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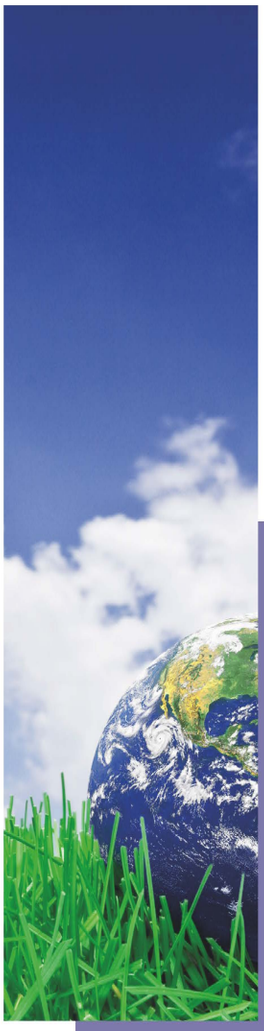

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# Implementing the Paris Agreement – Issues at stake in view of the COP 22 Climate Change Conference in Marrakesh

Study for the ENVI Committee

EN

2016

Implementing the Paris Agreement– Issues at stake in view of the COP 22 Climate Change Conference in Marrakesh

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

# Implementing the Paris Agreement – Issues at Stake in View of the COP 22 Climate Change Conference in Marrakesh

STUDY

**Abstract**

This study summarises the developments leading to the adoption of the Paris Agreement on climate change in 2015 and provides an overview of its contents. The further implementation process and the roles of the main Parties and other stakeholders are discussed, as well as related international developments and the challenges of the climate change conference in Marrakesh in November 2016.

The study was provided by Policy Department A at the request of the Committee on the Environment, Public Health and Food Safety (ENVI).

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| **AC** | Adaptation Committee |
| **ADP** | Ad Hoc Working Group on the Durban Platform for Enhanced Action |
| **AF** | Adaptation Fund |
| **AILAC** | Independent Alliance of Latin America and the Caribbean (Asociación Independiente de Latinoamérica y el Caribe) |
| **ALBA** | Bolivarian Alliance for the Peoples of Our America (Alianza Bolivariana para los Pueblos de Nuestra América) |
| **AOSIS** | Alliance of Small Island States |
| **APA** | Ad Hoc Working Group on the Paris Agreement |
| **AR5** | Fifth Assessment Report of the IPCC |
| **AR6** | Sixth Assessment Report of the IPCC |
| **AR7** | Seventh Assessment Report of the IPCC |
| **AREI** | Africa Renewable Energy Initiative |
| **BAU** | Business As Usual |
| **BINGO** | Business and Industry Non-Governmental Organisations |
| **BR** | Biennial Report |
| **BSER** | Best System of Emission Reduction |
| **BUR** | Biennial Update Report |
| **C** | Celsius |
| **C40** | Network of 40 cities addressing climate change |
| **CAEP** | Committee on Aviation Environmental Protection |
| **CAN** | Climate Action Network |
| **CCAFS** | Climate Change, Agriculture and Food Security |
| **CBDR** | Common But Differentiated Responsibilities |

| | |
|---|---|
| **CCS** | Carbon Capture and Storage |
| **CDM** | Clean Development Mechanism |
| **CDP** | Carbon Disclosure Project |
| **CFCs** | Chlorofluorocarbons |
| **CfRN** | Coalition for Rainforest Nations |
| **CGE** | Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention |
| **$CH_4$** | Methane |
| **CMA** | Conference of the Parties serving as the meeting of the Parties to the Paris Agreement |
| **CMP** | Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol |
| **$CO_2$** | Carbon dioxide |
| **COP** | Conference of the Parties |
| **CORSIA** | Carbon Offsetting and Reduction Scheme for International Aviation |
| **CPRD** | Center for Participatory Research and Development |
| **CTCN** | Climate Technology Centre and Network |
| **CVF** | Climate Vulnerable Forum |
| **DRI** | Direct Reduced Iron |
| **EAG** | Environment Advisory Group |
| **EEDI** | Energy Efficiency Design Index |
| **EIG** | Environmental Integrity Group |
| **EIPP** | European Investment Project Portal |
| **ENGO** | Environmental Non-Governmental Organisations |
| **EPA** | (United States) Environmental Protection Agency |
| **EU** | European Union |

| | |
|---|---|
| **EU ESD** | European Union Effort Sharing Decision |
| **EU ETS** | European Union Emissions Trading Scheme (until 2012); European Union Emissions Trading System (from 2013 onwards) |
| **FAO** | Food and Agriculture Organization |
| **FoEI** | Friends of the Earth International |
| **FPIC** | Free, Prior and Informed Consent |
| **G7** | Group of Seven |
| **G20** | Group of Twenty |
| **G-77** | Group of 77 at the United Nations |
| **GCA** | Global Climate Action |
| **GCF** | Green Climate Fund |
| **GDP** | Gross Domestic Product |
| **GEF** | Global Environment Facility |
| **GHG** | Greenhouse Gas |
| **GLADs** | Global Aviation Dialogues |
| **GMBM** | Global Market-Based Measure |
| **GMTF** | Global Market-Based Measure Technical Task Force |
| **Gt** | Gigatonnes |
| **GTP** | Global Temperature Potential |
| **GWP** | Global Warming Potential |
| **$H_2$** | Hydrogen |
| **HCFCs** | Hydrochlorofluorocarbons |
| **HFCs** | Hydrofluorocarbons |
| **HLS** | High-Level Segment |
| **IAR** | International Assessment and Review |

| | |
|---|---|
| **IBRD** | International Bank for Reconstruction and Development |
| **ICA** | International Consultation and Analysis |
| **ICAO** | International Civil Aviation Organization |
| **ICC** | International Chamber of Commerce |
| **ICLEI** | International Council for Local Environmental Initiatives |
| **ICSA** | International Coalition for Sustainable Aviation |
| **ICSID** | International Centre for Settlement of Investment Disputes |
| **IDA** | International Development Association |
| **IEA** | International Energy Agency |
| **IFC** | International Finance Corporation |
| **IGO** | Inter-Governmental Organisation |
| **IIPFCC** | International Indigenous Peoples' Forum on Climate Change |
| **IMF** | International Monetary Fund |
| **IMO** | International Maritime Organization |
| **INDC** | Intended Nationally Determined Contribution |
| **IOM** | International Organization for Migration |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **IPO** | Indigenous Peoples Non-Governmental Organisations |
| **IPR** | Intellectual Property Rights |
| **IRENA** | International Renewable Energy Agency |
| **ISA** | International Solar Alliance |
| **ITMO** | Internationally Transferred Mitigation Outcome |
| **ITUC** | International Trade Union Confederation |
| **JCM** | Joint Credit Mechanism |

| | |
|---|---|
| **JI** | Joint Implementation |
| **LDC** | Least Developed Countries |
| **LDCF** | Least Developed Countries Fund |
| **LEDS** | Low Emission Development Strategy |
| **LEG** | Least Developed Countries Expert Group |
| **LGMA** | Local government and municipal authorities |
| **LMDC** | Like-Minded Developing Countries |
| **LPAA** | Lima-Paris Action Agenda |
| **LULUCF** | Land Use, Land Use Change and Forestry |
| **MBM** | Market-Based Measures |
| **MEF** | Major Economies Forum on Energy and Climate |
| **MEPC** | Marine Environment Protection Committee |
| **MIGA** | Multilateral Investment Guarantee Agency |
| **MoI** | Means of Implementation (finance, technology development and transfer, capacity-building) |
| **MOU** | Memorandum of Understanding |
| **MRV** | Monitoring, Reporting and Verification |
| **Mt** | Megatonnes |
| **$N_2O$** | Nitrous oxide |
| **NAMA** | Nationally Appropriate Mitigation Action |
| **NAP** | National Adaptation Plan |
| **NAZCA** | Non-State Actor Zone for Climate Action |
| **NC** | National Communication |
| **NDC** | Nationally Determined Contribution |
| **NIR** | National Inventory Report |

| | |
|---|---|
| **$NF_3$** | Nitrogen trifluoride |
| **NGO** | Non-Governmental Organisation |
| **NWP** | Nairobi Work Programme |
| **ODS** | Ozone Depleting Substances |
| **OECD** | Organisation for Economic Co-operation and Development |
| **PCCB** | The Paris Committee on Capacity-building |
| **PFCs** | Perfluorocarbons |
| **REDD+** | Reducing Emissions from Deforestation and Forest Degradation, including the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries |
| **RINGO** | Research and Independent Non-Governmental Organisations |
| **SBI** | Subsidiary Body for Implementation |
| **SBSTA** | Subsidiary Body for Scientific and Technological Advice |
| **SCCF** | Special Climate Change Fund |
| **SCF** | Standing Committee on Finance |
| **SDG** | Sustainable Development Goal |
| **SEEMP** | Ship Energy Efficiency Management Plan |
| **$SF_6$** | Sulphur hexafluoride |
| **SIDS** | Small Island Developing States |
| **SR** | Special Report (of the IPCC) |
| **TEC** | Technology Executive Committee |
| **TEP** | Technical Examination Process |
| **TNA** | Technology Needs Assessment |
| **TUNGO** | Trade Union Non-Governmental Organisations |
| **UCLG** | United Cities and Local Governments |

| | |
|---|---|
| **UK** | United Kingdom (of Great Britain and Northern Ireland) |
| **UN** | United Nations |
| **UNDP** | United Nations Development Programme |
| **UNEP** | United Nations Environment Programme |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **UN-REDD** | United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation |
| **USD** | United States Dollar |
| **V20** | Vulnerable Twenty |
| **WFO** | World Farmers Organisation |
| **WIM** | Warsaw International Mechanism on Loss and Damage |
| **WMO** | World Meteorological Organization |
| **YOUNGO** | Youth Non-Governmental Organisations |

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# EXECUTIVE SUMMARY

## The Paris Agreement on climate change

At the climate change conference in Paris in December 2015, an agreement was reached which contains goals and mechanisms for responding to climate change and binding obligations for all Parties. The Paris Agreement is the result of negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) and goes beyond the Kyoto Protocol, which only committed a limited number of Parties to reduce their greenhouse gas emissions.

The Paris Agreement sets a long-term goal of limiting the increase in the global average temperature to well below 2 degrees C above pre-industrial levels, and of pursuing efforts to limit this temperature increase to 1.5 degrees C. It also includes the goal to increase the ability to adapt to the adverse impacts of climate change and to make finance flows consistent with a pathway towards low greenhouse gas emissions.

In order to achieve these goals, the Paris Agreement requires all Parties to undertake efforts towards reaching global peaking of greenhouse gas emissions as soon as possible and towards achieving a balance between anthropogenic emissions by sources and removals by sinks in the second half of the 21st century. Parties choose the efforts and measures themselves (the so-called Nationally Determined Contributions), but the Paris Agreement provides for a mechanism of assessing progress and increasing global ambition over time by a regular "global stocktake".

In addition to climate change mitigation, the Paris Agreement aims at enhancing adaptive capacity, strengthening resilience and reducing the vulnerability to climate change. The Agreement also acknowledges the importance of addressing loss and damage associated with the adverse effects of climate change. The Agreement contains comprehensive provisions on support to be provided to developing countries, which includes finance, technology development and transfer, and capacity-building. In order to ensure that such support and actions are transparent, the Agreement contains a number of reporting provisions.

The Paris Agreement addresses the period from 2020 onwards. In addition, the Conference of the Parties agreed on specific activities for the period before 2020, including the promotion of and an exchange on mitigation and adaptation actions.

It is important to note that, according to recent studies, the temperature increase by the end of the 21st century will be closer to 3 degrees C given the currently pledged mitigation contributions, and that large-scale negative global greenhouse gas emissions after 2050 will be needed to meet the 2 degrees C goal. Limiting the temperature increase to a value closer to 1.5 degrees C will be even more difficult when considering that global temperatures in 2015 and 2016 already approached a level of 1 degree C above the pre-industrial average.

## Signature, ratification and entry into force of the Paris Agreement

The urgent need for action in the light of the rising global temperatures was emphasised by many governments in 2016. In April of this year, 175 out of 197 Parties to the UNFCCC signed the Paris Agreement at a signature ceremony in New York.

In the following months, several (mostly small) countries ratified the Agreement. The momentum grew at the beginning of September, when the presidents of China and the United States deposited their instrument of ratification with the Secretary-General of the United Nations. More Parties followed suit during the General Assembly of the United Nations later that month.

On 5 October 2016, the European Union and several Member States deposited their instrument of ratification. On that day, the thresholds of more than 55 Parties accounting for more

than 55 % of global emissions were exceeded, triggering the entry into force of the Paris Agreement 30 days later, on 4 November 2016.

### The role of the main Parties and groups of Parties

China and the United States of America are the largest global greenhouse gas emitters, followed by the European Union. These Parties played an important role in the preparation of the Paris Agreement, China and the United States *inter alia* through coordinated statements on their mitigation plans and the European Union e.g. by establishing a coalition of countries supporting a strong mechanism to increase ambition under the Paris Agreement.

In the United States and the European Union, the year 2016 marks important domestic developments which will have effects on their future climate policies – the presidential and congressional elections in the United States and the plan of the United Kingdom to leave the European Union. However, the United States has already finalised its ratification process under the Paris Agreement and the EU and the United Kingdom have the option of continuing a close cooperation on climate change policies in the future.

In the climate negotiations, Parties that share similar views often bring forward their positions in a coordinated way. A large number of developing countries are represented by the group of "G-77 and China". On the other hand, the United States sides with developed countries in the so-called Umbrella Group. Other negotiating groups include, *inter alia*, associations of developing countries, regional associations of countries, and the Alliance of Small Island States.

### Other stakeholders and groups of countries

Besides the Parties and groups of Parties, other stakeholders play an important role in the run-up to and during climate change conferences, as they present their positions and their support for specific negotiating topics. Among the non-governmental organisations (NGOs), environmental NGOs have been actively voicing their positions from the beginning of the climate change negotiations. Other large groups of NGOs include research/independent NGOs and business and industry NGOs.

Groups of countries other than the main negotiating groups are also of interest because they coordinate their approaches and convey their messages ahead of the climate change conferences. In 2016, China and the United States made use of the meeting of the Group of Twenty (G20) which provided the setting for depositing their instrument of ratification of the Paris Agreement.

Furthermore, there are international organisations with close links to climate negotiations, such as the Intergovernmental Panel on Climate Change (IPCC) which has been requested under the Paris Agreement to provide scientific information on future emission pathways, or the International Civil Aviation Organization (ICAO).

### Other sectoral agreements and developments

On 6 October 2016, the ICAO assembly adopted a resolution on a Global Market-based Measure, which aims at offsetting the increase of greenhouse gas emissions from international aviation. In the area of international maritime transport, efficiency measures but no comparable market-based measures have been agreed. Under the Montreal Protocol, a phase-out of hydrofluorocarbons (greenhouse gases which are used in refrigeration and air conditioning) has been negotiated during the year 2016.

Other climate-change related developments on the international level include the United Nations Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction, adopted in the same year as the Paris Agreement. Besides, energy markets, energy policies and commodity markets may impede and/or support the transition to a low-carbon economy

in the coming years. Finally, developments such as the refugee crisis or the global financial crisis and its aftermath have diverted attention from climate change issues, although they also have links to climate change mitigation and adaptation.

### The challenges of the conference in Marrakesh

The Paris Agreement specifies the goals and lays down the general procedure for addressing climate change, but many details still need to be discussed and agreed by the Parties. For this purpose, the Ad Hoc Working Group on the Paris Agreement (APA) was established, which convened in May 2016 and will do so again at the climate change conference in Marrakesh from 7 to 18 November 2016. At this conference, the Parties under the UNFCCC and the Parties to the Kyoto Protocol will meet, as will subsidiary bodies, to discuss technical issues and issues of implementation.

The challenges in Marrakesh are expected to be: The early entry into force of the Paris Agreement, how to increase ambition prior to 2020 and negotiating the details of the Agreement. These include the contents of the Nationally Determined Contributions and the so-called “adaptation communication”, as well as cooperative mechanisms, transparency of action and support, and preparation for the global stocktake, including a “facilitative dialogue” scheduled for 2018.

# 1. INTRODUCTION

## 1.1. The Paris Agreement and the climate change conference in Marrakesh

At the Conference of the Parties (COP) in December 2015 in Paris, an international agreement was reached which is widely seen as a milestone in the global endeavour to respond to climate change. The Paris Agreement constitutes a universal and binding agreement with specific long-term goals, although the commitments put forward by the Parties are as yet not sufficient to meet these goals.

Now the ambitious objectives of the Paris Agreement need to be substantiated. Although the Agreement has already been ratified by a considerable number of Parties and will enter into force on 4 November 2016, there is still tremendous work ahead for governments and negotiators to implement the Paris Agreement and its accompanying Decision. In 2016, a dedicated working group on the Paris Agreement was established, which met in May of this year and will do so again at the COP in Marrakesh in November 2016.

## 1.2. Aim of the study

This document aims to provide a comprehensive overview of the Paris Agreement and its implications for the worldwide response to climate change. It summarises the events that led to the Paris Agreement, negotiations which have taken place so far in 2016 and challenges for the upcoming COP in Marrakesh. This includes an overview of the negotiation strands, the positions of the main stakeholders, and other global developments which are interlinked with climate change action and support.

The present study was commissioned by the European Parliament and is intended for members of the European Parliament delegation to the COP in Marrakesh. The study also addresses a wider audience by presenting an overview of the Paris Agreement and the current issues at stake in the climate negotiations. It provides concise explanations of the key terms, the negotiation bodies and documents, and it summarises the positions of the main Parties, groups of Parties, as well as governmental and non-governmental stakeholder groups.

## 1.3. Structure of the document

Chapter 2 of this study provides an overview of the main milestones in the climate negotiations leading to the Paris Agreement. It gives information on key documents such as the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol or the Doha Amendment. The Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP), which prepared the draft for the Paris Agreement, is introduced as well.

Chapter 3 summarises the COP which took place in Paris at the end of 2015 and the resulting Paris Agreement. The chapter describes the key events that took place during the two weeks of the conference and gives an overview of the contents of the Paris Agreement, including the accompanying Decision adopted by the COP.

The implementation of the Paris Agreement requires a series of steps and further negotiations. Chapter 4 gives an overview of the events and processes that have taken place so far in 2016. This includes the signature ceremony and the ratification process, the establishment of the Ad Hoc Working Group on the Paris Agreement (APA) and meetings of various bodies under the UNFCCC.

In chapter 5, information on the main Parties is given. This chapter presents the ten largest emitters of carbon dioxide ($CO_2$), which include both developed and developing countries. A comprehensive sub-chapter is dedicated to the European Union (EU) and its climate policies. Like the Member States of the European Union, other Parties present their positions as a

group in the climate negotiations, bringing together, for example, small island states or like-minded developing countries. The positions of these groups are laid out in chapter 6.

Besides the Parties to the UNFCCC, other stakeholders voice their positions on climate change in general and on the implementation of the Paris Agreement in particular. These include environmental organisations, industry stakeholders and groups of countries such as the Group of Twenty (G20). Their positions are summarised in chapter 7.

The Paris Agreement does not constitute the only approach to mitigating climate change. In chapter 8, the status of negotiations of other agreements is discussed – agreements which aim at limiting greenhouse gas (GHG) emissions in the sectors international aviation, international shipping and fluorinated gases.

Whether climate change will be addressed effectively and the goals of the Paris Agreement will be met will depend on other factors which govern present and future policies. These include energy and commodity markets, migration and economic policies. There are also important links to the implementation of the United Nations Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction. In Chapter 9, a summary of these factors and links is given. Finally, in chapter 10 the main challenges of the Marrakesh conference are summarised and an outlook is given on the work that is expected to be addressed by the international community in 2017 and beyond.

# 2. A BRIEF HISTORY OF CLIMATE NEGOTIATIONS

This chapter presents an overview of the milestones in the climate negotiations up to the Paris conference. These include the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the preparatory work for the Paris Agreement. The negotiations in Paris and the outcome of the Paris conference are covered by chapter 3.

