	State Programme “Forest of Ukraine” (2009)	<ul style="list-style-type: none"> <li>Target of 429,000 hectares of afforestation and 231,000 hectares of reforestation by 2030</li> </ul>

<sup>1)</sup> Policies that are implemented after 2013 are not explicitly considered in the scenario modelling due to the lack of data and the uncertainty on their implementation status.

Table 75: Impact of climate policies on greenhouse gas emissions (including LULUCF) in Ukraine. Absolute emission levels and emission levels relative to 2010 levels are presented. References for official emission data are provided in Table A – 1 in the Appendix.

2010 GHG emissions, incl. LULUCF	2020 pledge and NDC		Current policies	
	Official data	PBL and NewClimate estimates	Official data	PBL and NewClimate estimates
Absolute: 350 MtCO <sub>2</sub> e	N/A	640 to 730 MtCO <sub>2</sub> e; 83% to 109% in 2020 510 to 530 MtCO <sub>2</sub> e; 46% to 52% in 2030	448 MtCO <sub>2</sub> e; 30% in 2020 525 MtCO <sub>2</sub> e; 52% in 2030	340 to 445 MtCO <sub>2</sub> e; -3% to 26% in 2020 405 to 520 MtCO <sub>2</sub> e; 15% to 48% in 2030
Per capita: 7.7 tCO <sub>2</sub> e/capita	N/A	14.9 to 17.0 tCO <sub>2</sub> e/capita in 2020 12.4 to 12.9 tCO <sub>2</sub> e/capita in 2030	N/A	7.9 to 10.3 tCO <sub>2</sub> e/capita in 2020 9.8 to 12.6 tCO <sub>2</sub> e/capita in 2030

### Impact of climate policies on greenhouse gas emissions in Ukraine



Source: PBL FAIR/TIMER model; NewClimate Institute calculations; IIASA GLOBIOM/G4M model

Figure 26: Impact of climate policies in greenhouse gas emissions in Ukraine (all gases and sectors). Source: PBL FAIR/TIMER model (lower bound) and NewClimate Institute calculations adapted from Climate Action Tracker (CAT, 2015) based on the 'with measures' scenario from the 6<sup>th</sup> National Communication (upper bound). PBL calculations are supplemented with IIASA GLOBIOM/G4M projections of net LULUCF emissions. Historical greenhouse gas emissions from 2014 GHG inventory data submitted to the UNFCCC.

## Appendix

### A1: Notes on historical emission data

In this report, GHG emission values are expressed in terms of global warming potentials (GWPs) from the IPCC's 2<sup>nd</sup> Assessment Report (SAR) unless otherwise noted. Exceptions include official data for some 2020 pledges and 2030 targets that were calculated based on the GHG inventory data using GWPs from the IPCC's Fourth Assessment Report (AR4) but without information on breakdown by gases.

For historical emissions in Annex I Parties to the UNFCCC, we used the national GHG inventory data submitted to the UNFCCC in 2014 (UNFCCC, 2014), which is the final year the Parties submitted data under revised 1996 IPCC guidelines using SAR GWPs. The emissions projections from NewClimate Institute, PBL and IIASA were harmonised to the 2010 emissions data reported in the 2014 national GHG inventories. The differences in total GHG emissions (in CO<sub>2</sub> equivalent terms) between the 2014 submissions (under revised 1996 IPCC guidelines using SAR GWPs) and the 2016 submissions (under 2006 IPCC guidelines using AR4 GWPs; UNFCCC, 2016b) are within +/-5% for most countries when excluding LULUCF and +/-10% when including LULUCF.

For historical emissions in non-Annex I Parties, data reported in the latest national GHG inventory reports were primarily used, directly or after conversion from AR4 GWPs to SAR GWPs. When national data were not available, IEA CO<sub>2</sub> Emissions from Fuel Combustion (IEA, 2015b) were used for energy-related CO<sub>2</sub> emissions, EDGAR database (JRC/PBL, 2014) were used for non-energy-related CO<sub>2</sub> emissions and anthropogenic non-CO<sub>2</sub> GHG emissions, and FAO (2014) were used for LULUCF emissions. Other sources such as the CAIT database (WRI, 2015) were also used on a case-by-case basis.