## 2.1. The UNFCCC and the Conference of the Parties

The drafting of an international convention on climate change was initiated at the Toronto Conference in 1988, which can be seen as the starting point of international climate negotiations. At the United Nations (UN) Conference on Environment and Development in Rio de Janeiro in 1992, the United Nations Framework Convention on Climate Change was signed, which sets the framework for negotiating specific agreements, such as the Kyoto Protocol and the Paris Agreement.

**Box 1: The United Nations Framework Convention on Climate Change (UNFCCC)**

The objective of the United Nations Framework Convention on Climate Change is to achieve "stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (UNFCCC 1992). To this end, the Convention emphasises the common but differentiated responsibilities (CBDR) of the Parties, the principle of taking precautionary measures, and the importance of enabling economic development to proceed in a sustainable manner.

The Convention commits developed country Parties to adopt national policies and take measures on climate change mitigation. These developed country Parties are listed in Annex I to the Convention and include Parties undergoing the process of transition to a market economy. In Annex II to the Convention, Parties are listed that are committed to assisting and providing financial support to developing countries.

The Convention also includes matters such as research and systematic observation, education, as well as the establishment of the UNFCCC secretariat, the Conference of the Parties and subsidiary bodies to assist the Conference of the Parties (see Boxes 2 and 3). The Convention was adopted at the United Nations Headquarters in New York in May 1992. It was open for signature at the conference in Rio in June 1992 and additional signatures and ratification by Parties followed. It entered into force on 21 March 1994.

Currently, the UNFCCC has 197 Parties (196 countries plus the European Union). The most recent Party to join is the State of Palestine which deposited its instrument of accession in December 2015 and received Party status on 17 March 2016 (UNFCCC 2016a).

After the Convention had entered into force in 1994, the first Conference of the Parties convened in 1995.

**Box 2: The Conference of the Parties (COP)**

The Conference of the Parties (COP) was established under the UNFCCC as the supreme body of the Convention with the mandate to adopt the decisions necessary to promote its implementation. The first Conference of the Parties (COP 1) met in Berlin in 1995. Since then, such Conferences have taken place annually. The 22nd Conference of the Parties (COP 22) will be hosted in Marrakesh from 7 to 18 November 2016 (cf. chapter 10.1).

Besides the Conference of the Parties, the UNFCCC has established subsidiary bodies to provide the Conference with scientific and technological advice (SBSTA) and to assess and review the implementation of the Convention (SBI).

**Box 3: Subsidiary Bodies under the Convention (SBSTA, SBI)**

The Subsidiary Body for Scientific and Technological Advice (SBSTA) was established under the Convention to provide the Conference of the Parties with information and advice on scientific and technological matters. These included in recent years for example methodological guidance for reducing emissions from deforestation and forest degradation or information on market and non-market mechanisms.

The Subsidiary Body for Implementation (SBI) was established under the UNFCCC to assist the Conference of the Parties in the assessment and review of the effective implementation of the Convention. Its agenda items include, for example, the review of various reports from the Parties or matters related to the mechanisms under the Kyoto Protocol.

The SBSTA and SBI first met in Geneva in 1995. They meet biannually; in recent years during a two-week session in Bonn in May or June and during a one to two-week session in parallel to the COP towards the end of each year. SBSTA and SBI consider agenda items under the Convention, under the Kyoto Protocol (see chapter 2.2) and under the Paris Agreement (cf. chapter 4.3).

## 2.2. The Kyoto Protocol and the Doha Amendment

As provided for in the Convention, a protocol to mitigate climate change was developed and adopted at the Conference of the Parties in Kyoto in December 1997. This Kyoto Protocol set binding targets for limiting or reducing greenhouse gas emissions for the majority of the developed country Parties listed in Annex I to the Convention.

**Box 4: The Kyoto Protocol**

The Kyoto Protocol (UNFCCC 1997) committed 39 developed country Parties to limiting or reducing their greenhouse gas emissions (expressed as an average of the years 2008 to 2012) relative to the base year (1990 for most Parties). The Protocol requires these Parties to implement climate change mitigation policies and measures, in accordance with their national circumstances. It also requires them to introduce a national system for estimating anthropogenic greenhouse gas emissions and removals. Further, the Protocol regulates the monitoring, reporting and verification (MRV) of these emissions.

Annex A to the Protocol defines the greenhouse gases covered, i.e. carbon dioxide, methane ($CH_4$), nitrous oxide ($N_2O$), sulphur hexafluoride ($SF_6$) and two groups of gases, hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). This Annex also defines the sectors and greenhouse gas source categories for which emissions have to be estimated.

The developed country Parties to which a commitment applies are listed in Annex B to the Protocol. Besides country Parties, they also include the European Union as a separate Party with a reduction commitment of minus 8 %. Of the 39 Parties listed in Annex B, the United States did not ratify the Protocol and Canada withdrew from it in 2011.

The Kyoto Protocol was signed on 11 December 1997. For it to enter into force, it had to be ratified by at least 55 Parties, including Annex I Parties accounting for at least 55 % of Annex I Party emissions in 1990. This requirement was fulfilled in 2004 and the Protocol entered into force on 16 February 2005.

Although the Kyoto Protocol required the relevant Parties to implement domestic policies and measures, it also provided for flexible mechanisms to achieve their commitments. The three mechanisms are international emissions trading between Annex B Parties, the Clean Devel-

opment Mechanism (CDM) which allows accounting for emission reduction projects in developing countries, and Joint Implementation (JI) which makes use of emission reduction or the enhancement of greenhouse gas removal by sinks in other Annex B countries.

The more specific rules for implementing the Kyoto Protocol were adopted at the climate change conference in Marrakesh in 2001 (the "Marrakesh Accords"). After the adoption of the Kyoto Protocol in 2005, the first Conference of the Parties serving as the meeting of the Parties (see Box 5) took place in Montreal in November/December 2005.

**Box 5: The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP)**

According to the Kyoto Protocol, the Conference of the Parties (see Box 2) also serves as the meeting of the Parties to the Kyoto Protocol. Its mandate is to keep under regular review the implementation of the Protocol and to make related decisions. The "Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol" (CMP) is limited to those Convention Parties that also ratified the Kyoto Protocol. The conference in Montreal in 2005 was the first CMP. Since then, both COPs and CMPs have taken place annually and in parallel, and the conference in Marrakesh in November 2016 will be convened as CMP 12.

As the commitments under the Kyoto Protocol applied to emissions for the years 2008 to 2012 only, an amendment was developed which governs emission reductions for the years 2013 to 2020. This amendment was agreed upon by the Parties at the Doha COP 18 conference.

**Box 6: The Doha Amendment**

The Doha Amendment to the Kyoto Protocol (Decision 1/CMP.8) was adopted in December 2012. It defines additional emission reduction commitments for 38 Annex I Parties for the period 2013 to 2020. The Parties' emission reduction commitments range between -0.5 % and -24 % compared to the base year (1990 in most cases).

The amendment consists of a new Annex, to replace the former "Annex B" to the Kyoto Protocol and various technical provisions that regulate changes to emission accounting and other areas which became necessary after the introduction of a new commitment period. Besides, an additional greenhouse gas (nitrogen trifluoride, $NF_3$) has been added to the list of gases covered.

Of the Parties participating in the first commitment period, Japan, New Zealand and the Russian Federation are no longer included as countries with emission reduction commitments. On the other hand, Belarus, Cyprus, Kazakhstan and Malta are now included in the new version of Annex B.

As laid out in Article 20 of the Kyoto Protocol, the Amendment will enter into force once 75 % of the Parties to the Protocol have ratified it. The Doha Amendment has been ratified by 70 Parties as of 23 September 2016 (UNFCCC 2016b) and ratification by more than 70 additional Parties is needed for entry into force.

## 2.3. Towards a new agreement

The Kyoto Protocol had focused on mitigation actions to be undertaken by a limited number of Parties. Meanwhile emissions, in particular from emerging countries, saw a strong increase during the first decade of the 21st century. Therefore, after the Kyoto Protocol had entered

into force in 2005, international negotiations were aimed at preparing a new, global agreement.

In 2007, the Conference of the Parties in Bali (COP 13) decided "to launch a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action", with the aim of reaching an agreement two years later ("Bali Action Plan", Decision 1/CP.13).

A document in line with the Bali Action Plan was prepared at the Conference of the Parties in Copenhagen in 2009 ("Copenhagen Accord"). This document included a commitment by developed country Parties to mobilise climate finance amounting to USD (United States Dollar) 100 billion per year by 2020, from public and private sources. However, by the end of the COP, Parties did not agree on the Copenhagen Accord but took note of the document only (Decision 2/CP.15).

Although no comprehensive agreement was reached under the Bali Action Plan, Parties at COP 16 in Cancún in 2010 agreed on several important decisions which became to be known as the "Cancún Agreements" (Decision 1/CP.16). The COP recognised that deep cuts in global greenhouse gas emissions were required to limit the increase in the global average temperature below 2 degrees Celsius (C) above pre-industrial levels. The Parties agreed on enhanced action on adaptation and called for nationally appropriate mitigation commitments and actions.

At COP 17 in Durban in 2011, a dedicated body was established to develop a new, broad agreement under the Convention – the "Ad Hoc Working Group on the Durban Platform for Enhanced Action".

**Box 7: The Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP)**

The "Ad Hoc Working Group on the Durban Platform for Enhanced Action" (ADP) is a subsidiary body under the Convention which was established at the COP in Durban (Decision 1/CP.17). It started its work in 2012.

The ADP was organised in two workstreams: Workstream 1 was mandated with developing a protocol, another legal instrument or an agreed outcome with legal force under the Convention, applicable to all Parties, to be completed and adopted by the COP in 2015 and to be implemented from 2020 onwards.

Workstream 2 focused on enhancing mitigation ambition before 2020, as the COP in Durban also noted a significant gap between the aggregate effect of the Parties' mitigation pledges by 2020 and emission pathways that would allow keeping the global temperature increase below 2 degrees C or 1.5 degrees C compared to the pre-industrial level.

The ADP met during each COP and SBI/SBSTA session from 2012 to 2015, with additional dedicated ADP sessions in 2014 and 2015. With the adoption of the Paris Agreement in 2015, the mandate of the ADP ended. In 2016, work on the implementation of the Paris Agreement was taken over by the Ad Hoc Working Group on the Paris Agreement (APA, cf. chapter 4.2).

The climate change conference in Warsaw in November 2013 marked important progress in the preparation of the new agreement. The COP, in Decision 1/CP.19, requested the ADP to prepare specific elements for a draft negotiating text and to identify, by the next session of the COP, information that Parties need to provide when putting forward their contributions.

The draft negotiating text and the information to be provided by Parties (Intended Nationally Determined Contributions – INDCs, see Box 8) were adopted at the COP in Lima in December 2014 as part of Decision 1/CP.20, the "Lima Call for Climate Action".

**Box 8: Intended Nationally Determined Contributions (INDCs)**

According to the Lima Call for Climate Action (Decision 1/CP.20), an INDC is a "contribution towards achieving the objective of the Convention as set out in its Article 2", which is a "stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (UNFCCC 1992). It is, in short, the contribution a Party is willing to make to mitigate climate change.

The Lima Call for Climate Action lists the type of information which an INDC may include, "in order to facilitate clarity, transparency and understanding". This information covers quantifiable information on the reference point (including, as appropriate, a base year), time frames for implementation, scope and coverage, planning processes, assumptions and methodological approaches, information on how the Party considers that its INDC is fair and ambitious and how it contributes towards achieving the objective of the Convention. Parties were asked to communicate their INDCs well in advance of COP 21 in Paris. Those ready to do so were asked to submit them in the first quarter of 2015.

By December 2015, 187 out of 196 Parties had communicated an INDC (Climate Action Tracker 2015a). These submissions of INDCs were unprecedented in the history of global climate negotiations as – for the first time – Parties responsible for the vast majority of global emissions came forward with specific commitments to curb their emissions.

However, as several analyses showed, these commitments alone would not bring the world on the path towards the goal of limiting the global temperature increase to 2 degrees C or less (UNEP 2015a, UNFCCC 2015a, UNFCCC 2016c, Rogelj et al. 2016); the temperature increase estimated by various studies based on the INDCs is closer to 3 degrees C (cf. chapter 3.2.11).

In addition to the submissions of INDCs by the Parties, negotiators met several times during the year 2015 to make progress on the draft agreement text, which was based on the text of the "Lima Call for Climate Action". The ADP convened for a total of four dedicated sessions from February to October 2015. During these meetings, negotiators suggested additions and alternative options and the aim was to find common ground. For more information on these ADP sessions and on the progress made on the draft text see e.g. the report "International Climate Negotiations – On the Road to Paris" (Moosmann et al. 2015).

The draft agreement text which emerged from the last ADP meeting in October 2015 still contained a number of options which some Parties had introduced but other Parties would not agree on. It became clear that compromises on all these points would have to be found during the COP in Paris in December 2015.

The final draft, reflecting the status at the end of the October ADP meeting, consisted of a draft agreement text of 31 pages and a draft COP decision on ADP workstreams 1 and 2. With this draft on the table, the preparation for the conference in Paris was completed, but the outcome was very uncertain at the time this much-anticipated conference started.

# 3. THE COP IN PARIS AND THE PARIS AGREEMENT

## 3.1. The negotiations in Paris

The Paris climate change conference started on 30 November 2015 with a Leaders Event, when over 150 heads of state and government voiced their support for an ambitious agreement on climate change – the highest number of leaders ever to attend a UN event in a single day (UNFCCC 2015b). On the same day, the 21st session of the Conference of the Parties (COP) was opened by Manuel Pulgar-Vidal, the President of the previous COP in Lima. Laurent Fabius, the French Minister of Foreign Affairs and International Development, was then elected as president of COP 21.

At the same time, the 11th session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP, cf. Box 5), the 43rd sessions of the subsidiary bodies (SBI and SBSTA, cf. Box 3) and the 11th part of the 2nd session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP, cf. Box 7) took place. These bodies held negotiations on a wide range of topics, e.g. adaptation, finance or methodological issues under the Kyoto Protocol. The focus, however, was clearly on the negotiations towards a new, universal and ambitious agreement on climate change.

In the first week of the conference, the ADP continued its work on the draft agreement text which had been prepared in the course of the year 2015 (cf. chapter 2.3). On 5 December 2015, the final meeting of the ADP closed and its outcome was forwarded to the COP. Its President, Laurent Fabius, established the "Comité de Paris" as the negotiation body for the second week. This committee made use of bilateral consultations and of minister-led informal consultations, the so-called "indaba" format, which had been introduced at the COP in Durban in 2011 (the term originates from the Zulu word for a leaders' conference).

This set-up of the negotiations and the guidance provided by the French Presidency helped resolve a number of differences between the Parties. The main questions which remained open well into the second week of the conference concerned differentiation, i.e. different obligations of developing vs. developed countries, questions on finance and the level of ambition to be prescribed by the agreement (IISD 2015a). Progress on these issues was made during the last days of the conference when wider coalitions between Parties were formed.

**Box 9: The "high ambition coalition"**

The "high ambition coalition" is an example of a coalition across diverse Parties. In the months before the Paris Conference, several Parties that were calling for ambitious mitigation commitments started building an alliance. These included the European Union and small island states such as the Marshall Islands (Climate Home 2015a).

In the second week of the Paris Conference, almost 80 African, Caribbean and Pacific countries joined this coalition, and – later that week – the United States and Brazil followed suit (European Commission 2015). By Friday, 11 December, an alliance was formed which was unprecedented in international climate negotiations and which pushed for an ambitious long-term goal in the agreement and for the introduction of a five-year cycle which came to be known as the "global stocktake" in the final agreement (see chapter 3.2.8).

The ultimate day of the Paris Conference on 12 December 2015 began with members of the "high ambition coalition" entering the main conference room in an upbeat mood, though delegates had to wait until the early afternoon for the latest version of the agreement text. It was understood that this version had been agreed between all Parties the night before, but several hours passed while the Parties went through the text for the last time.

After additional discussions between the major Parties, the "Comité de Paris" convened in the late afternoon. A list of "technical corrections" was read out (i.e. the differences between the text provided in the early afternoon and the final agreement text), and then the "Comité de Paris" decided to submit the text, including the corrections mentioned, to the COP (IISD 2015b).

It turned out that these "technical corrections", from the point of view of many developing countries, included an important change. While the draft provided in the early afternoon had contained, in Article 4.4, a "shall" requirement related to mitigation actions, this had been turned into a "should" requirement in the final version. The understanding was that the United States delegation would not have agreed to the former version because it was of the opinion that for this requirement, approval of Congress would be needed, which would jeopardise a ratification of the agreement by the United States. Many developing countries were of the opinion that such a change should have been discussed in the COP plenary, rather than being dealt with as a "technical correction" (TWN 2015).

However, a mere two minutes after the end of the "Comité de Paris", Laurent Fabius brought the gavel down on the Paris Agreement, confirming the adoption of the first Decision on the agenda of COP 21, perhaps the most significant Decision in the history of the Convention. This moment was followed by several minutes of standing ovations, when delegates cheered as a long, demanding and at times exhausting process came to a successful conclusion. (The events during the minutes leading up to the Decision taken at 19:26 are available as webcast at UNFCCC 2015c and UNFCCC 2015d.)

After the adoption of the Paris Agreement, the final plenaries of the COP and the CMP were held. These plenaries included the Parties' closing statements and the adoption of several decisions on topics such as adaptation and finance (see chapter 3.3). The COP closed shortly after midnight on 13 December 2015 and the CMP closed a few minutes thereafter (IISD 2015b). The date that will be remembered, however, is 12 December 2015, when the Paris Agreement was adopted.

## 3.2. The Paris Agreement at a glance

The international agreement reached in Paris on 12 December 2015 contains specific goals for responding to climate change, mechanisms to pursue these goals, and binding obligations for all Parties.

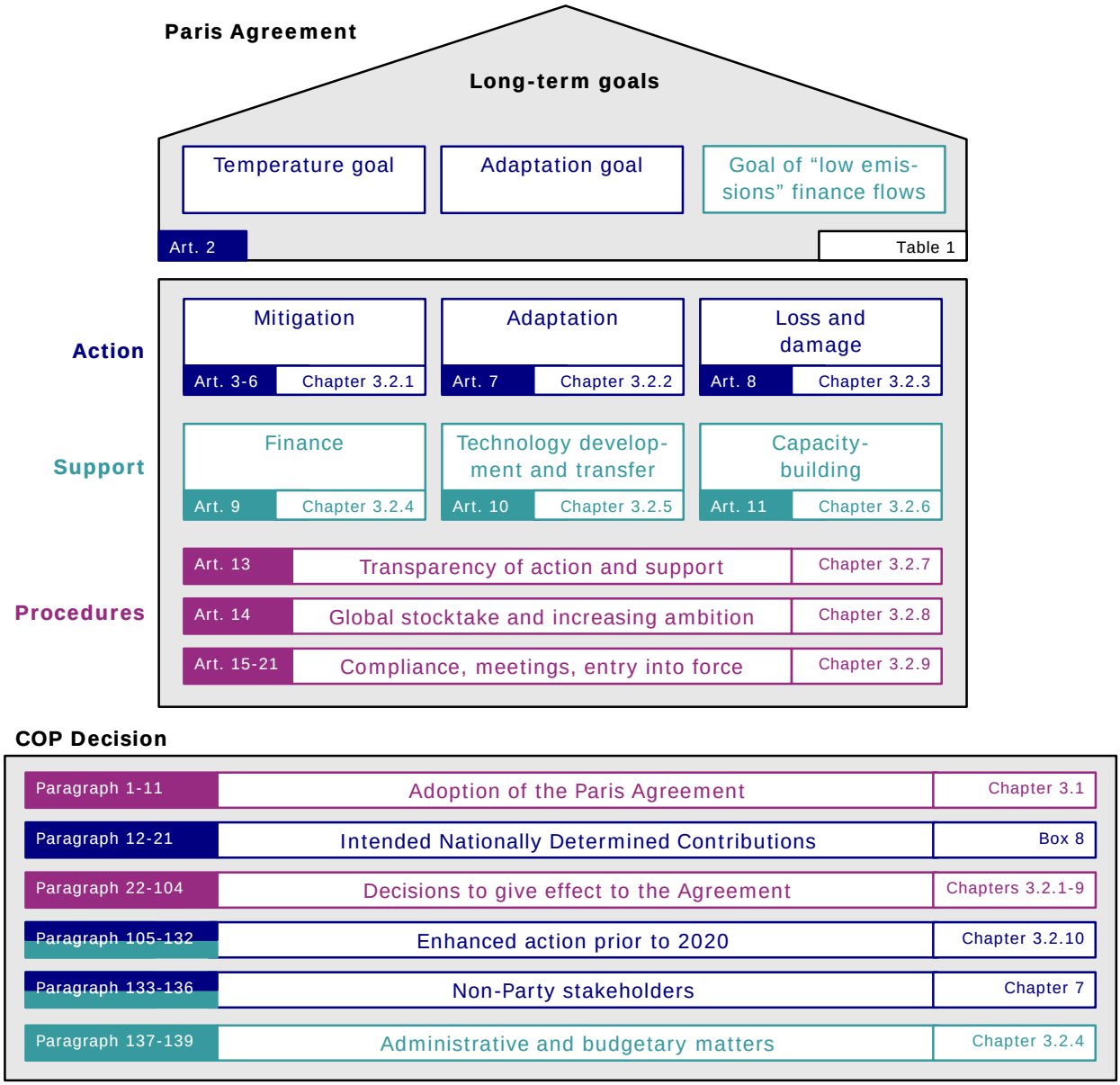
The document adopted by the Conference of the Parties is a COP Decision (Decision 1/CP.21), consisting of a Decision text and – in the Annex – the text of the Paris Agreement (UNFCCC 2015e). The Paris Agreement lays down the goals and the general procedure of addressing climate change from 2020 onwards, whereas the COP Decision specifies additional details, and issues that could not be agreed in Paris but for which the Parties agreed that they would continue to elaborate them. The COP Decision also addresses enhanced action prior to 2020.

The Paris Agreement aims to strengthen the global response to the threat of climate change and specifies **long-term goals** regarding global average temperatures, adaptation to climate change and finance flows. It covers the main cornerstones of international climate action:

- **Mitigation**, i.e. the reduction of greenhouse gas emissions and the enhancement of sinks for greenhouse gases
- **Adaptation**, i.e. the adjustment of natural and human systems in response to climate change
- Averting, minimising and addressing **loss and damage** associated with the effects of climate change

The Agreement also specifies **financial, technological and capacity-building support** (also known as Means of Implementation – MoI). Finally, it lays down procedures for transparency, for a global stocktake and for compliance, as well as for meetings and the entry into force (see Figure 1).

**Figure 1: Structure of the Paris Agreement and the accompanying COP Decision**




Each main topic is presented in a box, including the corresponding Articles of the Agreement or Paragraphs of the Decision. The table/chapters of the present report where more information can be found are also listed.

**Source:** UNFCCC 2015e, Decision 1/CP.21, authors' views.

In the following, the goals and the key elements of the Paris Agreement are described in more detail (Table 1 and chapters 3.2.1 to 3.2.9). Chapter 3.2.10 covers provisions relating to enhanced action prior to 2020, and chapter 3.2.11 provides a summary and discussion of the overall Agreement. A tabular overview of the key contents of the Paris Agreement – listed by topic – can be found in Table 9 in the Annex. Important elements of the accompanying COP Decision are listed in Table 10 in the Annex.

**Table 1: Long-term goals of the Paris Agreement**

| Goal | Wording in the Paris Agreement |
|---|---|
| **Temperature goal**<br>Article 2.1(a) | Holding the increase in the global average temperature to well below 2 degrees C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 degrees C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change. |
| **Adaptation goal**<br>Article 2.1(b) | Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production. |
| **Goal of "low emissions" finance flows**<br>Article 2.1(c) | Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. |

**Source:** UNFCCC 2015e.

### 3.2.1. Mitigation

The mitigation of climate change – by reducing greenhouse gas emissions and enhancing sinks for greenhouse gases – is inscribed in the United Nations Framework Convention on Climate Change and has been operationalised in the Kyoto Protocol for developed country Parties. The Paris Agreement constitutes a leap forward as it prescribes:

- a more ambitious temperature goal (cf. Table 1);
- a long-term emission goal;
- efforts to be undertaken and communicated by all Parties and to be updated periodically.

The **temperature goal** refers to holding the increase in the global average temperature to well below 2 degrees C above pre-industrial levels and to pursue efforts to limit this increase to 1.5 degrees C. The goals of 2 and 1.5 degrees C were introduced in the Cancún Agreements of 2010 (Decision 1/CP.16, cf. chapter 2.3). As summarised in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), a global temperature increase above 1.5 degrees C and, to a larger extent, above 2 degrees C is associated with impacts on ecosystems, human health, food security and infrastructure, as well as risks of widespread and irreversible impacts (IPCC 2015). However, it is important to note that the IPCC did not recommend any temperature goal because such a recommendation would be policy prescriptive and therefore beyond the mandate of the IPCC.

In order to be able to achieve the temperature goal, the current trend of greenhouse gas emissions needs to be reverted. The **emission goal**, introduced in Article 4 of the Paris Agreement, is twofold. First, Parties aim at reaching global peaking of greenhouse gas emissions as soon as possible. This is especially important because global emissions of greenhouse gases are still increasing and the emissions of many developing countries show clear upward trends.

Secondly, the goal is to achieve a balance between anthropogenic emissions by sources and removals by sinks in the second half of this century. Such a balance, which is also known as "carbon neutrality", will require drastic changes compared to today's situation: All worldwide

emissions of greenhouse gases will have to be counterbalanced by carbon sequestration. Carbon neutrality, or having a net zero carbon footprint, refers to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered.

Related to the long-term emission goal, Parties are invited by Decision 1/CP.21 to communicate, by 2020, long-term low emission development strategies (LEDS) with a mid-century timeframe.

**Efforts** to reach the temperature and emission goals will be shared by all Parties. Article 3 states that all Parties undertake and communicate ambitious efforts, progressing over time. The Paris Agreement points out the common but differentiated responsibilities and capabilities between developing and developed country Parties and it states that developed countries should be taking the lead. However, unlike the Kyoto Protocol, contributions will be required from all Parties.

These contributions are not prescribed for each Party in a top-down approach, but they are prepared, communicated and maintained by the Party itself ("Nationally Determined Contributions" – NDCs, see Box 10). This bottom-up approach can be seen as a response to the failure to reach an agreement with prescribed contributions at the COP in Copenhagen in 2009.

**Box 10: Nationally Determined Contributions: From INDC to NDC**

187 out of 196 Parties communicated Intended Nationally Determined Contributions (INDC, cf. Box 8) in 2015. These contributions – as long as they are not updated or replaced – will serve as "Nationally Determined Contributions" (NDC) under the Paris Agreement. The NDCs describe the efforts which Parties make to contribute to the global response to climate change. According to Article 3 of the Paris Agreement, such efforts cover the areas of mitigation, adaptation, finance, technology, capacity-building and transparency.

Nationally Determined Contributions have to be updated every five years and have to represent a progression over time. Parties with a time horizon until 2025 in their INDCs have to communicate a new NDC by 2020. Parties with a time horizon until 2030 have to provide an update in 2020. Finally, Parties that have not yet communicated an INDC have to communicate their first NDC at the latest together with their instrument of ratification or accession to the Paris Agreement.

The information to be provided in an NDC is listed in Paragraph 27 of Decision 1/CP.21, but this information is expressed in rather general terms. The Ad Hoc Working Group on the Paris Agreement (APA, cf. chapter 4.2) will develop further guidance. The NDCs will be provided in a public registry; those that have already been communicated, including the INDCs of Parties that have already ratified the Paris Agreement, are available in an interim registry (UNFCCC 2016d).

Periodic updates of NDCs are central to the Agreement because the mitigation contributions communicated by the end of 2015 are not sufficient to meet the agreed temperature goals (cf. chapter 3.2.11). For the process of increasing mitigation ambition over time (facilitative dialogue and global stocktake), see chapter 3.2.8.

In order to achieve their mitigation contributions, Parties may make use of voluntary cooperation. A mechanism will be set up, similar to the Clean Development Mechanism under the Kyoto Protocol (cf. chapter 2.2) which will allow for emission reductions in one country to be counted towards the Nationally Determined Contribution of another country. As laid out in

the Agreement, it has to be ensured that this mechanism avoids double counting of contributions and that the mitigation actions covered are sustainable and environmentally sound. The details of such cooperation between Parties will be elaborated by SBSTA, the responsible subsidiary body (cf. chapter 4.3.1).

### 3.2.2. Adaptation

All countries will need to adapt to a changing climate in some ways, but the topic of adaptation is especially important for developing countries because of their limited resources and means to adjust. In the Paris Agreement, an adaptation goal is prescribed, which is, according to Article 7 of the Agreement, the goal to

- enhance adaptive capacity;
- strengthen resilience; and
- reduce vulnerability to climate change.

Parties are required to engage in an adaptation planning process and encouraged to report on their adaptation efforts and/or needs. A review of the overall progress made in achieving the global goal on adaptation, and of the adequacy and effectiveness of adaptation support, is part of the global stocktake to be undertaken every five years (see chapter 3.2.8). Parties should submit and update periodically an "adaptation communication", which may include adaptation priorities, needs, plans and actions.

Decision 1/CP.21 mandated the Adaptation Committee (AC) and other bodies under the Convention to perform important tasks related to the implementation of the Paris Agreement in the area of adaptation. The mandate includes a Technical Examination Process (TEP) on adaptation under the Convention and the following tasks: considering suitable methodologies for assessing adaptation needs, developing modalities to recognise the adaptation efforts of developing country Parties, developing methodologies for taking the necessary steps to facilitate the mobilisation of support for adaptation in developing countries and reviewing the adequacy and effectiveness of adaptation and support.

Originating in the discussion on adaptation, the topic of loss and damage has gained in importance and has become a topic in its own right in recent years. It is now covered by a separate article in the Paris Agreement. Therefore, loss and damage is discussed separately here, in the following section.

### 3.2.3. Loss and damage

Loss and damage associated with the adverse effects of climate change is a key concern of the Least Developed Countries (LDC) and of Small Island Developing States (SIDS). Their representatives stress the limited means they have to avert or minimise such loss and damage.

Article 8 of the Paris Agreement states that Parties recognise the importance of averting, minimising and addressing loss and damage associated with the adverse effects of climate change. The fact that this topic is covered by a separate Article is a sign of the acknowledgement of its importance. The Agreement also strengthens the existing Warsaw International Mechanism on Loss and Damage.

**Box 11: The Warsaw International Mechanism on Loss and Damage (WIM) and its role under the Paris Agreement**

At the COP in Warsaw in 2013, the Warsaw International Mechanism on Loss and Damage (WIM) was established. This mechanism addresses loss and damage associated with impacts of climate change, including extreme events and slow onset events (e.g. sea level rise or land and forest degradation), in developing countries that are particularly vulnerable to adverse effects of climate change. The mechanism aims at:

- Enhancing the knowledge and understanding of comprehensive risk management approaches;
- strengthening the dialogue and coordination among relevant stakeholders; and
- enhancing action and support, including finance, technology and capacity-building.

According to the Paris Agreement, the Warsaw International Mechanism shall be subject to the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA, see Box 14).

The Paris Agreement also lists examples of areas of cooperation and facilitation, such as early warning systems, emergency preparedness, comprehensive risk assessment and management, risk insurance and resilience.

However, in the accompanying Decision (Decision 1/CP.21), it is specified that the provisions on loss and damage do not involve or provide a basis for any liability or compensation. This provision reflects the position of the developed countries which oppose the idea of establishing a link, which might entail claims for compensation, between greenhouse gas emissions and climate change induced loss and damage. The COP Decision which contains this provision applies to all Parties, but it may not prevent requests for compensation/liability in the private domain.

### 3.2.4. Finance

Mitigation, adaptation and addressing loss and damage require financial resources, and both the Convention and the Paris Agreement foresee that such resources are provided to developing countries.

Under the Convention, the provision of financial resources is the task of a specified number of developed countries. Under the Paris Agreement (Article 9), developed country Parties should still take the lead in mobilising climate finance, but other Parties are encouraged to provide or continue to provide such support. This provision reflects today's situation that emerging countries such as China provide financial support and other emerging countries are seen to be in a position to do so as well.

The provision of finance is also addressed in Article 2 of the Agreement, which specifies the goal of making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development (goal of "low emissions" finance flows, cf. Table 1).

At the COP in Copenhagen in 2009 (cf. chapter 2.3), it had been agreed that developed countries would mobilise, by the year 2020, climate finance amounting to USD 100 billion per year. The Decision on the Paris Agreement specifies that this amount will be provided annually from 2020 until 2025 and that a new, higher goal will be set for the period thereafter.

Related to financial support, Decision 1/CP.21 contains a section "Administrative and budgetary matters", which points out the urgency of making additional resources available for the implementation of the actions referred to in this Decision.

### 3.2.5. Technology development and transfer

Besides financial support, the development and transfer of technology constitutes an important pillar of the support provided to developing countries. Under the Paris Agreement, a technology framework is to be established to strengthen the existing Technology Mechanism under the Convention.

**Box 12: The Technology Mechanism under the Convention**

The Technology Mechanism was established at the COP in Cancun to help countries develop and transfer the technologies needed to mitigate and adapt to climate change. It consists of two bodies:

- The Technology Executive Committee (TEC), as policy arm, analyses technology policy issues and provides recommendations.
- The Climate Technology Centre and Network (CTCN), as implementation arm, provides technical assistance to developing countries, facilitates access to knowledge on climate technologies and fosters collaboration among stakeholders.

Examples of CTCN activities include technical assistance missions, tutorials and technical workshops.

An outline of the technology framework under the Paris Agreement is given in Decision 1/CP.21. The technology framework should facilitate, *inter alia*, Technology Needs Assessments (TNA), the assessment of technologies that are ready for transfer and the enhancement of enabling environments for the development of socially and environmentally sound technologies. The Subsidiary Body for Scientific and Technological Advice (SBSTA) was mandated with the development of this framework, whereas the Subsidiary Body for Implementation (SBI) will develop the modalities for a periodic assessment of the framework's effectiveness.

### 3.2.6. Capacity-building

In addition to financial and technological support, the Paris Agreement aims at further strengthening the capacity of developing countries to respond to climate change. This includes, for example, the implementation of adaptation and mitigation actions, the development, dissemination and deployment of technology and various aspects of education, training and public awareness.

Under the accompanying Decision to the Paris Agreement, a Paris Committee on Capacity building has been established.

**Box 13: The Paris Committee on Capacity-building (PCCB) and the 2016-2020 workplan**

The aim of the Paris Committee on Capacity-building is to address gaps and needs in the implementation of capacity-building in developing countries. The Committee will meet annually during the session of the Subsidiary Body for Implementation (SBI, cf. chapter 2.1) and will manage and oversee the 2016-2020 workplan which includes, *inter alia*:

- Identification of capacity gaps and needs;
- fostering global, regional, national and sub-national cooperation;
- identifying and collecting good practices.

### 3.2.7. Transparency of action and support

In order to be able to effectively address climate change, the measures taken and the support provided and received need to be made transparent. Transparency has become even more important under the Paris Agreement because actions have to be measured against specific goals (in the areas of mitigation, adaptation and finance) and the implementation of Nationally Determined Contributions has to be assessed in order to be able to improve them over time.

Under the Paris Agreement, a transparency framework is to be established, which includes binding provisions for all Parties, though less stringent ones for developing countries. All Parties, except the least developed countries and small-island developing states, are required to provide, at least biennially:

- A **national inventory report** of greenhouse gas emissions and removals
- **Information necessary to track progress made** in implementing and achieving the Nationally Determined Contribution
- Information related to climate change **impacts and adaptation** ("should" requirement)
- Information on the financial, technology transfer and capacity-building **support provided** (mandatory for developed country Parties, "should" requirement for developing countries)
- Information on the financial, technology transfer and capacity-building **support needed and received** (developing country Parties only; "should" requirement)

The national inventory report, the information relating to the Nationally Determined Contribution and the information on the support provided will undergo an expert review. For an overview of the various reporting requirements, see also Figure 2 in chapter 4.3.7.

### 3.2.8. Facilitative dialogue and global stocktake

As the Intended Nationally Determined Contributions which have been communicated so far are not sufficient to meet the temperature goals of the Agreement (cf. chapter 2.3), the Paris Agreement provides for a cycle of increasing ambition.

The year 2018 constitutes the first important step in this cycle. In that year, the IPCC (cf. chapter 7.3.1) will provide a Special Report (SR) on the impacts of global warming of 1.5 degrees C above pre-industrial levels and related global greenhouse gas emission pathways.

Based on this report, a facilitative dialogue will be held, which will form the basis for new or updated NDCs (cf. Box 10), to be communicated by Parties by 2020. New NDCs by 2020 are especially important for Parties with a time horizon until 2025 in their INDCs.

The cycle of further increasing ambition under the Paris Agreement will start in 2023, when the first global stocktake will take place: Collective progress towards achieving the purpose of the Paris Agreement and its long-term goals will be assessed in the light of equity and best available science. The outcome of the global stocktake will serve as a basis for Parties to update and enhance their actions and support.

### 3.2.9. Entry into force, meetings and compliance

In Articles 15 to 21 of the Paris Agreement, various procedural aspects are laid out. The Agreement enters into force on the 30th day after at least 55 Parties to the Convention accounting in total for at least 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession.

The threshold of 55 % of the total emissions ensures that a number of large emitters have to ratify the Paris Agreement before it enters into force. On the other hand, this threshold (and the threshold of 55 Parties) ensures that the Agreement can enter into force even if a group of Parties decide not to ratify it. For the progress of ratification during the year 2016 and the entry into force in November 2016, see chapter 4.1.3.

Once the Paris Agreement has entered into force, the Parties to the Agreement meet regularly.

**Box 14: The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA)**

As laid out in Article 16 of the Agreement, Parties meet in the so-called "Conference of the Parties serving as the meeting of the Parties to the Paris Agreement" (CMA). The meeting is held in conjunction with the annual Conference of the Parties (COP), in the same way as the meetings of the Parties to the Kyoto Protocol have been running in parallel to the COP since 2005.

The mandate of the CMA is to promote and review the implementation of the Paris Agreement. The specific topics which the CMA will have to negotiate and decide on are laid out in Decision 1/CP.21 and include, *inter alia*, the type of information to be provided by Parties on their Nationally Determined Contributions, the rules for accounting for greenhouse gas emissions, the modalities for recognising the developing countries' adaptation efforts and the modalities for the global stocktake.

In order to facilitate implementation of the Paris Agreement and to promote compliance with its provisions, an expert-based committee is to be established (the "compliance committee"). It is to be facilitative in nature and to operate in a non-adversarial and non-punitive manner.

### 3.2.10. Enhanced action prior to 2020

The Paris Agreement applies to the post-2020 period. Mitigation until 2020 is governed by the second commitment period under the Kyoto Protocol (cf. chapter 2.2), but due to the limited participation of Parties in mitigation actions under the Kyoto Protocol and in view of increasing emission trends, it is critical that additional efforts are pursued prior to 2020.

Therefore, in parallel to the preparation of the Paris Agreement, the ADP (cf. chapter 2.3) was working on the enhancement of mitigation ambition prior to 2020. The outcome of the negotiations on this topic constitutes an important part of Decision 1/CP.21 (Paragraphs 105 to 132).

The Decision provides for:

- Strengthening of the existing **Technical Examination Process (TEP) on mitigation**. This process highlights policies, practices and technologies with high mitigation potential. The current format of technical expert meetings will continue and will be organised by the UNFCCC secretariat with support from the institutions under the Technology Mechanism (cf. Box 12).
- A new **Technical Examination Process on adaptation**. This process is organised jointly by SBI and SBSTA (cf. Box 3) and conducted by the Adaptation Committee. Its aim is to identify opportunities for strengthening resilience, reducing vulnerabilities and increasing the understanding and implementation of adaptation actions.
- A **high-level event** at each COP from 2016 to 2020, which provides the opportunity for announcing new or strengthened efforts, initiatives and coalitions.
- **High-level champions** to facilitate and scale-up mitigation and adaptation efforts. These positions are currently held by Laurence Tubiana, who was the French ambassador for the international climate negotiations at the COP in Paris and by Hakima El Haite, Minister Delegate to the Minister of Energy, Mines, Water and Environment of Morocco. These champions set out the "Global Climate Action Agenda", an agenda for cooperative action between governments, cities, businesses, investors and citizens (UNFCCC 2016e).
- The engagement of **non-Party stakeholders** (cf. chapter 7) in the technical examination processes and through the Lima-Paris Action Agenda (LPAA).