### A2: Notes on population data

For the calculation of per capita emissions, population data were taken from the Shared Socioeconomic Pathways 2 database (Fricko et al., 2016) for several large emitting countries, supplemented by the UN population statistics (UN DESA, 2015), UNFCCC national reports (National Communications, Biennial Reports and Biennial Update Reports) as well as other national reports for other countries.

### A3: Overview of GHG emissions projections by country

Table A - 1 presents an overview of GHG emissions projections by country, developed based on the UNEP Emissions Gap Report 2015 (UNEP, 2015). For each country or Party, emission estimates for 2020 and 2030 under four cases are compared:

- 2020 pledge and NDC/INDC (official data)
- 2020 pledge and NDC/INDC (independent analysis)
- Current policies trajectory (official data)
- Current policies trajectory (independent analysis)

The definitions of these four cases are based on UNEP (2015; Box 2.2 in Chapter 2). For the official data on 2020 pledges and NDCs/INDCs, in most cases the exact values described in national reports submitted to the UNFCCC were taken. For official data on current policy trajectories, projection values were taken from national reports by carefully examining the definitions described in each national report. Therefore, for example, we did not automatically categorise “Without Measures” scenario projections reported in the national reports submitted to the UNFCCC as official current policy trajectories.

Table A - 1: Overview of GHG emissions projections by country (MtCO<sub>2</sub>e). Figures do not consider the possible purchase or sale of offsets. Figures including LULUCF indicated with a, excluding LULUCF indicated with b. Source: Adapted and extended from UNEP (2016) .

Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>Australia</b>	530 <sup>a,e</sup> (Department of Energy, 2015a)	425 – 535 <sup>a</sup> (this study)	577 <sup>a,e</sup> (Australian Government, 2016) 656 <sup>a,e</sup> (Department of Energy, 2015a)	575 <sup>b</sup> (CAT, 2015) 650-665 <sup>a</sup> (den Elzen et al., 2015) 610-615 (this study)	N/A	440 – 460 <sup>a</sup> (this study) 395 – 435 <sup>b</sup> (CAT, 2015)	724 <sup>a,e</sup> (Department of Energy, 2015a)	605-700 <sup>a</sup> (this study)	Base year pledge  Current policies trajectory (Official Data) excludes impacts of Emissions Reduction Fund (ERF) (see discussion below)
<b>Brazil<sup>a</sup></b>	2,070 (Government of Brazil, 2010)	1,975 – 2,070 (this study)	N/A	1,750 – 2,075 (CAT, 2014) 1,470 – 1,520 (den Elzen et al., 2015) 1,080-1,225 (this study)	1,200 (Federative Republic of Brazil, 2015)	1,200 – 1,250 (this study)	N/A	980 – 1,205 (this study)	Baseline scenario pledge for 2020; base year pledge for 2030

<sup>6</sup> References to den Elzen *et al.* (2015) in this column represent PBL estimates based on the method of den Elzen *et al.* (2015). Some numbers presented here have been updated per latest estimates available from <http://infographics.pbl.nl/indc/>.

Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>Canada<sup>b</sup></b>	622 <sup>e</sup> (Government of Canada, 2015)	610 – 630 (this study)	768 <sup>e</sup> (Government of Canada, 2015)	745 (CAT, 2015) 720-760 (den Elzen et al., 2015) 690 – 755 (this study)	N/A	525 – 640 <sup>d</sup> (this study)	815 <sup>e</sup> (Government of Canada, 2015)	680 – 805 (this study)	Base year pledge
<b>Chile<sup>b</sup></b>	N/A	120 (this study)	N/A	135 – 140 (CAT, 2015); (this study)	N/A	125 – 160 (CAT, 2015); (this study)	N/A	160 – 165 (this study)	Per GDP intensity pledge
<b>China<sup>c</sup></b>	14,500 <sup>a</sup> (The People's Republic of China, 2012)	11,885 – 13,580 <sup>a</sup> (this study)	N/A	12,200 – 12,500 <sup>b</sup> (CAT, 2015) 12,535 – 13,420 <sup>a</sup> PBL (den Elzen et al., 2015) 12,410 – 12,855 <sup>a</sup> (this study)	N/A	13,500 – 14,000 <sup>a</sup> (den Elzen et al., 2016b) 12,800 – 15,200 (range of ten studies, (UNEP, 2015)) <sup>e</sup> 12,890 – 14,350 <sup>a</sup> (this study)	N/A	14,700 – 15,415 <sup>a</sup> (den Elzen et al., 2015) 13,200 – 14,100 <sup>b</sup> (CAT, 2015) 12,200 (Green and Stern, 2016) <sup>f</sup> 13,390 – 14,455 <sup>a</sup> (this study)	2020 Pledge Case assumes 40% reduction in GHG intensity and 2020 GDP of People's Republic of China (2012), adjusted for non-CO <sub>2</sub> projections from CAT (2014)
<b>European Union<sup>b</sup></b>	4,354 <sup>e</sup> (unconditional) (EEA, 2016)	3,940 – 4,500 (this study)	4,358 <sup>e</sup> (EEA, 2016)	4,115 – 4,375 (CAT, 2015) 4,105 – 4,370 (den Elzen et al., 2015) 4,100 – 4,370 (this study)	N/A	3,375 (this study)	4,183 <sup>e</sup> (EEA, 2016)	3,670 – 4,310 (this study)	Base year pledge

Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>India<sup>c</sup></b>	3,815 <sup>b</sup> (Planning Commission Government of India, 2011, 2014)	3,375 – 4,140 <sup>a</sup> (this study)	N/A	3 575-3,610 <sup>b</sup> (CAT, 2015) 3 535-3 960 <sup>a</sup> (den Elzen et al., 2015)  3,335 – 3,970 <sup>a</sup> (this study)	N/A	4,170 – 6,735 <sup>a</sup> (this study)	N/A	5,400 – 5,500 <sup>b</sup> (CAT, 2015)  4,610 – 5,795 <sup>a</sup> (this study)	Intensity pledge  Official data for 2020 pledge assumes 20% reduction in GHG intensity as per Planning Commission Government of India (2011), 2020 GDP per Planning Commission Government of India (2014), and exclusion of the emissions from agriculture and LULUCF as per Planning Commission Government of India (2011)

Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>Indonesia<sup>a</sup></b>	1,335 (conditional : 1,065) (BAPPENAS, 2015) 2,185 (Ministry of Environment, 2010)	1,065 – 1,335 (this study)	N/A	1,455 (CAT, 2015) 1,910 – 1,950 (den Elzen et al., 2015) 1,645 – 1,730 <sup>a</sup> (this study)	2,050 (conditional: 1,700) (BAPPENAS, 2015)	1,700 – 2,050 (this study)	N/A	1,940 (CAT, 2015) 2,095 <sup>a</sup> (den Elzen et al., 2015) 1,795 – 2,220 (this study)	Baseline scenario pledge  Official data for 2020 pledge (1,335 <sup>a</sup> ) is calculated based on the baseline from BAPPENAS (BAPPENAS, 2015) <sup>7</sup> , 2,185 <sup>a</sup> is calculated based on the baseline from Ministry of Environment Indonesia (2010)
<b>Japan</b>	1,343 <sup>b,e</sup> (Government of Japan, 2015)	1,300 – 1,335 <sup>b</sup> (this study)	N/A	1,230-1,330 <sup>b</sup> (CAT, 2015) 1,135 – 1,330 <sup>b</sup> (den Elzen et al., 2015) 1,160 – 1,260 <sup>b</sup> (this study)	1,042 <sup>d,e</sup> (UNFCCC, 2015b)	1,035 <sup>d</sup> - 1,040 <sup>d,e</sup> (this study)	N/A	1,070– 1,170 <sup>b</sup> (this study)	Base year pledge

<sup>7</sup> The INDC baseline is based on a revised national inventory that shows significantly lower 2010 emissions than those shown in the National Communication and assumed by other studies cited here. See <http://ranradgrk.bappenas.go.id/rangrk/beranda/92-bahasa/informasi-sektoral/193-hasil-indc> for a comparison of 2010 emissions.



Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>Kazakhstan<sup>a</sup></b>	N/A	250 – 290 (this study)	373 (Ministry of Energy of the Republic of Kazakhstan, 2016a)	330 – 340 (this study)	N/A	265 – 300 (this study)	448 (Ministry of Energy of the Republic of Kazakhstan, 2016a)	390 – 410 (this study)	Base year pledge
<b>Mexico<sup>a</sup></b>	555 (UNFCCC, 2015c) 670 (NCCS, 2013)	670 (this study)	830 (SEMARNAT, 2013)	785 – 800 (CAT, 2015) 770-810 (den Elzen et al., 2015) 755 – 815 (this study)	N/A	625 – 760 (this study)	N/A	860 – 920 (this study)	Baseline scenario pledge  Official data for 2020 pledge (555 <sup>a</sup> ) is calculated from INDC (UNFCCC, 2015c) baseline <sup>8</sup> of 792  Current policies trajectory (official data) is based on Government of Mexico (2012), adjusted per SEMARNAT (2013)

<sup>8</sup> The INDC baseline is based on a new methodology with global warming potentials (GWPs) from the IPCC 5<sup>th</sup> Assessment Report; it is therefore not comparable to any other sources cited here. All other sources use GWPs from the IPCC 2<sup>nd</sup> Assessment Report; the NCCS (2013) also uses a previous methodology.

Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>Republic of Korea</b>	550 <sup>a</sup> (UNFCCC, 2015c) 545 <sup>a</sup> (Republic of Korea, 2014)	545 <sup>b</sup> (this study)	N/A	745 – 755 <sup>b</sup> (CAT, 2015) 585-620 <sup>b</sup> (den Elzen et al., 2015) 730 – 805 <sup>b</sup> (this study)	536 (Republic of Korea, 2015)	535 – 630 <sup>b</sup> (this study)	N/A	720 – 835 <sup>b</sup> (this study)	Baseline scenario pledge  Official data for 2020 pledge (550 <sup>a</sup> ) and INDC are calculated from INDC (UNFCCC, 2015c) baseline of 782.5 MtCO <sub>2</sub> e for 2020 and 850.6 MtCO <sub>2</sub> e for 2030
<b>Russian Federation<sup>b</sup></b>	2,515 (Government of Russia, 2014)	2,525 (this study)	2,410 (Government of Russia, 2014)	2 600 (CAT, 2015) 2 295-2 375 (den Elzen et al., 2015) 2,365 – 2,440 (this study)	N/A	2,365 – 3,165 (this study)	2,590 (Government of Russia, 2015)	2,560 – 2,640 (this study)	Base year pledge  Official data for 2020 pledge reflects 25% reduction calculated based on national inventory data (Government of Russia, 2014)
<b>Saudi Arabia<sup>b</sup></b>	No pledge	665 – 765 (this study)	No pledge	645 (CAT, 2015)  755-770 (this study)	N/A	840 – 1,040 (this study)	N/A	1,090 – 1,155 (this study)	Saudi Arabia <sup>b</sup>

Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>South Africa<sup>a</sup></b>	585 (Department of Environmental Affairs, 2011a, 2011b)	400 – 585 (CAT, 2015); (this study)	N/A	730 <sup>b</sup> (CAT, 2015) 560 – 885 <sup>b</sup> (PBL, 2015) 620 – 655 (this study)	398 – 614	400 – 615	N/A	710 – 855 (this study)	Baseline scenario pledge for 2020; absolute emission pledge for 2030
<b>Thailand<sup>b</sup></b>	N/A	395 – 440 (this study)	N/A	405 (this study)	N/A	415 – 445 (this study)	N/A	520 (this study)	Baseline scenario pledge
<b>Ukraine<sup>a</sup></b>	N/A	640 - 730 (this study)	448 (Government of Ukraine, 2013)	340 – 445 (this study)	N/A	510 – 530 (this study)	525 (Government of Ukraine, 2013)	405 – 520 (this study)	Base year pledge
<b>United States of America</b>	5,344 <sup>a,e</sup> Calculated based on (U.S. Department of State 2016)	5,145 – 5,165 <sup>a</sup> (this study)	5,451 – 5,597 <sup>a,e</sup> (U.S. Department of State 2016)	6,360 - 6,600 <sup>b</sup> (CAT, 2015) 5,445 - 6,170 <sup>a</sup> (den Elzen et al., 2015) <sup>9</sup> 5,675 – 6,200 (this study)	4,635 – 4,765 <sup>a,e</sup> calculated based on (U.S. Department of State 2016)	4,480 – 4,700 <sup>a</sup> (this study)	5,379 – 5,672 for 2025, 5,274 – 5,703 for 2030 <sup>a,e</sup> (U.S. Department of State 2016)	5,645 – 6,275 <sup>a</sup> (this study)	Base year pledge  Current policies trajectory (Official Data) is from the “current measures only” scenario in the 2 <sup>nd</sup> Biennial Report (U.S. Department of State 2016). This includes the impact of the Clean Power Plan.