**Box 15: The Lima-Paris Action Agenda (LPAA)**

In order to involve both state and non-state actors in accelerating climate action, the Lima-Paris Action Agenda (LPAA) was initiated in 2014 by the Peruvian and French COP presidencies, the Office of the Secretary-General of the United Nations and the UNFCCC secretariat.

Under this initiative, cities, regions and companies registered their commitments to address climate change in the so-called Non-State Actor Zone for Climate Action (NAZCA) (UNFCCC 2016f). As of the end of September 2016, 77 cooperative initiatives have been registered. In total, over 11 600 commitments are listed, covering 2 364 cities, 167 regions, 2 090 companies and 448 investors.

Non-Party stakeholders are the subject of a dedicated section in Decision 1/CP.21 (Paragraphs 133 to 135). This section welcomes their efforts in addressing and responding to climate change and invites them to scale up their efforts. More information on the role of non-Party stakeholders can be found in chapter 7.

### 3.2.11. Summary and discussion

The Paris Agreement can be seen as a milestone in the international endeavour to respond to climate change, as for the first time an agreement was reached which requires all Parties to contribute to achieving ambitious mitigation goals. In this regard, the Agreement delivered more than many had expected at the start of the Paris Conference.

More specifically, all Parties are required to prepare, communicate and maintain Nationally Determined Contributions. This provision constitutes an important difference to the Kyoto Protocol, which prescribed mitigation actions for a limited number of developed country Parties only. In this regard, the Paris Agreement has overcome the differentiation between developing and developed country Parties which originated from Annex I to the Convention of 1992 and does not fully reflect today's realities, as the contributions of developing and

emerging countries to global greenhouse gas emissions have already surpassed the share of developed countries.

It is notable that, unlike earlier COP Decisions, the Decision on the Paris Agreement does not mention Annex I to the Convention. What is maintained and remains important is the notion that Parties have "common but differentiated responsibilities" (CBDR). Under the Paris Agreement, differentiation is expressed through different obligations for developing versus developed country Parties to engage in mitigation, adaptation and support, but not in a static distinction between Annex I and non-Annex I Parties.

Although all Parties are required to maintain and enhance their NDCs, there is no legal obligation to meet the targets set in the NDCs. A strict legal obligation was opposed by some developing countries and by countries such as the United States as they would have difficulties ratifying an agreement with such legal obligations (cf. chapter 5.2).

It may remain uncertain whether the specific goals stated in the NCDs will be reached, but the Paris Agreement contains a mechanism for responding in case the goals are missed or new scientific findings show that efforts have to be further increased. This mechanism, consisting of the facilitative dialogue in 2018 and the global stocktake from 2023 onwards, still has to prove itself as a suitable mechanism for responding to an accelerating global problem in a dynamic world.

In addition, as already stated in chapter 2.3, the contributions communicated by Parties so far would not bring the world on the path towards the goal of limiting the global temperature increase to 2 degrees C or less. The temperature increase estimated in various studies, based on the INDCs communicated in 2015 (e.g. Rogelj et al. 2016), will be closer to 3 degrees C by the end of the 21st century. Assessments of the scientific literature show that without large-scale negative global greenhouse gas emissions after 2050, it will not be possible to meet even the 2 degrees C goal.

Limiting the temperature increase to a value closer to 1.5 degrees C (as also stated in the Paris Agreement) will be even more difficult. The year 2015 and the first eight months of 2016 saw record highs of average earth surface temperatures (NASA 2016, NOAA 2016). The average temperatures of 2015 were already 1.1 degrees C above the average of the years 1881 to 1910 and temperatures are expected to be considerably higher in 2016, even if temperature anomalies in the final months of this year turn out to be less pronounced due to end of the 2015-2016 El Niño episode (Climate Central 2016).

In any case, it seems likely that the willingness to mitigate greenhouse gas emissions is mainly driven by the increasing impacts of climate change as well as by its long-term consequences and the limits of adaptation, especially with respect to natural systems. The most efficient and effective approach to limiting long-term climate change risks is by reducing greenhouse gas emissions now.

### 3.3. Other negotiating strands at the COP in Paris

The negotiations on the Paris Agreement were running in parallel to discussions on a number of topics under the Convention (within the COP) and under the Kyoto Protocol (within the CMP), and to the meetings of the subsidiary bodies under the Convention (SBI and SBSTA).

The COP adopted several Decisions (Decisions 2/CP.21 to 13/CP.21) on the main topics of climate change action and support, based on preparatory work which had been carried out by SBI and SBSTA in the first week of the conference. However, as the negotiations in Paris were dominated by the provisions for the new Agreement, several other agenda items were postponed – either to the next session of SBI / SBSTA in May 2016 (cf. chapter 4.3) or to the COP in November 2016 (cf. chapter 10).

On **adaptation**, delegates discussed the progress under the Nairobi Work Programme (NWP – a mechanism to disseminate information on adaptation policies and practices). The report of the Adaptation Committee formed the basis of a COP Decision. A three-year work programme (2016-2018) was agreed, allowing also for work to be carried out related to the implementation of specific adaptation topics under the Paris Agreement, provided that sufficient financial resources are available. The mandate which was given to the Adaptation Committee and other bodies under the Decision accompanying the Paris Agreement includes, *inter alia*, conducting a technical examination process on adaptation and providing recommendations to the CMA on issues related to the implementation of adaptation under the Paris Agreement (cf. chapter 3.2.2).

On **loss and damage**, the COP Decision was based on the report of the Executive Committee of the Warsaw International Mechanism (cf. Box 11). The terms of the members of the Committee were extended until 2018/2019 due to the late nomination of members in 2015.

The negotiations on **finance** were about long-term finance and the reports of the Standing Committee on Finance (SCF), the Green Climate Fund (GCF) and the Global Environment Facility (GEF). For an overview of these entities, see Box 16. It was decided that the 2016 ministerial high-level event on climate finance (see Box 37) would focus on the financing of adaptation and readiness activities.

**Box 16: Entities involved in climate finance**

The financial mechanisms under the Convention are operated by dedicated entities. The Global Environment Facility (GEF) was established in 1991 to provide financing in various areas of environmental protection. The GEF is located in Washington, D.C. and administers, *inter alia*, the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF).

The Adaptation Fund (AF) was established in 2001 to finance adaptation projects and programmes in developing country Parties to the Kyoto Protocol.

The Green Climate Fund (GCF) was established in 2010 at the COP in Cancun as operating entity of the financial mechanism under the Convention (Decision 1/CP.16). The fund was made fully operational in 2015, with the GCF secretariat based in Songdo (Republic of Korea). As of 10 September 2016, 43 Parties pledged a total of USD 10.3 billion to the Green Climate Fund (GCF 2016).

The Standing Committee on Finance (SCF) was established in 2010. It assists the COP in coordinating and mobilising climate-related financing and in measuring, reporting and verifying the financial resources provided.

On **technology development and transfer**, the linkage to finance was a central point of the negotiations. The related COP Decision welcomes the dialogue between the Green Climate Fund and the bodies of the Technology Mechanism and provides for an in-session workshop on the linkages between finance and technology development/transfer at the subsidiary body session in May 2016.

In the area of **capacity building**, a "capacity building committee" was established through the initiative of the developing countries and despite reservations expressed by many developed country Parties, including the EU. The composition and mandate of this committee are still to be discussed and decided at the upcoming COP in Marrakesh.

Related to side-effects of **mitigation** action, the COP adopted a Decision on the impact of the implementation of response measures (Decision 11/CP.21).

**Box 17: Impact of the implementation of response measures**

Measures in response to climate change have various economic and social side-effects. As an example, a shift away from fossil fuels affects the economy of oil-exporting countries. At the COP in Paris, a Decision was adopted which acknowledges the calls for exchange on this topic and which strengthens the "forum on the impact of the implementation of response measures" (see UNFCCC 2016g), which has been meeting regularly since 2011.

The impacts of the implementation of response measures are also mentioned in Article 4 of the Paris Agreement – Parties shall take into consideration the concerns of Parties whose economies are most affected by these impacts – and the Decision accompanying the Paris Agreement specifies that the above-mentioned forum shall serve the Agreement.

The consideration of this topic both under the Convention and under the Paris Agreement can be seen as a comprehensive, though rather unspecific response to a concern most prominently voiced by Saudi Arabia (cf. chapter 5.11).

Several agenda items of the subsidiary body meetings addressed mitigation. The SBI held the third session of the so-called "multilateral assessment", which assesses the progress achieved towards the developed countries' emission limitation/reduction targets for 2020. This multilateral assessment was organised as question and answer sessions and as part of the International Assessment and Review (IAR) process, which is based on Decision 1/CP.16. In Paris, two Parties were assessed only (the others had already been assessed during the two previous SBI meetings).

Under the SBSTA, a remaining issue under the Doha Amendment (cf. Box 4) was negotiated and resolved: Article 3.7 of the Kyoto Protocol sets out rules for determining the assigned amount (total greenhouse gas emissions in $CO_2$ equivalents) for the various Parties in the first commitment period (2008-2012). This article was amended in Doha with additional Articles defining the rules for the second commitment period (Articles 7bis and 7ter). According to Article 3.7ter, the average annual assigned amount of the second commitment period must not exceed the average annual emissions of the years 2008-2010. This provision was introduced to ensure that commitments under the Doha Amendment constitute not only an emission reduction compared to the base year, but also a reduction compared to more recent years.

Kazakhstan, which did not participate in the first commitment period under the Kyoto Protocol, requested clarification in 2013 on how to interpret the above mentioned Article in its own particular case. This request led to a number of different interpretations, which were also important for the European Union as it is a special case as well – with one emission reduction target that applies to the European Union as a whole and many different targets applying to the individual countries it consists of.

During the negotiations in Paris, it was agreed that Article 3.7ter should also apply to Parties that did not participate in the first commitment period and it was clarified how to compare the average annual assigned amount to the average emissions of 2008-2010. For the purpose of Article 3.7ter, Parties have the choice to calculate these emissions either using the gases and sources according to the Kyoto Protocol of 1997 or using the (slightly extended) set of gases and sources according to the Doha Amendment. The EU and its Member States will use the latter approach.

In addition, an agreement was reached on the requirements for Parties which do not have an emission limitation or a reduction commitment for the second commitment period, such as the Russian Federation or Japan.

With these agreements, the methodological issues relating to the second commitment period under the Kyoto Protocol have been resolved (with one exception relating to the Clean Development Mechanism, cf. chapter 4.3.1). The rules are now largely set for the monitoring, reporting and reviewing of greenhouse gas emissions and removals for the period 2013 to 2020. These rules were adopted as Decisions 2/CMP.11 to 5/CMP.11 of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.

# 4. IMPLEMENTING THE PARIS AGREEMENT

During 2016 a number of events took place which paved the way for the entry into force of the Paris Agreement, and negotiations started on how it would be implemented in detail. In the second quarter of the year, a signing ceremony was held at the United Nations headquarters in New York (see chapter 4.1), the Ad Hoc Working Group on the Paris Agreement began its work (APA, see chapter 4.2) and negotiators gathered in Bonn for the subsidiary body meetings (chapter 4.3). Other events with close links to the climate negotiations took place throughout the year. A selection of these events is presented in chapter 4.4.

Important stakeholder meetings are presented under the relevant sections in chapter 7 and other climate-related negotiation events can be found in chapter 8. Statements made by Parties during 2016 are discussed under the respective Party section in chapter 5. In order to provide an overview of the key events, Box 18 lists them in chronological order and shows the chapters where they are discussed in more detail.

**Box 18: Selected events during 2016**

11-13 April: The 43rd IPCC plenary meeting takes place in Nairobi (see chapter 4.4.1)

15-16 April: Informal ministerial consultations are hosted in Paris by France and Morocco (see chapter 4.4.2)

18-22 April: IMO's Marine Environment Protection Committee convenes (see chapter 8.2).

22 April: 175 Parties sign the Paris Agreement at a high-level signature ceremony at the UN headquarters in New York (see chapter 4.1.1)

16-26 May: Parties convene for the Bonn climate change conference (see chapter 4.3)

26-27 May: G7 leaders meet for the 42nd G7 summit in Japan (see chapter 7.2.1)

3-5 July: The Petersberg Climate Dialogue discusses the process in the run-up to COP 22 (see chapter 7.2.4)

15-23 July: Meetings under the Montreal Protocol take place in Vienna (see chapter 8.3)

3 September: China and the United States of America deposit their instrument of ratification of the Paris Agreement, on the day before the 11th G20 summit takes place in Hangzhou (see chapter 7.2.2)

21 September: More than 30 countries deposit their instrument of ratification of the Paris Agreement at a special event at the UN headquarters in New York (see chapter 4.4.3)

29 September to 7 October: ICAO hosts its 39th assembly (see chapter 8.1)

5 October: 11 Parties, including the EU and some of its Member States, deposit their instrument of ratification of the Paris Agreement, surpassing the final threshold for its entry into force (see chapter 4.1.3)

10-14 October: The 28th Meeting of the Parties to the Montreal Protocol takes place in Kigali (see chapter 8.3)

17-18 October: The Pre-COP convenes in Marrakesh (see chapter 4.4.4)

17-20 October: The 44th IPCC plenary meeting is held in Bangkok (see chapter 7.3.1)

4 November: The Paris Agreement enters into force (see chapter 4.1.3)

## 4.1. Signature and ratification process

### 4.1.1. Signature ceremony

On 22 April 2016 a high level signature ceremony took place at the headquarters of the United Nations in New York, where 175 Parties (174 countries and the European Union), signed the Paris Agreement on Climate Change. It thereby became the multilateral agreement with the highest number of countries to sign on the first day. From this day on the agreement is open for signature for one year (UNFCCC 2016h; IISD 2016a). As of 7 October 2016 there are 191 signatory Parties out of 197 Parties to the Convention.

### 4.1.2. Conditions for entering into force

The entering into force and the ratification process of the Agreement depend on domestic legislative and/or constitutional procedures; therefore signing represents a first step only. The Paris Agreement enters into force 30 days after at least 55 Parties that account for at least 55 % of the global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary, the Secretary-General of the United Nations (UNFCCC 2015e).

Ratification of a multinational agreement is a formal process that starts at the national level, where countries follow and comply with their own constitutional and legislative procedures in order to establish the legal grounds that represent the country's consent to be bound by the agreement. Furthermore, ratification leads to a country legally becoming a Party to the agreement. In some countries it is not compulsory, at national level and within the scope of domestic constitutional law, for the head of state to ratify a treaty; in such a case the instruments of acceptance or approval are used instead. If a country wants to join the Paris Agreement as a party after the one year signature period is over, it will be able to do that by depositing an instrument of accession. In the end acceptance, approval and accession have the same legal implications as ratification (United Nations 2016a; UNFCCC 2016i; Jones and Mace 2016).

### 4.1.3. Progress of ratification and entry into force

In order to determine the exact moment when the required emission threshold of 55 % of the global greenhouse gas emissions is achieved, a specific compilation report was added as an Annex to the report on the COP in Paris (UNFCCC 2016k). This report lists the total greenhouse gas emissions of each Party, based on the most recent information submitted to the UNFCCC. According to this calculation, the ten largest emitting countries are responsible for approx. 73 % of the GHG emissions.

During and after the signature ceremony in April 2016, mostly small countries deposited their instrument of ratification. This changed on 3 September 2016, when the world's two largest emitters, China and the United States, deposited their instrument of ratification ahead of the G20 summit (cf. chapter 7.2.2).

On 21 September 2016, a special event was held in New York at the headquarters of the United Nations, where representatives of 31 countries deposited their instruments of ratification (see chapter 4.4.3). With this event, the first threshold, requiring 55 Parties to ratify the Agreement, has been surpassed.

At the beginning of October, additional Parties deposited their instrument of ratification, starting with India on 2 October and including, on 5 October, the European Union, seven of its Member States, and Canada. On that day, the second threshold – the emissions threshold – has been surpassed, triggering the entry into force of the Agreement 30 days thereafter, on 4 November 2016.

As of 7 October 2016, 75 Parties accounting for approx. 59 % of global greenhouse gas emissions have deposited their instrument of ratification (UNFCCC 2016h). For the status of ratification of the main Parties, cf. chapter 5 and Table 11 in Annex 3.

### 4.2. The Ad Hoc Working Group on the Paris Agreement (APA)

In order to prepare for the implementation of the Paris Agreement, the Ad Hoc Working Group on the Paris Agreement was established. The Decision accompanying the Paris Agreement (Decision 1/CP.21) mandated the APA with preparing for the entry into force of the Agreement and for convening the first session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA, cf. Box 14).

The APA was mandated with preparing a number of draft decisions on the various topics covered by the Paris Agreement, to be considered and adopted by the CMA at its first session. It reports regularly to the COP on the progress of its work.

The APA convened for the first time during the Bonn climate change conference in May 2016 (see chapter 4.3). The main topics which were discussed in Bonn (APA 2016a) and which will continue to be negotiated in Marrakesh are:

- The information to be contained in Nationally Determined Contributions (cf. Box 10)
- The type of information to be contained in the adaptation communications (see chapter 4.3.2)
- Modalities, procedures and guidelines for the transparency framework (cf. chapter 3.2.7)
- Modalities of the global stocktake (cf. chapter 3.2.8)
- Modalities of the compliance committee (cf. chapter 3.2.9)

The current co-chairs of the APA are Sarah Baashan from Saudi Arabia and Jo Tyndall from New Zealand.

### 4.3. The meeting of the subsidiary bodies in Bonn (SB 44)

From 16 to 26 May 2016, the subsidiary bodies under the Convention met in Bonn. Approx. 1 900 Party delegates plus non-governmental and media representatives participated in the negotiations under the 44$^{th}$ session of the SBI and SBSTA (SB 44, cf. also Box 3) and – for the first time – under the Ad Hoc Working Group on the Paris Agreement.

The start of the APA meeting was dominated by a dispute about the agenda. Representatives from developing countries pointed out that the draft agenda was focused on mitigation and lacked a main adaptation component. After lengthy but constructive discussions, an agenda item on the adaptation communication was added.

In its conclusions (APA 2016b), the APA requested the co-chairs to prepare a set of guiding questions by 30 August 2016 and invited Parties to provide, by 30 September 2016, their views on the information related to NDCs, on the adaptation communication, on the modalities for the transparency framework and on the global stocktake. The first session of the APA was adjourned on 26 May 2016 and will resume at the COP in Marrakesh.

It is important to note that certain topics may be discussed under the APA, the SBI and/or the SBSTA. Therefore, in the following, the main negotiation topics of the Bonn conference are structured according to the main topics of the Paris Agreement (mitigation – adaptation – loss and damage etc.).

The full agendas of each negotiating body are available on the UNFCCC website (UNFCCC 2016l). A table listing the responsible bodies for each task under Decision 1/CP.21 can be found in the reflections note by the COP Presidents (Governments of France and Morocco

2016a), and the progress of the negotiations is summarised in the "progress tracker", a document updated regularly by the UNFCCC secretariat (UNFCCC 2016j).

### 4.3.1. Mitigation

As the information to be provided in Nationally Determined Contributions (NDCs) is not clearly specified in Decision 1/CP.21 (cf. Box 10), the APA's task is to put this information into concrete terms. APA develops guidelines for the "features of NDCs", for information on how to facilitate clarity, transparency and understanding and for "accounting" (including, e.g., a comparison of pledged emission reductions with actual emission reductions). The work programme on NDCs is still at the very beginning and APA invited Parties to submit their views ahead of the COP in Marrakesh.

The topic of a "public registry", i.e. a publicly accessible collection of documents submitted by Parties, relates to both mitigation and adaptation, because according to the Paris Agreement both the NDCs and the adaptation communications will be recorded in such a registry. The Group of 77 (G-77) and China (cf. chapter 6.1) requested a separate agenda item under the SBI for the adaptation-related registry, to underline its importance. Discussions in the SBI focused on procedural matters and links between the two registries; their contents still need to be developed. An NDC interim registry is available at the UNFCCC secretariat's website (UNFCCC 2016d).

Besides the topics under the Paris Agreement, SBSTA discussed one remaining accounting issue under the Kyoto Protocol. It addresses emissions accounting and accounting for removals through Land Use, Land Use Change and Forestry (LULUCF) under the Clean Development Mechanism.

**Box 19: Land Use, Land Use Change and Forestry (LULUCF) and the Clean Development Mechanism**

Land use, changes in land use and forestry activities can alter the carbon stock of biomass and soils. As such, these activities may act as sources or sinks of greenhouse gases. In greenhouse gas inventories to be compiled under the UNFCCC, these sources and sinks are reported as a separate sector, "Land Use, Land Use Change and Forestry" (LULUCF), provided that they result from human-induced activities. Under the Kyoto Protocol, Parties account for LULUCF emissions/removals resulting from certain land use activities (e.g. deforestation, forest management and cropland management).

The discussion at the SBSTA session in Bonn focused on the types of activities which may be eligible as "removals" under the Clean Development Mechanism (CDM, one of the flexible mechanisms, cf. chapter 2.2). Columbia and other developing countries suggested that in addition to reforestation, certain revegetation activities should be eligible. As no agreement was reached, this topic will continue to be discussed in Marrakesh.

Even though the introduction of additional LULUCF activities may not be of large significance in the second commitment period of the Kyoto Protocol, it will be important under the Paris Agreement, where all Parties will account for greenhouse gas sources and sinks and – according to Article 6 – have the option of participating in cooperative mechanisms (cf. chapter 3.2.1).

Discussion on these future mechanisms started at the SBSTA in Bonn, where Parties presented their views on a mechanism to reduce greenhouse gas emissions (which may retain some similarities to the CDM) and on Internationally Transferred Mitigation Outcomes (ITMOs), which are a more general term and may include activities other than emission reduction/removal.

In addition to a mechanism to reduce greenhouse gas emissions and ITMOs, the Paris Agreement introduced a third option, a framework for non-market approaches. At the Bonn conference, there were widely diverging views as to which of these three options may be suitable for REDD+ activities.

**Box 20: The UN-REDD programme and REDD+**

The Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD Programme) was established in 2008 by the United Nations' Food and Agriculture Organization (FAO), Development Programme (UNDP) and Environment Programme (UNEP), triggered by a COP Decision of 2007 (Decision 2/CP.13). This programme supports nationally led processes and promotes the informed and meaningful involvement of all stakeholders (UN-REDD 2016).

The REDD+ initiative extends this approach as it includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries. Activities in the area of REDD+ are supported by the UN-REDD programme. Under the UNFCCC, these activities are promoted under the Warsaw framework for REDD+, established at COP 19.

### 4.3.2. Adaptation

As mentioned above, the "adaptation communication" was added as a main item to the APA agenda at the start of the APA session. Developing countries requested clear guidance on the type of information to be provided on adaptation activities. They consider transparency and comparability of such information important because adaptation activities may also form a part of Nationally Determined Contributions. All Parties reiterated that flexibility should be provided for in the adaptation communication, in order not to create an additional burden for developing countries.

The Decision accompanying the Paris Agreement (Decision 1/CP.21) mandated the Adaptation Committee (AC), the Least Developed Countries Expert Group (LEG) and other bodies with important tasks related to implementation. Specifically, the AC is requested to review, in 2017, the work of adaptation-related institutional arrangements under the Convention and to consider methodologies for adaptation needs.

In addition, the AC and the LEG are requested to develop modalities to recognise the adaptation efforts of developing countries. These two bodies, together with the Standing Committee on Finance and other relevant institutions are asked to develop methodologies and make recommendations on facilitating the mobilisation of support for adaptation in developing countries and on the review – in the course of the global stocktake – of the adequacy and effectiveness of adaptation and of support provided for adaptation.

Directly following the Bonn conference, on 27 May 2016, the AC and the LEG held an informal meeting to discuss these mandates (AC-LEG 2016).

As the discussion on adaptation reporting under the Paris Agreement is just starting, negotiations on the same topic under the Convention, which took place in the SBI, provided unspecific results only. SBI will re-consider the enhancement of reporting on National Adaptation Plans (NAPs) in May 2017.

**Box 21: National Adaptation Plans (NAPs)**

The National Adaptation Plan (NAP) process was established in 2010 under the Cancún Adaptation Framework (Decision 1/CP.16). It supports Parties in preparing and implementing National Adaptation Plans and in integrating adaptation into policies, programmes and activities. Initial guidelines for the formulation of NAPs were adopted at COP 17 in Durban (Decision 5/CP.17), outlining the following elements:

- Laying the groundwork and addressing gaps;
- preparatory elements (e.g. design and development of plans, communication);
- implementation strategies (e.g. strengthening institutional and regulatory frameworks, training and coordination);
- reporting, monitoring and review.

As adaptation will be a key challenge for agriculture in the future, especially in developing countries, issues related to agriculture have been discussed under the SBSTA agenda since 2012. At the meeting in Bonn, a workshop on the identification of adaptation measures and a workshop on the identification and assessment of agricultural practices and technologies to enhance productivity in a sustainable manner were held. However, diverging views between developing and developed countries remained on the draft conclusions on SBSTA's work, therefore the deliberations will be taken up again at the COP in Marrakesh (IISD 2016b).

### 4.3.3. Loss and damage

As requested by the Alliance of Small Island States group (AOSIS, cf. chapter 6.4), the COP presidencies convened informal consultations on the upcoming review of the "Warsaw International Mechanism for Loss and Damage" (WIM, cf. Box 11). Developed country Parties pointed out the difficulty of determining the topics of the review at this point in time, as the executive committee of the WIM had been meeting since September of the previous year only. The terms of reference for the review of the WIM still need to be discussed and agreed on.

### 4.3.4. Finance

SBSTA started its work on the modalities for the accounting of financial resources provided by developed country Parties through public interventions, as provided for in Article 9 of the Paris Agreement. SBSTA invited Parties to provide their views on the following questions: Which modalities exist already, which modalities need to be developed with a view to the Paris Agreement and how can they be developed in a timely manner to fulfil the transparency requirements under the Paris Agreement.

The Parties' views on these questions will be presented and further developed at an in-session workshop in Marrakesh.

### 4.3.5. Technology development and transfer

SBSTA had been mandated by the COP in Paris with the preparation of the details of the new technology framework under the Paris Agreement. At the Bonn session, the next steps were discussed and agreed, including a document on technology initiatives under and beyond the Convention (to be prepared by the UNFCCC secretariat) and submissions by Parties.

As regards the structure of the new framework, developed countries called for a concise but flexible framework, whereas some developing countries called for a comprehensive structure. Although it will take more negotiations to be able to agree on the structure and comprehensiveness, there is a broad consensus as far as the goal of the framework is concerned, which is to facilitate, and cooperate on, technology development and transfer.

In addition to the discussions on the framework, a workshop on the linkages between the technology mechanism and the finance mechanism was held. The workshop was prepared by the two technology bodies TEC and CTCN (cf. Box 12) and the two funds GEF and GCF (cf. Box 16). While the GCF and the developed country Parties suggested informal links, some developing country representatives suggested institutionalising the links between technological and financial support.

#### 4.3.6. Capacity-building

The SBI discussed the composition and the modalities of the Paris Committee on Capacity Building (PCCB), which had been established in the Decision accompanying the Paris Agreement (cf. chapter 3.2.6). It was agreed that the Committee members would be nominated by regions and that other bodies such as the Adaptation Committee would have observer status only.

#### 4.3.7. Transparency of action and support

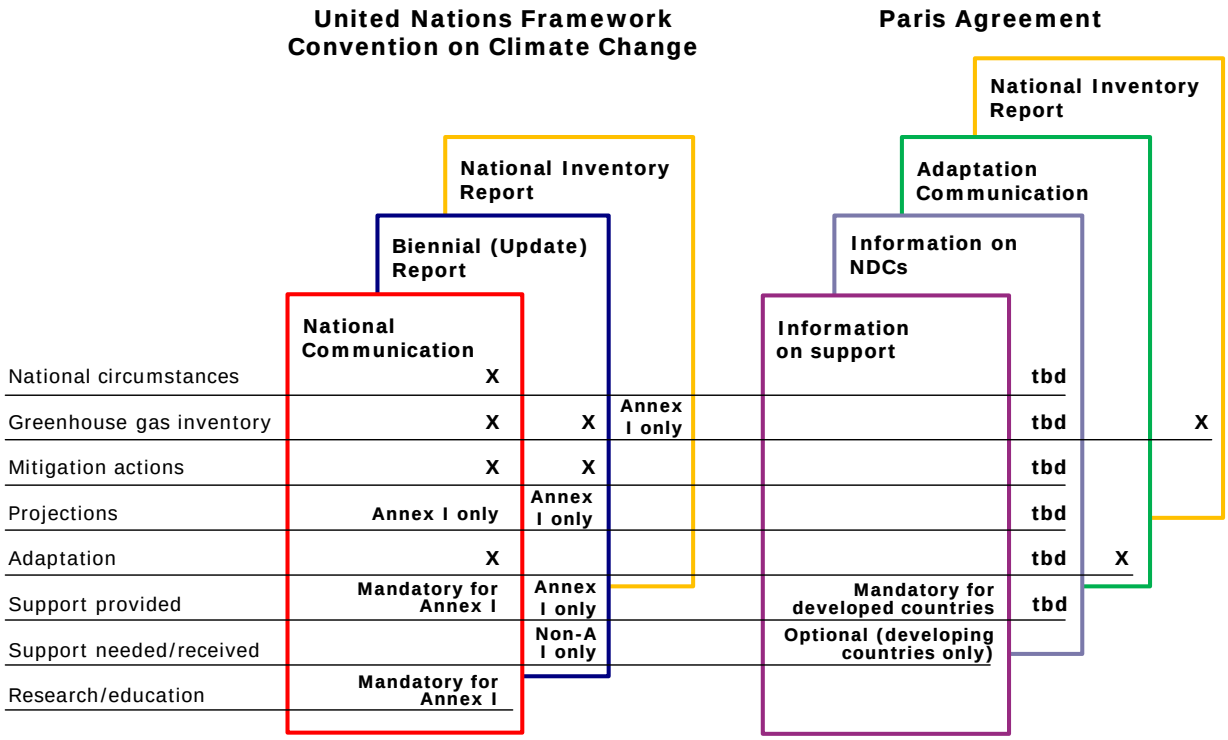
Under the Paris Agreement, a transparency framework for action and support was established (cf. chapter 3.2.7). The APA started its work on determining the modalities, procedures and guidelines for this framework. Compared to the obligations under the Convention, developing countries will also have to comply with additional reporting obligations. Although the Paris Agreement provides for flexibilities depending on a country's capacities, some emerging countries called for a stricter differentiation between the obligations of developing and developed countries.

A process under the Convention which takes into account the different capacities of developing country Parties is the so-called "facilitative sharing of views". This is a question and answer session on the Biennial Update Reports (BUR, cf. Figure 2) of non-Annex I Parties. It is part of the "International Consultation and Analysis" (ICA) process and comparable to the "multilateral assessment" for Annex I Parties (cf. chapter 3.3). During the SBI session in Bonn, 13 developing and emerging countries were subject to this process, which highlighted their experience in the areas of greenhouse gas inventories, projections, policies and measures, but also their need for further support. Developing countries are supported in the process of preparing their National Communications (NC) by the so-called Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE).

Under the SBSTA, a revision of the guidelines for the preparation of National Communications by Annex I Parties was negotiated. National Communications are due every four years, with the next issue due on 1 January 2018. The draft guidelines prepared in Bonn aim at a better alignment with the structure of the current National Inventory Reports (NIR) and Biennial Reports (BR, cf. Figure 2). The only point on which no agreement was reached was whether Parties should also be encouraged to prepare an English version of the report (Russia had insisted on the equality of all official UN languages). It can be expected that the guidelines will be adopted by the COP in Marrakesh, in time for the developed country Parties to draft their National Communications during 2017.

Figure 2 gives an overview of the reporting obligations under the Convention and under the Paris Agreement. It shows how National Communications are complemented by Biennial Update Reports for non-Annex I Parties and by Biennial Reports and National Inventory Reports for Annex I Parties. New specific information will be required for various reporting obligations under the Paris Agreement (cf. chapter 3.2.8).

**Figure 2: Topics covered by national reports under the Convention and under the Paris Agreement**




tbd … details to be decided.

Under the Convention, "Biennial Reports" are requested from Annex I country Parties; "Biennial Update Reports" are requested from non-Annex I countries.

**Source:** Decisions 4/CP.5, 2/CP.17 (Annex I) and 24/CP.19 for Annex I country Parties; Decisions 17/CP.8 and 2/CP.17 (Annex III) for non-Annex I countries; Article 13 of the Paris Agreement (UNFCCC 2015e).

### 4.3.8. Facilitative dialogue and global stocktake

At the May 2016 session in Bonn, the APA started working on details of the facilitative dialogue (scheduled for 2018) and the global stocktake (starting in 2023). Almost all Parties were of the view that the focus in 2018 should be on mitigation. On the global stocktake, the views were more diverse. Many Parties stressed the importance of also covering progress on adaptation and on support. It can be expected that the global stocktake will consist of a technical phase (ahead of 2023) and a political phase (at the COP in 2023).

There is a broad consensus that the IPCC will play a key role in informing the Parties to the Paris Agreement about the latest science on climate change, which will be the basis for increasing ambition in the context of the global stocktake (cf. also chapter 7.3.1). At the conference in Bonn, the SBSTA discussed the role of the IPCC and its Special Reports. Parties were invited to submit their views on the type of information which should be requested from the IPCC.

At a special event during the Bonn conference (UNFCCC 2016m), it was discussed how the assessments of the IPCC can inform the global stocktake. It was pointed out that the time schedule was rather tight for the IPCC to develop an outline, select authors and to draft and review its 2018 Special Report, which will be a key input to the facilitative dialogue in that year.

#### 4.3.9. Enhanced action prior to 2020

Under the Technical Examination Process (TEP, cf. chapter 3.2.10), which had previously focused on mitigation, the first dedicated adaptation session was held in Bonn. The umbrella topic of the Technical Examination Process on Adaptation in 2016 is "reducing vulnerability and mainstreaming climate change adaptation", with a focus on National Adaptation Plans (cf. Box 21).

The Bonn session consisted of two technical examination workshops on adaptation, with one workshop addressing gaps, needs and opportunities and one workshop covering institutional arrangements. Based on these workshops, the high-level champions (cf. chapter 3.2.10) are currently preparing a "summary for policy makers", which will be made available ahead of the high-level event at the COP in Marrakesh (see Box 37).

### 4.4. Other events in 2016

#### 4.4.1. IPCC plenary meeting (April 2016)

The Intergovernmental Panel on Climate Change (IPCC) held its 43rd session from 11 to 13 April 2016 at the headquarters of the United Nations Environment Programme (UNEP) in Nairobi, Kenya (IISD 2016c; cf. chapter 7.3.1 for more details on the IPCC). The panel discussed and decided on a multitude of topics and issues at this meeting, which was the first in the Sixth Assessment Report (AR6) cycle. This report cycle is expected to be finished in the year 2022.

The COP in Paris, in its Decision on the Paris Agreement, invited the IPCC to supply a Special Report (SR) on "the impacts of global warming of 1.5 degrees C above pre-industrial levels and related global greenhouse gas emission pathways" in the year 2018. The Panel discussed and accepted this invitation. The scoping meeting for this report was held on 15-17 August 2016.

Moreover, the meeting deliberated on a wide range of other Special Report proposals. In the end, two additional Special Reports were decided, the first one on "climate change, desertification, land degradation, sustainable land management, food security and GHG fluxes in terrestrial ecosystems" and the second one about "climate change and oceans and the cryosphere". The exact timeline for the three planned SRs is yet to be decided. In addition, the IPCC plans to prepare a Special Report on cities within the seventh Assessment Report cycle.

Another important topic of the discussions was how to place a stronger focus on regional aspects in AR6, without preparing a Special Report solely on this topic. It is a long-standing goal of the IPCC to increase the participation of scientists from developing countries while also including areas which are currently underrepresented with regard to the availability of scientific literature.

Furthermore, strategic planning and possible alignment of the work of the IPCC with that of the UNFCCC, specifically in terms of the Paris Agreement's global stocktake cycle (cf. chapter 3.2.8) with the Assessment Report cycles, were discussed. Effectively this means that the assessment cycles would be cut from seven to five years from AR7 onwards. The IPCC secretariat was asked to draw up possible suggestions on how this could be achieved.

The Panel is also working on improving the communication and outreach strategy of its next Assessment Report, as well as refining and updating some of the methodological guidance of the 2006 IPCC Guidelines, which are used by Parties to prepare their greenhouse gas emission inventories. The scoping meeting for this methodological report was held on 29 to 31 August 2016; the report is scheduled to be adopted in 2019.

The 44th IPCC plenary meeting will be held in Bangkok from 17 to 20 October 2016 (after the completion date of the present study). Information on the outcome of this meeting can be found at website of the IPCC secretariat (IPCC 2016a).

### 4.4.2. Informal consultations hosted by France and Morocco (April 2016)

Between COP 21 and 22, the Moroccan together with the French government organised informal consultations on the Paris Agreement (Governments of France and Morocco 2016b). They were held from 15 to 16 April 2016 in Paris and chaired by the ambassadors Laurence Tubiana and Aziz Mekouar, from the previous and the upcoming COP presidency.

It is important to note that this meeting did not represent official negotiations where decisions were taken. Rather, it was an informal conversation between negotiators and decision-makers. The intention of this meeting was to provide an opportunity to analyse the common tasks and the work that needs to be taken up to implement the Paris Agreement.

The discussions focused on questions relating to preparations for the entry into force of the Paris Agreement, on delivering support and on pre-2020 action. Participants raised questions about the possible consequences of an early entry into force of the Paris Agreement and pointed out that Parties whose national arrangements to ratify the Agreement have not yet been completed should not be at a disadvantage in collective decision-making. Furthermore, possibilities for holding stocktaking meetings also between COP sessions in the form of informal technical workshops were explored.

The consultations underlined the view that Marrakesh would be an “implementation COP” and that taking the means of implementation forward – finance, technology and capacity-building – would be key to making progress in implementing the Paris Agreement. The participants emphasised that a possible early entry into force of the Agreement should not be seen as an alternative to implementing existing commitments or to enhancing pre-2020 ambition.

### 4.4.3. UN Special Event on the ratification of the Paris Agreement (September 2016)

The 71st session of the United Nations General Assembly was held between 13 and 26 September 2016 in New York. The theme of the General Debate, which started on 20 September, was “The Sustainable Development Goals: a universal push to transform our world” (United Nations 2016b).

During the General Assembly, a special event under the banner “UN Paris Climate Agreement: Toward Entry into Force”, took place on 21 September 2016. During this event, representatives of 31 countries deposited the instrument of ratification of the Paris Agreement with UN Secretary-General Ban Ki-moon. On this day, the threshold of 55 countries ratifying the Agreement was surpassed and the share of these countries in the global greenhouse gas emissions rose to almost 48 % (United Nations 2016c).

### 4.4.4. Informal consultations and Pre-COP (September, October 2016)

On 9 to 10 September, delegates from over 50 countries met in Skhirat (Morocco) for informal consultations on the contents and expected outcome of COP 22. Discussions included pre-2020 topics, such as a roadmap for the USD 100 billion finance goal and a possible early entry into force of the Paris Agreement (COP 22 2016a).

From 17 to 18 October 2016, ministers meet in Marrakesh for the so-called “Pre-COP”, to discuss diverging options and explore possible compromises on negotiation topics. Information on the outcome of this meeting (which takes place after the completion date of the present study) can be found at the COP 22/CMP 12 host country website (COP 22 2016b).