<sup>9</sup> A suite of additional studies (Hausker et al., 2015, Belenky, 2015, Rhodium Group, 2014) finds that US emissions in 2020 could range from 5,087-5,844 MtCO<sub>2</sub>e incl. LULUCF if the Administration implements further regulations consistent with its Climate Action Plan.

Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>No 2020 pledge</b>									
<b>Argentina</b>	No pledge	No pledge	463 (Ministry of the Environment and Sustainable Development, 2015)	380 – 480 <sup>b</sup> (CAT, 2015) 510 <sup>a</sup> (this study)	469 – 570 <sup>a</sup>	470 – 570 <sup>a</sup> (CAT, 2015); (this study)	549 (Ministry of the Environment and Sustainable Development, 2015)	605 – 610 <sup>a</sup> (this study)	Base year pledge
<b>Colombia<sup>a</sup></b>	No pledge	No pledge	215 – 235 (this study)	245 – 265 (this study)	235 (conditional) 268 (unconditional)	235 – 270 (this study)	N/A	290 – 325 (this study)	Baseline scenario pledge
<b>D.R. Congo<sup>a</sup></b>	No pledge	No pledge	N/A	315 (this study)	357	355 (this study)	N/A	405 (this study)	Baseline scenario pledge
<b>Ethiopia<sup>a</sup></b>	No pledge	No pledge	N/A	210 (this study)	145	145 (CAT, 2015); (this study)	N/A	310 (this study)	Baseline scenario pledge
<b>Morocco<sup>a</sup></b>	No pledge	No pledge	N/A	110 (this study)	99-141	100 – 140 (this study)	N/A	150 – 155 (this study)	Baseline scenario pledge
<b>The Philippines<sup>b</sup></b>	No pledge	No pledge	N/A	215 (this study)	N/A	95 (this study)	N/A	315 (this study)	Baseline scenario pledge

Parties	2020 projections				2030 projections (2025 for the United States)				Mitigation pledge and current policies trajectory details
	Pledge		Current policies trajectory		NDC/INDC		Current policies trajectory		
	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	Official data	Independent estimates	Official data	Independent estimates <sup>6</sup>	
<b>Turkey</b>	No pledge	No pledge	673 <sup>a,e</sup> 713 <sup>b,e</sup> (Ministry of Environment and Urbanization, 2016)	655 <sup>b</sup> (CAT, 2015) 485-690 <sup>b</sup> (den Elzen et al., 2015) 440 – 570 <sup>a</sup> (this study)	929 <sup>e</sup> (Republic of Turkey, 2016)	865 – 930 <sup>a</sup> (this study)	1,175 <sup>a,e</sup> 1,213 <sup>b,e</sup> (Ministry of Environment and Urbanization, 2016)	525 – 1,050 (this study) <sup>a</sup>	Baseline scenario pledge  For official data, “Without Measures” scenario projections are presented.

**Notes:**

a Figures including LULUCF. For Colombia, net removals by natural forests are excluded.

b Figures excluding LULUCF

c China and India have GHG intensity targets based on the ratio of GHG emissions to GDP. For consistency, we have converted these to absolute emission numbers based on the official documentation cited above, but a determination of whether each country has achieved its pledge should be based on intensity rather than absolute emissions.

d Figures excluding LULUCF but including LULUCF credits

e Based on GWPs from the IPCC AR4

f Assuming non-energy CO<sub>2</sub> and non-CO<sub>2</sub> emission projections from UNEP (2015)

Independent estimates are rounded to the nearest 5 MtCO<sub>2</sub>e.

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