# 5. MAIN PARTIES

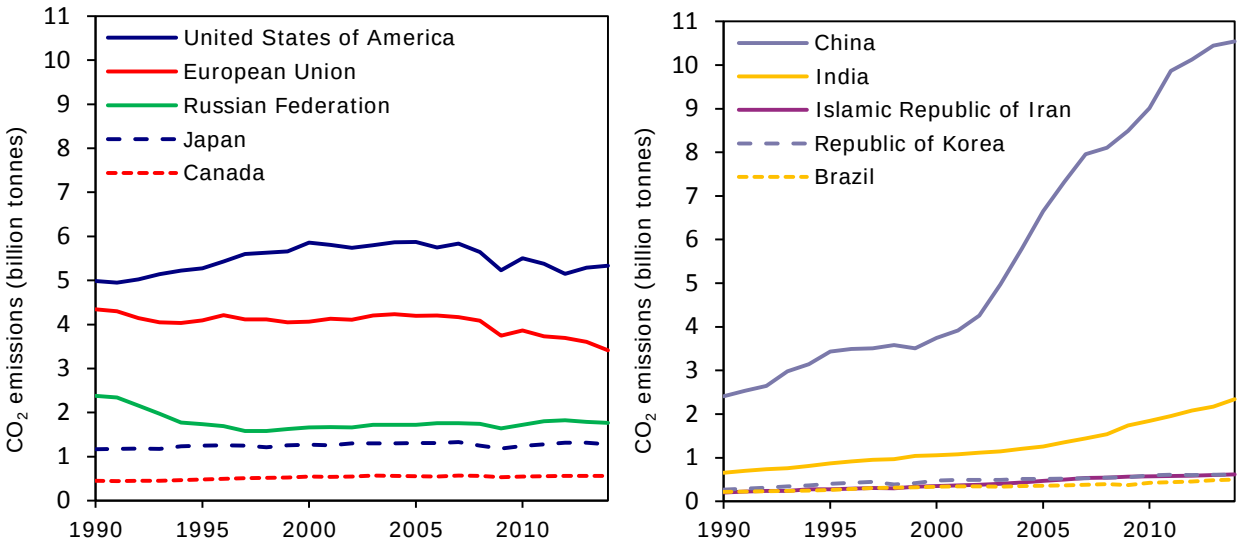
In the UNFCCC negotiations, all countries participate independent of their population size or greenhouse gas emissions. Nevertheless, in view of the goals of the Paris Agreement, it is important to take a closer look at those that make up the largest share of emissions. In the following, information is provided on the ten Parties with the highest $CO_2$ emission levels (as compiled for the year 2014 by Olivier et al. 2015). Together, they account for approx. 76 % of the global $CO_2$ emissions. They also include six of the top ten of the world's most populous countries and the top eight Parties, ranked according to the Gross Domestic Product (GDP).

In this chapter, the European Union is presented as one Party. Germany is both an EU Member and a Party to the UNFCCC and accounts for the 6th highest $CO_2$ emissions in 2014. In this chapter, Germany is considered as part of the EU and not presented separately.

Figure 3 presents the development of $CO_2$ emissions of the ten largest emitters from 1990 to 2014. It has to be noted that not all sources of $CO_2$ emissions are accounted for here and that greenhouse gases other than $CO_2$ are not included. Nevertheless, this dataset is used because it constitutes the most recent consistent time series that is comparable across all Parties.

In Annex I to the report on the COP in Paris (UNFCCC 2016k), a compilation of greenhouse gas emissions per Party can be found. However, as stated in that Annex, the information was compiled only for the purpose of determining the threshold of 55 % of the global greenhouse gas emissions for the entry into force of the Paris Agreement. As the data come from a range of reports dating from different years, they do not constitute a consistent dataset for the purpose of comparing the emissions of the main Parties.

**Figure 3: $CO_2$ emissions of Parties to the UNFCCC with largest emissions in 2014**




Parties listed on the left are known as developed country Parties. Parties listed on the right are known as developing (emerging) countries. Emissions of the European Union are expressed as the sum of the 28 Member States over the whole time series.

**Source:** European Commission Joint Research Centre (JRC) / PBL Netherlands Environmental Assessment Agency (2015), http://edgar.jrc.ec.europa.eu/.

Information on other indicators (such as emissions per capita or per GDP) is provided in Table 2. Total greenhouse gas emissions, including other gases, are also shown in this table. The most recent data available for all Parties are from 2012 (WRI 2016a). Again, they may differ

from the figures provided by the Parties in their reports under the UNFCCC but they constitute the most recent information that is comparable across all Parties.

**Table 2: Parties to the UNFCCC with largest $CO_2$ emissions in 2014**

| Party | $CO_2$ emissions (million tonnes) in 2014 | $CO_2$ emissions (percent of world total) | $CO_2$ emissions (tonnes per capita) | $CO_2$ emissions per GDP (kg per 1 000 USD) | Greenhouse gas emissions[1] (million tonnes $CO_2$ eq.) in 2012 |
|---|---|---|---|---|---|
| China | 10 541 | 29.6 % | 7.6 | 628 | 10 975 |
| United States | 5 335 | 15.0 % | 16.5 | 321 | 6 235 |
| European Union | 3 415 | 9.6 % | 6.7 | 194 | 4 399 |
| India | 2 342 | 6.6 % | 1.8 | 333 | 3 014 |
| Russian Federation | 1 766 | 5.0 % | 12.4 | 519 | 2 322 |
| Japan | 1 279 | 3.6 % | 10.1 | 282 | 1 345 |
| Islamic Republic of Iran | 618 | 1.7 % | 7.9 | 514 | 715 |
| Republic of Korea | 610 | 1.7 % | 12.3 | 359 | 693 |
| Canada | 566 | 1.6 % | 15.9 | 375 | 714 |
| Brazil | 501 | 1.4 % | 2.5 | 172 | 1 013 |

[1] Greenhouse gas emissions excluding land use, land use change and forestry (LULUCF) in $CO_2$ equivalents.
Source: World Resources Institute (2016a), http://cait.wri.org, data derived from several sources.

**Source:** European Commission Joint Research Centre (JRC) / PBL Netherlands Environmental Assessment Agency (2015), http://edgar.jrc.ec.europa.eu/.

As can be seen from Table 2, per capita $CO_2$ emissions are highest in the United States of America and China has the highest $CO_2$ emissions per unit of GDP. Furthermore, China is the largest emitter of $CO_2$ as well as of total greenhouse gases.

In the following, this chapter provides information for each of the Parties listed above on greenhouse gas emissions, climate policies, and on their position regarding the implementation of the Paris Agreement. A tabular overview of each Party's progress with respect to the ratification of the Paris Agreement is provided in Table 11 in Annex 3.

In chapter 5.11, key information is given on additional Parties which are among the top 15 $CO_2$ emitters and also play important roles in climate change negotiations (Saudi Arabia, Mexico, Indonesia, Australia and South Africa).

## 5.1. China

The People's Republic of China is with approx. 1.4 billion inhabitants the world's most populous country. It has experienced high economic growth in the last decades and, since 2006, has been the world's largest $CO_2$ emitter. In recent years, China has made important statements and announcements on climate change, several times in coordination with the United States (e.g. The White House 2015). On 3 September 2016, the presidents of these two countries deposited their instruments of ratification of the Paris Agreement with United Nations Secretary-General Ban Ki-moon (see also chapter 7.2.2).

China is the biggest producer, importer and consumer of coal in the world, accounting for approx. half of the global consumption in 2014 (IEA 2015a).

### 5.1.1. Emission profile

As can be seen from Table 2, China contributed 29.6 % of the world's total anthropogenic $CO_2$ emissions in 2014. The $CO_2$ emissions more than quadrupled from 2.4 Gt (gigatonnes) in 1990 to 10.5 Gt in 2014 (Olivier et al. 2015).

Concerning other greenhouse gases, the most recent detailed inventory is available from China's Second National Communication submitted in November 2012. According to that inventory, $CO_2$ accounted for approx. 80 % of the total greenhouse gas emissions (expressed in $CO_2$ equivalents) in 2005, followed by methane with 12.5 % and nitrous oxide with 5.3 % (People's Republic of China 2012).

In recent years, after 2011, a slow-down in the annual increase of $CO_2$ emissions was observed which can be attributed, *inter alia*, to a smaller increase in coal consumption (Olivier et al. 2014). The latest Global Carbon Budget study shows that this trend continued throughout 2014 with an increase of 1.2 % from 2013, which is considerably lower than the growth rate over the last decade (Le Quéré et al. 2015).

However, it was also found that $CO_2$ emissions from coal consumption may be associated with considerable uncertainties, due to uncertainties in emission factors and revisions of statistical data. In February 2016, the Chinese National Bureau of Statistics published updated economic indicators (National Bureau of Statistics of China 2016). According to these numbers, the consumption of coal for energy production declined by 3.7 % from 2014 to 2015. A similar decrease had been reported for the previous years, but was revised later. Korsbakken et al. (2016) found that actual coal consumption was higher in recent years than suggested by preliminary statistical data. In particular, it was found that Chinese total $CO_2$ emissions from 2000 onwards were higher by approx. 9 % when taking into account revised energy statistics.

### 5.1.2. Climate policies

A comprehensive overview of China's climate policy was given in its Second National Communication on Climate Change (People's Republic of China 2012) submitted to the UNFCCC, which was later supplemented by various statements and by China's Intended Nationally Determined Contributions in June 2015. China's economy consists of energy-intensive industries and its industrial policy aims at transforming and upgrading traditional industries, improving energy efficiency and developing the service industry. However, it has been pointed out that with a strong focus on energy-related $CO_2$ emissions, emissions of other greenhouse gases such as methane, nitrous oxides or fluorinated gases may be underrepresented in Chinese climate policies (Climate Action Tracker 2015b).

The People's Republic of China adopted its 13$^{th}$ 5 year plan for the years 2016 – 2020 at their National People's Congress in March 2016. Top priority is given to further economic development, but at the same time targets have been set for greenhouse gas emissions and energy

consumption, as well as goals for increasing the efficiency of the industrial sector and goals for renewable energy (LSE 2016a). The target for carbon intensity, i.e. $CO_2$ emissions per unit of GDP, is an 18 % decrease by the year 2020 from 2015 levels (WRI 2016b).

Regarding its energy policy, the People's Republic of China has set itself the goal to cut energy consumption per unit of GDP by 15 % from 2015 levels by the year 2020. To achieve these objectives, China is aiming to diversify its energy mix, giving more importance to renewables and less to coal. In response to the increasingly important issue of air pollution, specific targets for ambient air quality have been set and emphasis is placed on transportation measures. Furthermore, one of the targets of the 13th five year plan is to increase forest coverage.

### 5.1.3. Implementation of the Paris Agreement

In June 2015, China submitted its Intended Nationally Determined Contribution to the UNFCCC secretariat (People's Republic of China 2015). It consists of a summary of enhanced actions (goals) and a wide range of policies and measures, including national and regional actions, enhancement of energy efficiency, low-carbon development, and financial and policy support. Ahead of COP 21, in September 2015, China's President Xi Jinping and U.S. President Barack Obama reaffirmed their mitigation commitments (The White House 2015). In this statement, two additional Chinese initiatives were announced, namely a national emissions trading system planned for 2017 and a "South-South Climate Cooperation Fund" to support other developing countries in combating climate change.

China is aiming to reach the peak of $CO_2$ emissions around 2030 and will make best efforts to peak early, to lower its $CO_2$ emissions per unit of GDP by 60 to 65 % from the level of 2005, to increase the share of non-fossil fuels in primary energy consumption to around 20 % and to increase the forest stock volume by around 4.5 billion cubic metres compared to 2005.

China may be on track to peaking $CO_2$ emissions considerably earlier than 2030, as some researchers suggested recently (Green and Stern 2016; Forbes 2016). However, such findings have to be seen in the light of the uncertainties associated with recent energy consumption and emission data (see chapter 5.1.1).

China is an associate member of the G-77 (cf. chapter 6.1) as well as the so called Like Minded Group of Developing Countries (LMDC, cf. chapter 6.3) and puts forward its positions during international climate negotiations through these groups, as well as bilaterally with other key players such as the United States or the European Union.

The People's Republic of China signed the Paris Agreement in April 2016. On 3 September 2016, on the eve of the G20 summit hosted by China (cf. chapter 7.2.2), China's President Xi Jinping, jointly with U.S. President Barack Obama, deposited the instrument of ratification of the Paris Agreement with United Nations Secretary-General Ban Ki-moon (Reuters 2016a). China was the first large emerging economy to ratify the Paris Agreement.

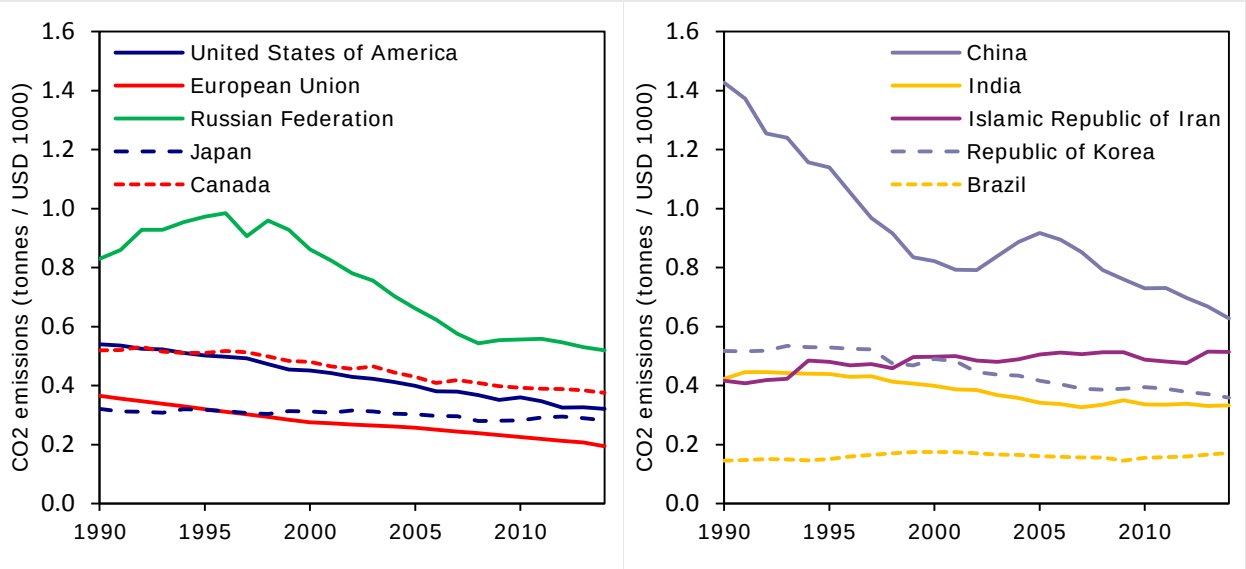
**Box 22: $CO_2$ emissions per unit of GDP**

Both in its 2016-2020 five-year plan and its INDC, China included a target to lower $CO_2$ emissions per unit of GDP. It is therefore instructive to present this metric for the main Parties discussed in this chapter. In Figure 4, it can be seen that countries such as China or the Russian Federation have high $CO_2$ emissions per unit of GDP, due to their carbon-intensive industries.

China has made important improvements since 1990. It has to be noted that its $CO_2$ emissions per unit of GDP have further decreased since 2005, which means that part of the decrease stated in China's INDC has already been achieved and the additional improvement from the present to 2030 is correspondingly lower.

For the majority of countries the $CO_2$ emissions per unit of GDP show a downward trend overall, but no drastic changes over the past few years. In absolute terms, the rate is lowest in Brazil and in the EU.

**Figure 4: $CO_2$ emissions per unit of GDP of Parties with largest emissions in 2014**




Parties listed on the left are known as developed country Parties. Parties listed on the right are known as developing (emerging) countries.

**Source:** European Commission Joint Research Centre (JRC) / PBL Netherlands Environmental Assessment Agency (2015), http://edgar.jrc.ec.europa.eu/. Note that the U.S. Dollar is adjusted by purchasing power parity of 2012.

## 5.2. United States of America

The United States of America is the world's second largest $CO_2$ emitter and has the highest per capita $CO_2$ emissions among the main Parties presented here. The United States plays a pivotal role in international negotiations, including the negotiations on the Paris Agreement, and the course U.S. climate policies will take in the future will be shaped on 8 November 2016, when the presidential and Congress elections will be held.

The United States is the only Party with a commitment under the Kyoto Protocol that has not ratified the Protocol, but it was one of the first developed countries to ratify the Paris Agreement (The White House 2016a; of the developed countries, only Norway had deposited its instrument of ratification at an earlier date).

### 5.2.1. Emission profile

As can be seen in Table 2, the United States contributed, in 2014, 15.0 % of the world's total anthropogenic $CO_2$ emissions (Olivier et al. 2015). Overall, U.S. greenhouse gas emissions peaked in 2007. After a decrease in the years after that, emissions increased again after 2012 and, in 2014, they were 7.4 % above the level of 1990.

According to the latest inventory submitted by the U.S., $CO_2$ accounted for 80.9 % of the total greenhouse gas emissions in 2014, followed by methane with 10.6 %, nitrous oxide with 5.9 % and fluorinated gases with 2.6 %. The share of methane has gained in importance compared to the inventories published in earlier years. This is due to a revision of the emissions from natural gas systems, which has affected all inventory years (U.S. Environmental Protection Agency 2016).

**Box 23: Methane emissions from natural gas extraction and distribution**

The combustion of natural gas results in lower $CO_2$ emissions per unit of energy produced compared to other fossil fuels. Therefore, the replacement of coal with natural gas for electricity generation in the United States over the past decade contributed to a decrease in $CO_2$ emissions from the energy sector. However, the extraction, transmission, storage and distribution of natural gas are associated with leakages and emissions of methane (the main component of natural gas). As methane is a potent greenhouse gas, its emissions play an important role in overall greenhouse gas emissions (U.S. Environmental Protection Agency 2016).

Based on new findings on the levels of these emissions (e.g., Brandt et al. 2014), the U.S. Environmental Protection Agency (EPA) has revised its emission estimates and explored ways to reduce these emissions. In a joint statement in March 2016, President Barack Obama and Canadian Prime Minister Justin Trudeau committed to reducing methane emissions from the oil and gas sector by 40-45 % below 2012 levels by 2025, through regulations for this sector and collaboration on federal measures. This goal was also adopted by Mexican President Enrique Peña Nieto in June 2016 under the "North American Climate, Clean Energy and Environment Partnership" (The White House 2016b, 2016c, see also chapter 5.9).

### 5.2.2. Climate Policies

In 2013 a comprehensive Climate Action Plan was laid out by President Obama covering policies and measures to reduce greenhouse gas emissions, prepare for the impacts of climate change and lead international efforts to combat and adapt to global climate change (U.S. Department of State 2014). Mitigation efforts cover, among others, increasing the use of renewable energy, energy efficiency and fuel economy standards. Adaptation efforts include measures to identify vulnerabilities, promoting resilience and managing risks e.g. of wildfires and floods.

Unlike many other countries, the United States addresses greenhouse gases under its air pollution legislation, following a Supreme Court ruling (U.S. Supreme Court 2007) that "greenhouse gases fit well within the […] capacious definition of 'air pollutant' " under the Clean Air Act. $CO_2$ emissions are sometimes referred to as "carbon pollution" by agencies such as the Environmental Protection Agency.

Following the Supreme Court ruling, the EPA started regulating greenhouse gas emissions under the Clean Air Act in 2011. The regulations include emission standards for light-duty vehicles, corporate average fuel economy standards, and a permitting programme for stationary sources. This regulation on stationary sources was extended by adopting the "Clean

Power Plan" (U.S. Environmental Protection Agency 2015, see Box 24), announced by President Obama and the EPA in August 2015.

**Box 24: The U.S. Clean Power Plan**

Under the U.S. Clean Air Act, the Environmental Protection Agency is authorised to issue standards, regulations or guidelines that address pollution from new and existing fossil fuel fired power plants.

For existing power plants, the EPA has introduced a state-based programme, setting state-by-state $CO_2$ emission goals ("performance rates") for the period 2022-2029 and for the year 2030. States are provided with several options for implementing state-wide plans to meet these goals. The EPA has also prepared a federal plan, to be applied to states that do not submit an approvable plan under the state-based programme.

For new, modified and reconstructed power plants, $CO_2$ emission standards have been introduced that apply nation-wide, based on emission limits achievable through the application of the best system of emission reduction (BSER) as determined by the EPA.

The implementation of the Clean Power Plan is estimated to reduce $CO_2$ emissions of the U.S. electricity sector in 2030 by 32 % compared to 2005.

Following the announcement of the Clean Power Plan, 29 states and a number of companies and industry groups challenged the plan in court. On 9 February 2016, the Clean Power Plan was put on hold by the Supreme Court, pending a further hearing by the Court of Appeals (Climate Policy Observer 2016a). Hearings at the United States Court of Appeals for the District of Columbia commenced on 27 September 2016 (The New York Times 2016).

On the other hand, it has to be noted that 18 states legally intervened in 2015 in support of the Clean Power Plan and several of them set ambitious emission goals for their power plants for 2030 and beyond (The Atlantic 2016).

The Clean Power Plan constitutes the centrepiece of the United States' Intended Nationally Determined Contribution (INDC), which was communicated in March 2015 (United States of America 2015). Recent research has shown, however, that the policies listed in the INDC may not be sufficient for achieving the emission reductions pledged for the year 2025 (Greenblatt and Wei 2016).

### 5.2.3. Implementation of the Paris Agreement

During the preparation of the Paris Agreement and up to the last hours of the COP in Paris, the United States was one of the most prominent and influential negotiators (cf. chapter 3.1). The United States is part of the Umbrella Group (cf. chapter 6.2), but also coordinates its position on main climate change issues with Parties such as China.

On 3 September 2016, the United States acted jointly with China, when on the eve of the G20 summit, the presidents of the two largest greenhouse gas emitters deposited their instruments of ratification of the Paris Agreement with United Nations Secretary-General Ban Ki-moon (cf. chapter 7.2.2). As the Republican-dominated Congress did not support the ratification of the Paris Agreement, President Obama used an executive order to ratify it (Reuters 2016a).

However, further implementation – as well as the overall U.S. climate policies – will be shaped by the next president and, to a lesser degree, by Congress and by the state governments. In that sense, the 2016 elections, held on 8 November (i.e. during the first week of the COP in Marrakesh) will be crucial.

In the following table, the positions of the two main presidential candidates in the 2016 elections are summarised (in addition to the Republican and Democratic candidates, a Libertarian and a Green Party candidate are on the ballot in many states).

**Table 3: Positions of the main U.S. presidential candidates on climate policies**

| Topic | Position of Donald Trump (Republican Party) | Position of Hillary Clinton (Democratic Party) |
|---|---|---|
| Adoption of the Paris Agreement | The Paris Agreement is rejected. Such an agreement is not binding without ratification by the U.S. Senate[1]. | The ratification of the Paris Agreement and its implementation is supported[2]. |
| Domestic emission reductions | No clear position is available. | Deliver the emission reduction pledges of the United States' Indented Nationally Determined Contribution of 2015. Put the country on a path towards cutting emissions by more than 80 % by 2050[2]. |
| U.S. Clean Power Plan | Revoke the U.S. Clean Power Plan[3]. | Fulfil or surpass the goals of the U.S. Clean Power Plan[2]. |
| Economic instruments | Subsidies for renewable energy producers are opposed[1]. | Provide competitive grants and other market-based incentives for states and communities. Cut tax subsidies for oil and gas companies[2]. |
| Vulnerability, impacts, adaptation | No clear position is available. | Invest in resilient infrastructure[1]. |
| Financial support | Stop payments to UN climate change programmes and to the UNFCCC[1]. | Provide support to developing countries in the areas of mitigation and adaptation[1]. |

**Source:**

[1] https://www.carbonbrief.org/us-election-tracker-republicans-democrats-energy-climate,
[2] https://www.hillaryclinton.com/issues/climate/,
[3] https://www.gop.com/the-2016-republican-party-platform/

Besides the presidential elections, other elections will be held on 8 November 2016. All seats in the House of Representatives, a third of the Senate seats and numerous governor and state legislature positions will be up for election. The outcome of these elections will also affect future U.S. climate policies.

**Box 25: Implications of U.S. Congress and state elections for climate policies**

Currently, Republicans possess a majority in both the Senate and the House of Representatives. Opinion polls suggest that these majorities may remain after the election – at least in the House of Representatives.

The Republican Congress majority during six of the eight years of Obama's presidency meant that mitigation action was mainly based on executive orders and channelled through the Environmental Protection Agency and no comparable initiatives originated from Congress. This situation can be expected to continue if the combination of a Republican Congress and a Democratic president remains after the election.

On the state level, the elected lawmakers and governors will shape the implementation of the Clean Power Plan. However, in cases where states do not comply with the provisions of the Plan, the EPA can step in with a federal plan.

Whether the EPA can actually implement the Clean Power Plan may still depend on the election results on the national level: The Plan has been halted by the Supreme Court and will become effective only if the related legal challenges are resolved. Whether a final ruling of the Supreme Court will be in favour of the Plan is a question that is currently open. The Court is said to be split between three "conservative" and three "progressive/liberal" Justices and the seventh Justice may be casting the pivotal vote. The seat of this seventh Justice will be filled after the November elections – based on a possible proposal by the newly elected president and after confirmation by the newly elected Congress.

## 5.3. European Union

The European Union is the only group of countries which is a Party to the UNFCCC. The EU as well as its Member States committed to reducing their greenhouse gas emissions jointly under the Kyoto Protocol. For the second commitment period under the Kyoto Protocol, which was laid down in the Doha Amendment (cf. Box 6), all current Member States (plus Iceland) agreed to further reduce their greenhouse gas emissions in the period 2013-2020. The Intended Nationally Determined Contribution which was submitted in 2015 also applies to all current Member States combined.

The European Union and seven of its Member States deposited their instruments of ratification of the Paris Agreement on 5 October 2016 (see chapter 5.3.3, below).

### 5.3.1. Emission profile

As can be seen in Table 2, the European Union contributed 9.6 % of the world's total anthropogenic $CO_2$ emissions in 2014 (Olivier et al. 2015). In recent years, the EU has seen a steady decline of greenhouse gas emissions due to the implementation of various European and national regulations e.g. in the field of energy efficiency and renewable energy use. There are also two distinct phases of steeper greenhouse gas emission reductions since 1990: at the beginning of the 1990s due to, inter alia, an economic restructuring of the Eastern European economies and from 2008 onwards in the aftermath of the economic crisis.

The total greenhouse gas emission reduction of the 28 EU Member States from 1990 to 2014 was -24.4 % excluding LULUCF (EEA 2016a). Consequently, the EU will most probably overachieve its emission reduction target of minus 20 % until 2020 as foreseen in the second commitment period under the Kyoto Protocol. During this period emissions were reduced in all sectors but transport (including international transport) and refrigeration and air conditioning. The decrease in emissions occurred in the manufacturing industries, the household and service sector and in public electricity/heat production, whereas emissions from road

transport and from the use of halocarbons (fluorinated gases) increased substantially after 1990.

Between 2013 and 2014 emissions decreased significantly (by 4.1 %), accompanied by an increase of GDP of 1.4 %. The emission reduction in 2014 was mainly triggered by a lower heat demand in particular from households as a consequence of mild conditions in Europe in the winter months. In 2014, $CO_2$ emissions amounted to approx. 81 % of the total greenhouse gas emissions, followed by methane and nitrous oxide with 11 % and 6 % of the total emissions respectively (EEA 2016a).

### 5.3.2. Climate Policies

EU climate policies can be roughly divided into four phases:

**Table 4: Overview of EU climate policies**

| Policies | Time period |
|---|---|
| Policies and measures for the first Kyoto commitment period, including the EU Emissions Trading Scheme (EU ETS) | 2008-2012 |
| The 2020 climate and energy package to meet the target of the second Kyoto commitment period, including the EU Emissions Trading System and national emission reduction targets. | 2013-2020 |
| The 2030 Climate and Energy Policy Framework, which forms the basis for the EU's Intended Nationally Determined Contribution (INDC). | 2021-2030 |
| A long-term strategy for a low-carbon economy, as laid out in the 2050 low-carbon economy and the energy roadmap. | 2031-2050 |

**Source:** Decisions, Directives and Commission Communications as outlined in the text below.

The EU Climate and Energy package (adopted in 2009) includes targets to reduce EU greenhouse gas emissions by at least 20 % by 2020 compared to 1990; to increase the share of renewable sources in energy consumption to 20 % by 2020 and to reduce the total primary energy consumption by 20 % by 2020, compared to a business as usual baseline (known as the "20-20-20 targets").

In order to meet these targets, the EU Emissions Trading System (ETS), including a single EU-wide emissions cap, was introduced as well as the EU Effort Sharing Decision (ESD, Decision No 406/2009/EC), setting binding annual targets for Member States at national level for 2013 to 2020. The latter is relevant for sectors not covered by the EU ETS (housing, services, agriculture, waste and transport, excluding aviation as well as industrial sources not covered by the ETS). In addition, Member States were assigned binding national targets under the Renewable Energy Directive (Directive 2009/28/EC). These policies are complemented by EU-wide and national measures addressing areas such as energy efficiency, low carbon technologies and transport.

For the time period beyond 2020, in its Climate and Energy Policy Framework (European Commission 2014, Council of the European Union 2014) the EU is committed to a target of an at least 40 % domestic reduction of greenhouse gas emissions by 2030 compared to 1990, a renewable energy target of at least 27 % of final energy consumption and a 27 % target

for improving energy efficiency (known as the "40-27-27 targets"). The energy efficiency target will be reviewed in 2020 having in mind a 30 % target.

The 40 % reduction of greenhouse gas emissions is the centrepiece of the European Union's INDC. In 2016, work within the EU focused on substantiating the Climate and Energy Policy Framework, i.e. on drafting the legislation for achieving the 40 % emission reduction.

**Box 26: The European Commission's "Low emission economy package"**

On 20 July 2016, the European Commission presented a package of measures to accelerate the transition to a low-carbon economy. The package consists of a proposal for a Regulation on the Member States' binding annual greenhouse gas emission reductions (European Commission 2016a), a proposal for a regulation on including the LULUCF sector (cf. Box 19) into the 2030 climate and energy framework (European Commission 2016b) and a Commission Communication on "A European Strategy for Low-Emission Mobility" (European Commission 2016c).

The two legislative proposals address in particular the period from 2021 to 2030 and are part of the implementation of the Climate and Energy Policy Framework (Council of the European Union 2014), the European Union's INDC (European Union 2015) and, hence, the EU's commitment under the Paris Agreement.

The overall emission reduction target of -40 % compared to 1990 translates into a -43 % reduction in the sectors covered by the EU ETS compared to 2005, and a -30 % reduction to be achieved by the EU Member States, again compared to 2005. The various Member States are allocated different targets, depending on their different capacities to implement additional mitigation measures. The resulting Regulation will be known as the "Effort Sharing Regulation", similar to the "Effort Sharing Decision" for 2012-2020 (mentioned above).

Given the far-reaching measures which are needed to fulfil the targets of the Effort Sharing Regulation, it can be expected that it may take quite some time until the Council and the European Parliament will be able to adopt the Regulation. In addition, the targets of Member States may need to be adjusted because the United Kingdom may not be contributing to the EU's target once it has left the European Union (see Box 27).

With regard to the EU's long-term climate strategy, the European Commission has adopted policy documents to promote the discussion on the long-term framework of climate and energy policies in Europe. These include a roadmap on moving towards a competitive low carbon economy in 2050 (European Commission 2011a), an energy roadmap 2050 (European Commission 2011b) a White Paper on competitive and efficient transport systems (European Commission 2011c) and a bioeconomy strategy (European Commission 2012). The roadmap for moving towards a competitive low carbon economy suggests that by 2050 the EU should reduce its greenhouse gas emissions by 80 % compared to 1990 levels.

**Box 27: Implications of the United Kingdom's plan to leave the European Union ("Brexit") for international climate change policies**

On 23 June 2016, voters in the United Kingdom (UK) voted to leave the European Union. Withdrawal from the EU will become effective within two years after the United Kingdom's government notifies the European Council; this notification is planned for March 2017. The exit from the European Union ("Brexit") has a wide range of implications for the EU's and the UK's international relations and obligations, including those related to climate change. In the following, some of the main aspects are listed.

- **Obligations under the Paris Agreement**: As the European Union ratified the Paris Agreement before "Brexit" becomes effective, the commitments as described in the INDC (cf. Box 8) apply to the remaining EU Member States plus the UK. It is currently open what kind of arrangement the United Kingdom and the European Union will choose to ensure that the commitments are fulfilled; it is possible that the UK will decide to adhere to those parts of the EU legislation which are related to the European Union's international commitments in the area of climate change.
- Under the Paris Agreement, the European Union plus the United Kingdom are invited to communicate a **long-term low greenhouse gas emission development strategy** (LEDS). The deadline, according to Decision 1/CP.21, is 2020, which is likely to be after the UK's withdrawal from the EU has become effective. Again, the EU and UK may decide to communicate a common LEDS.
- **Updating of the Effort Sharing Regulation**: In the draft Effort Sharing Regulation for 2021-2030 (cf. Box 26) the United Kingdom has an above-average emission reduction target. If the UK does not take part in the reduction effort, this will have to be compensated by other Member States (cf. Carbon Brief 2016). However, the Effort Sharing Regulation may be finalised before the UK's withdrawal becomes effective, and the UK may adhere to its provisions.
- **European Union Emissions Trading System** (EU ETS): After leaving the European Union, the United Kingdom will not be required to participate in the EU ETS. However, it may decide to be part of it, in a similar way as Iceland, Liechtenstein and Norway which are currently part of the EU ETS.
- The United Kingdom, its **research institutes and business organisations** play a leading role in international climate change action, support and science. It is expected that UK institutes and organisations will continue to play an important role in the future, and the United Kingdom may emerge as a separate actor in international climate negotiations.

### 5.3.3. Implementation of the Paris Agreement

During the preparation for the COP 21 the European Union stressed that the agreement should contain mitigation commitments by all Parties, acknowledging different national circumstances and evolving economic realities and capabilities. The European Union was a proponent of the dynamic five-year cycle for submitting new or updated commitments under the Paris Agreement and will play an active role when the details of the global stocktake are negotiated.

As for adaptation, the EU holds the view that all Parties shall commit to plan, prepare for and respond to the adverse impacts of climate change. The European Union holds the view that risks of loss and damage are best addressed through ambitious mitigation and adaptation actions.

As regards climate finance, the EU finance ministers reconfirmed their commitment to scale up climate finance in their conclusions of 10 November 2015 (Council of the European Union 2015). For the implementation of the Paris Agreement, it can be expected that the EU will continue to call for support from a wide range of sources, including emerging countries.

Also, transparency and accountability rules for all Parties are of central importance for the EU, although these rules may differ according to the type of commitment and the Parties' capabilities as well as the national circumstances.

The European Commission is aware that the transition to a low carbon, resource-efficient economy entails a fundamental shift in technology, energy production and consumption, economics, finance and with it, society. The European Commission highlights the following elements of an enabling environment for a low carbon transition (European Commission 2016d):

- Energy Union Transition: The aim of the Energy Union is the shift from an economy driven by fossil fuels to an economy committed to clean energy alternatives. Future investments in renewables will far exceed investments in fossil fuel power plants.
- Innovation and competitiveness: The EU is striving for greater competiveness of European low carbon and energy efficiency technologies. It is planning to join the "Mission Innovation", a global initiative launched on the fringes of COP 21, with the aim to stimulate clean energy innovation and the development of ground-breaking technologies.
- Investment and capital markets: The European Investment Project Portal (EIPP) has been launched by the EU to attract potential investors to viable investment projects in Europe. Scaling up private investment is seen as a crucial element of fostering the transition to a low carbon economy.
- Carbon pricing and fossil fuel subsidies: Carbon pricing (e.g. emissions trading, taxation and other instrument) is seen as an effective method to encourage transition. Sharing experiences with all countries that are active in this field will be intensified.
- The role of cities, civil society and social partners: The European Union strengthens work undertaken at city level and urban policies as both smart cities and urban communities will play an important role in the transformation process.
- Climate diplomacy and global action: The European Commission acknowledges that maintaining the positive momentum from Paris will require challenging policy making in the fields of development aid and cooperation with developing countries, technology transfer, trade, economic diplomacy, as well as neighbourhood and security policies.

The steps necessary for the ratification of the Paris Agreement by the European Union were taken at the end of September and beginning of October 2016. On 30 September 2016, at an extraordinary meeting of the Environment Council in Brussels, EU ministers approved the ratification of the Paris Agreement by the European Union (European Commission 2016e). On 4 October 2016, the European Parliament gave its consent to this ratification. Shortly thereafter, the Council of the European Union adopted the Decision on the Conclusion of the Paris Agreement in a written procedure (Council of the European Union 2016).

On 5 October 2016, ambassadors from the EU and seven of its Member States deposited their instrument of ratification of the Paris Agreement with the UN Secretary-General (United Nations 2016d). With the deposition of these instruments of ratification, the second threshold for entry into force of the Paris Agreement was surpassed (cf. chapter 4.1.3). The Member States which had already completed their national ratification procedures on that day were Austria, France, Germany, Hungary, Malta, Portugal and Slovakia. The other Member States,

according to the Council Decision mentioned above, shall endeavour to deposit their instruments of ratification as soon as possible.

## 5.4. India

India, currently the fourth largest $CO_2$ emitting Party, contributes 6.6 % of the world's $CO_2$ emissions. The reasons for this high ranking position are India's population size (second most populous country) and the expanding industry and service sector – partly affected by international outsourcing – driving the national consumption of energy and other resources. Per capita emissions, however, are much lower than those of most developed countries and China (Olivier et al. 2015).

### 5.4.1. Emission profile

As shown in Table 2, India contributed, in 2014, 6.6 % of the world's total anthropogenic $CO_2$ emissions. According to India's Second National Communication, $CO_2$ accounted for approx. 67.3 % of total greenhouse gas emissions in 2000, followed by methane with 26.7 % and nitrous oxide with 5.2 % (Government of India 2012).

The Indian economy has been growing rapidly since the 1990s, especially energy-intensive sectors such as power generation, steel, cement, refineries, chemicals, fertilisers and transport with low energy efficiency standards (Government of India 2012). From 2013 to 2014, India's $CO_2$ emissions increased by 7.8 % (average growth rate of 7 % over the past 10 years). Coal consumption accounted for 56.5 % of India's total primary energy consumption and coal consumption increased by 11 % from 2013 to 2014. Production as well as imports of coal and coke increased remarkably and are expected to further increase according to the 12$^{th}$ Five-Year Plan 2012-2017 (Olivier et al. 2015).

### 5.4.2. Climate policies

In 2008 India launched a National Action Plan on Climate Change, outlining so-called "national missions" including a national mission for renewable energy (Government of India 2008). In this area India has implemented two major renewable energy-related policies: the "Strategic Plan for New and Renewable Energy" (2011) and the' National Solar Mission' (2010), containing targets for solar energy. The "Strategic Plan for New and Renewable Energy" was developed in view of the economic growth and the enormous demand for electricity as well as the high dependence on fossil fuel imports (Government of India 2011).

Further initiatives introduced by the Indian Government are e.g. the introduction of a tax on coal (both produced within the country and imported) and the "National Mission on Enhanced Energy Efficiency", setting targets for the energy consumed by the country's largest industrial and power generation facilities. Furthermore, a target of a 20 % ethanol and biodiesel blend by 2017 has been adopted (Climate Action Tracker 2015c).

The "national missions" under the National Action Plan on Climate Change were revisited after Narendra Modi took office as Prime Minister in 2014 and supplemented by new initiatives such as the plan to increase renewable energy capacity (mostly solar) by the factor of five by 2022 (India 2015).

### 5.4.3. Implementation of the Paris Agreement

According to its INDC India is committed to reducing the emission intensity of its GDP by 33 to 35 % by 2030 compared to 2005. It aims at achieving an installed cumulative electric power capacity from non-fossil fuel based energy resources of 40 % by 2030 and at creating an additional carbon sink by increasing forest and tree cover (India 2015).

India holds the view that the focus of providing finance should remain with developed countries and public sources, rather than private investment, should be the main contributor to

finance. In the Paris negotiations, India also called for financial support for research and development. Similar to China, India sees the importance of addressing intellectual property rights (IPR) in the context of technology transfer.

**Box 28: The International Solar Alliance (ISA)**

At the COP 21 in Paris the International Solar Alliance (ISA) was launched jointly by India and France involving more than 120 countries (IISD 2015b). In April, at its third meeting, ISA also entered into a partnership with the United Nations Development Programme (UNDP). ISA is aiming for easier finance for the solar projects of member countries (Economic Times 2016).

At the beginning of October 2016, India ratified the Paris Agreement and the instrument of ratification was deposited with the United Nations Secretary-General on 2 October 2016 (United Nations 2016d).

## 5.5. Russian Federation

The Russian Federation is a leading producer of natural gas and oil, although in 2010, it was overtaken by the United States as the world's largest gas producer (Olivier et al. 2014). Its greenhouse gas emissions declined considerably at the beginning of the 1990s due to the closure of heavy industries after the collapse of the Soviet Union.

As a consequence of the decline in emissions since 1990, the Russian Federation over-achieved its emission commitment for 2008-2012 under the Kyoto Protocol. However, for the second commitment period under the Kyoto Protocol, the Russian Federation did not commit itself to a quantitative target (Decision 1/CMP.8).

### 5.5.1. Emission profile

The Russian Federation is the fifth largest emitter of $CO_2$, contributing 5.0 % of the global total anthropogenic $CO_2$ emissions in 2014 (Olivier et al. 2015). According to the most recent inventory data submitted for 2014, $CO_2$ accounted for approx. 59 % of the total greenhouse gas emissions, methane for 36 % and nitrous oxide for 3 % (Russian Federation 2016).

After an historical low in 1998, emissions have been increasing steadily, with the exception of a decrease in 2008 and 2009 in the wake of the global financial crisis. In the years 2013 and 2014 emissions again declined by 1.9 % and 1.5 % respectively (Olivier et al. 2015). In 2014 emission reductions were, *inter alia*, caused by a decreasing consumption of coal (Analytical Center for the Government of the Russian Federation 2015).

### 5.5.2. Climate policies

Policies and measures to mitigate climate change include legislative and regulatory acts to fulfil national commitments under the UNFCCC, as well as targeted measures and national programmes (Russian Federation 2014). Russia's climate policy has a clear focus on energy, setting energy intensity targets to be achieved in the period until 2020. Under the "Energy saving and energy efficiency improvement programme until 2020", Russia has committed to reducing energy intensity per GDP by 40 % in 2020 compared to 2007 levels.

This approach requires technological improvements and the elimination of non-economic risks and barriers, e.g. in the areas of energy efficiency, public transport, fuel economy, gas transportation and timber biomass (Kokorin and Korppoo 2014). Furthermore, environmental legislation exists for an improved recovery of petroleum gas and with regard to the technical requirements for oil companies (Climate Action Tracker 2015d).

### 5.5.3. Implementation of the Paris Agreement

The Russian Federation stated in its INDC that "limiting anthropogenic greenhouse gases by 25 to 30 % compared to 1990 levels by the year 2030 might be a long-term indicator", subject to unlimited and full use of forest sinks. No use of international market mechanisms is planned.

It has to be noted that the Russian Federation already has legally binding instruments in place to achieve at least a 25 % emission reduction ten years earlier, i.e. by 2020. The INDC would therefore not commit the Russian Federation to additional emission reductions from 2020 to 2030. As greenhouse gas emissions currently are still significantly below 1990 levels, the INDC in fact constitutes an increase in emissions between the current levels and 2030 (Carbon Brief 2015).

In climate negotiations, Russia puts forward its position as part of the Umbrella Group (cf. chapter 6.2). During a meeting with the French Minister of Ecology, Sustainable Development and Energy, Ségolène Royal, Russia's Deputy Prime Minister Alexander Khloponin indicated that a preparatory document for ratification of the Paris Agreement would be ready by October 2016. When the final ratification could take place has not yet been specified (Climate Home 2016b). Russia also indicated that they considered increasing their climate mitigation efforts for 2030.

The Paris Agreement was signed by Russia on 22 April 2016. However, in May 2016 Oleg Shamanov, Russia's climate negotiator, told Reuters that for Russia it was crucial to know the rules for the implementation of the Paris Agreement before joining it (Reuters 2016b), which indicates that Russia is not planning an early ratification of the Paris Agreement.

## 5.6. Japan

Japan contributed, in 2014, 3.6 % of the world's total anthropogenic $CO_2$ emissions and was thus the sixth largest emitter of $CO_2$. Japan currently has a population of about 126 million and, ranked by population, is the 10$^{th}$ most populated country in the world.

### 5.6.1. Emission profile

Japan's $CO_2$ emissions show a gradual increase after 1990, interrupted by the global economic crisis from 2008 to 2011, and resulting in a total increase of 9.3 % (compared to 1990) by 2014, and a decrease of 2.6 % compared to 2013 (Olivier et al. 2015).

With respect to the overall greenhouse gas emissions, $CO_2$ accounted for approx. 93 % of total emissions in 2013, followed by methane with 2.6 % and nitrous oxide with 1.5 % (expressed in $CO_2$ equivalents) (Ministry of the Environment 2016a).

Japan possesses very limited domestic energy resources and is therefore a major importer of natural gas, coal and oil. For this reason, Japan has only been able to meet less than 9 % of its primary energy demand domestically since 2012 in comparison to approximately 20 % before the shutdown of the nuclear power stations (Olivier et al. 2015).

### 5.6.2. Climate policies

Japan's energy policy in recent years was shaped by the aftermath of the Fukushima nuclear accident. In 2011, all nuclear power plants were taken off the grid, strict energy conservation measures were imposed and gas and coal fired power generation was increased. However, in 2014, nuclear power was included in Japan's Basic Energy Plan and the use of nuclear energy is planned to be resumed as a baseload power source by the current government (Olivier et al. 2015).

The Basic Energy Plan decided by the Cabinet Council in 2014 includes a re-evaluation of coal as energy source and gives coal a much more important role in baseload power generation

than up until now. Currently there are plans for 49 coal plants at various development stages. These plans are, *inter alia*, fraught with certain economic risks as well as carrying risks for Japans future climate obligations (Caldecott et al. 2016).

Japan had already introduced effective policies in the area of energy efficiency in the transport, industrial and commercial/residential sector. These policies were recently complemented by additional policies in the buildings sector, along with a global warming tax.

Starting in 2010, Japan introduced a Joint Credit Mechanism (JCM) to help spread Japanese technologies in climate change mitigation worldwide (in particular in Asia). It has to be noted that this mechanism was established independently of the Clean Development Mechanism under the Kyoto Protocol. Japan intends to use credits originating from this mechanism to help meet its future emission targets.

Japan participated in the first commitment period of the Kyoto Protocol, but is not committed to a target in the second commitment period.

#### 5.6.3. Implementation of the Paris Agreement

In its Intended Nationally Determined Contribution Japan presented an emission reduction target of 26 % below 2013 emission levels by 2030, which corresponds to an 18 % reduction below 1990 levels. Japan plans to achieve this mainly through a decrease of energy-related $CO_2$ emissions, based on energy efficiency measures and a shift from fossil fuels to renewable and nuclear power generation. In addition, Japan expects that measures in the LULUCF sector and credits from its Joint Credit Mechanism will contribute to achieving the target. During climate negotiations, Japan is working actively together with other members of the Umbrella Group (cf. chapter 6.2) as well as representing its interests bilaterally.

On 22 December 2015 the Global Warming Prevention Headquarters, a body chaired by the Prime Minister, formulated Japan's domestic response to the Paris Agreement. Japan intends to develop a governmental action plan and move forward with the preparations towards the signing and ratification of the Paris Agreement, and to actively contribute to the development of detailed international rules for the implementation of the Agreement (Ministry of the Environment 2016b).

During spring 2016 the draft government action plan was discussed and Prime Minister Shinzo Abe stated that this plan also indicates Japan's direction towards the long-term goal of reducing global greenhouse gas emissions by 80 % by 2050 (Prime Minister of Japan and His Cabinet 2016).

Japan signed the Paris Agreement in April 2016 and signalled in August 2016 its intent to ratify the agreement by the end of 2016 (Climate Analytics 2016).

### 5.7. Islamic Republic of Iran

The Islamic Republic of Iran was the seventh largest emitter of $CO_2$ in 2014. It has appeared on the list of the top ten emitters worldwide for the first time because emission estimates were revised upwards considerably by Olivier et al. (2015) based on the latest available energy statistics. The country has a population of approx. 79 million and is the seventeenth most populous country in the world.

#### 5.7.1. Emission profile

The Islamic Republic of Iran has the second largest oil reserves in the world and is a major producer of oil. Furthermore, it is the fourth largest gas producer with the second largest gas reserves in the world (LSE 2016b). As a consequence, the energy sector is responsible for more than 90 % of its greenhouse gas emissions (Islamic Republic of Iran 2015a). In 2010,

99 % of primary energy supply in the Islamic Republic of Iran came from its own oil and gas resources (Islamic Republic of Iran 2015b).

In the business as usual (BAU) scenario provided in Iran's INDC, it is anticipated that the energy sector will grow 4.7 % each year until 2030, which would result in a steep increase of greenhouse gas emissions from approx. 700 million tonnes of $CO_2$ equivalent in 2010 to over 1700 million tonnes in the year 2030 (Islamic Republic of Iran 2015b).

### 5.7.2. Climate policies

In this context, with Iran's energy system based on fossil fuels, the Iranian government concentrates on mitigation policies in the energy sector when it comes to addressing climate change (LSE 2016b). The Islamic Republic of Iran sees it as imperative to move to a more diverse energy supply mix (Islamic Republic of Iran 2015b).

The last national five year development plan 2010-2015 set a 30 % energy intensity reduction target. The Islamic Republic claims in its INDC that the international sanctions which were in place in these years prevented it from reaching this target and that energy intensity actually increased in recent years (Islamic Republic of Iran 2015a). Data from the time period after lifting the international sanctions are as yet not available and although energy intensity may decrease again after the lifting of the sanctions at the beginning of 2016, overall greenhouse gas emissions are expected to increase considerably due to the rebound in fossil fuel extraction and transport.

So far combating climate change has been envisioned in the Islamic Republic of Iran within the broader goal of sustainable development (LSE 2016b). An official national climate change action plan is currently being worked out (Islamic Republic of Iran 2015a).

### 5.7.3. Implementation of the Paris Agreement

Like other important oil producing countries, the Islamic Republic of Iran submitted its INDC shortly before the Paris conference in November 2015. This INDC contains plans for a 4 % decrease in emissions by the year 2030 compared to its business as usual scenario as an unconditional mitigation action (Islamic Republic of Iran 2015a). Apart from that it is stated that subject to the termination of sanctions and appropriate support, Iran could use its mitigation potential and achieve a further reduction of greenhouse gas emission by up to 8 % compared to the BAU scenario (Islamic Republic of Iran 2015a).

Unlike e.g. Saudi Arabia (cf. chapter 5.11), the Islamic Republic of Iran has committed itself to a quantified reduction of emissions compared to the BAU scenario. However, it is important to note that this reduction is small compared to the projected increase in emissions and that overall greenhouse gas emissions are likely to more than double by 2030. In this regard, it will be interesting to see whether the Islamic Republic of Iran will be able to follow the encouragement of Article 4.4 of the Paris Agreement, which is – for developing country Parties – to move towards economy-wide emission reductions or limitation targets over time.

The Islamic Republic of Iran is a member of the G-77 as well as the Like Minded Group of Developing Countries (cf. chapter 6.3).

In April 2016 the Islamic Republic of Iran signed the Paris Agreement. In July 2016 its Cabinet of Ministers ratified the Paris Agreement and sent it for final consent to the Majles, the unicameral legislative body. Once approved in this next instance, it will be signed by the President and deposited with the Secretary-General of the United Nations (WRI 2016c).

## 5.8. Republic of Korea

The Republic of Korea contributed, in 2014, 1.7 % of the world's total anthropogenic $CO_2$ emissions and is thus the eighth largest emitter of $CO_2$. Ranked by population, Korea is with approx. 50 million people the 26th most populous country in the world.

### 5.8.1. Emission profile

In 2012, 87.2 % of greenhouse gas emissions were caused by the energy sector, coming mainly from fossil fuel combustion (Republic of Korea 2014). The share of $CO_2$ in total greenhouse gas emissions was 90.9 % in 2012, followed by methane with 4.3 %, nitrous oxide with 2.1 %, HFCs with 1.3 %, $SF_6$ with 1.1 %, and PFCs with 0.3 %.

Korea's natural resources are very limited and as a result it is one of the top five importers of coal and liquid natural gas. Its economy is very susceptible to changes in the energy markets. Consequently, it is planned to enlarge Korea's nuclear power capacity in the future (Eschborn 2015).

Despite the growing importance of renewable energy sources, greenhouse gas emissions are increasing. This is due to the growth of energy-intensive industries (e.g. chemical and primary metal industry) and the related use of coal and gaseous fuels.

Between the years 1990 and 2012 greenhouse gas emissions rose by 133 % in Korea (Republic of Korea 2014). Nevertheless, partial decoupling of emissions from GDP has been achieved since the Asian financial crisis in 1997. The 1998-2007 manufacturing output doubled while emissions rose by one third, which shows that energy efficiency has improved and a step towards shifting away from energy intensive activities has taken place (OECD 2012).

### 5.8.2. Climate policies

In 1998 a Special Committee on Climate Change was founded, which drafted the Comprehensive Action Plans for Climate Change to promote strategies related to the environment, industry and international cooperation. "Low Carbon, Green Growth" was established as a national vision (Republic of Korea 2012).

The Republic of Korea has implemented a Green Growth Strategy, a comprehensive policy package targeting all policy areas including climate change. One of its key policies is a cap and trade scheme introduced in January 2015 (Climate Action Tracker 2015e).

### 5.8.3. Implementation of the Paris Agreement

In its INDC, submitted ahead of COP 21, the Republic of Korea committed itself to reducing its greenhouse gas emissions by 37 % compared to a business as usual scenario (which assumes a steady growth in emissions) by 2030 (Republic of Korea 2015). Korea plans to use carbon credits from international market mechanisms to achieve this target.

This approach was criticised for lacking ambition because, due to the use of market mechanisms, domestic reductions may be significantly lower and their level cannot be predicted as they depend on the further development of the business as usual scenario (Climate Action Tracker 2015e).

Korea joined forces with other countries in the Environmental Integrity Group (EIG, cf. chapter 6.9) and is actively working together with them to represent and advance its interests.

Currently the government of the Republic of Korea is finalising a 2030 Roadmap for reducing greenhouse gases, as well as developing an evaluation system to oversee progress toward its goal. The Republic of Korea signed the Paris Agreement in April 2016. At the ceremony, Yoon Seong-kyu, Minister of Environment, stated that Korea would prepare for ratification in its National Assembly so that the Agreement could be put into effect swiftly (Korean Culture

and Information Service 2016). There is no further information available as to when Korea will officially ratify the Paris Agreement.

## 5.9. Canada

Canada is the second largest country in the world by surface area, with a population of approx. 36 million citizens. Canada was the ninth largest emitter of $CO_2$ in 2014, with a share of 1.6 % in global $CO_2$ emissions.

### 5.9.1. Emission profile

Since 1990, Canada's greenhouse gas emissions have shown an increasing trend, driven primarily by an increase in emissions from the fossil fuel industries and transport, with a plus of 28 % until 2014. Canada (as well as the United States, China and Argentina) produces shale gas and shale oil on an industrial scale (Olivier et al. 2015).

Carbon dioxide contributed 78 % of Canada's total greenhouse gas emissions, mainly as a result of the combustion of fossil fuels. Methane, largely from fugitive sources in oil and natural gas systems, accounted for 15 % and $N_2O$ for 5 % of the total emissions. In 1995, greenhouse gas emissions started to be decoupled from economic growth. This shift can be attributed to increases in efficiency, the modernisation of industrial processes, and structural changes in the economy. In the last few years however, emissions intensity seems to have followed a stabilising trend (Environment and Climate Change Canada 2016).

### 5.9.2. Climate policies

Canada's climate change plan aims at regulating greenhouse gas emissions on a sectoral level. Federal, provincial as well as territorial governments have adopted action plans to address climate change and investments in clean energy technology and other non-regulatory measures shall help reduce emissions in the longer term (Canada 2014).

In December 2011, Canada notified the Secretary-General of the United Nations that it was going to withdraw from the Kyoto Protocol. Withdrawal became effective in December 2012.

However, after the election in October 2015 and with the newly elected Prime Minister Justin Trudeau the course of Canada's climate and energy policy changed. This became visible during the COP in Paris, e.g. with Mr. Trudeau's assertive speech during the Leaders Event (UNFCCC 2015f). Nevertheless, Canada's INDC still represents the less ambitious position of the previous government.

In June 2016 Canada, the United States and Mexico forged a North American Climate, Clean Energy and Environment Partnership, which aims at generating 50 % of power from "clean energy", which includes renewable and nuclear energy as well as carbon capture storage, by 2025. Currently, the three countries combined are generating 37 % of their electricity by "clean energy", whereby more than 80 % of the total amount of electricity used is consumed by the United States. Furthermore, the partnerships targets a cut in methane emissions by 40-45 % to be achieved by 2025 (The White House 2016b, 2016c, Wade 2016, see also Box 23).

### 5.9.3. Implementation of the Paris Agreement

In its Intended Nationally Determined Contribution, Canada has committed itself to reducing its greenhouse gas emissions by 30 % below 2005 levels by 2030. International mechanisms may be used to achieve this target (Canada 2015).

The INDC, prepared under the previous government, was criticised for lacking ambition, *inter alia* because it constitutes a modest emission reduction below 1990 levels only (Climate Action Tracker 2015f). It has to be noted that forest sinks are expected to play an important

role and therefore the actual pledged emission reduction excluding land use, land use change and forestry will be even smaller.

Although the liberal government is expected to take more ambitious action than the previous government, no specific policy changes have emerged so far, as these require the agreement of the Canadian provinces and territories (CBC 2016). Canada engages with the Umbrella Group (cf. chapter 6.2) to join forces with other like-minded countries and to advance its own national interests.

Canada signed the Paris Agreement in April 2016. The instrument of ratification was deposited by Canada on the same day the European Union deposited its instrument of ratification – on 5 October 2016 (United Nations 2016d).

## 5.10. Brazil

Brazil is ranked tenth in the list of largest emitters of $CO_2$. In 2014 Brazil had a share of 1.4 % of the world's total anthropogenic $CO_2$ emissions (see Table 2).

### 5.10.1. Emission profile

In 2010, $CO_2$ emissions contributed approx. 58 % of the total greenhouse gas emissions (expressed in $CO_2$ equivalents according to the IPCC's Second Assessment Report, see Box 29), followed by methane with 27 % and $N_2O$ with 14 % (Brazil 2016).

**Box 29: Metrics for comparing the effects of greenhouse gases**

In its Third National Communication (Brazil 2016), Brazil reports its greenhouse gas emissions without converting them to $CO_2$ equivalents. For countries emitting a high share of greenhouse gases other than $CO_2$, it is relevant how the effect of these gases on the climate system is compared to the effect of $CO_2$. In its National Communication, Brazil shows that its total greenhouse gas emissions would be lower if the effect of other greenhouse gases were converted using a Global Temperature Potential (GTP) approach, as opposed to a Global Warming Potential (GWP) approach, which is based on the overall warming effect of a gas over a given time period.

This is because methane, which is a relatively short-lived gas, plays a smaller role when looking at its effect on the global temperature at a certain point in time in the future, rather than over a given time period. Hence, Brazil's methane emissions would be less relevant when using a GTP approach, its emissions in $CO_2$ equivalents would be lower and its $CO_2$ emission reductions would stand out more prominently.

It has been pointed out that the GTP may be better suited to target-based policies, including policies related to the 2 degrees C goal, and the topic "common metrics to calculate the carbon dioxide equivalence of greenhouse gases" has been on the SBSTA agenda in recent years. At the SBSTA meeting in Bonn in May 2016 (cf. chapter 4.3), this topic was deferred until the next meeting in 2017, where it will be taken up and alternative metrics may find their way into the guidance on accounting for Parties' Nationally Determined Contributions.

The largest share of Brazil's net $CO_2$ emissions originates from land-use change, especially the conversion of forests to cropland and pasture. Due to the high share of renewable energy in the energy matrix, the share of $CO_2$ emissions from fossil fuel use is relatively small in Brazil.

More than 42 % of Brazil's energy supply comes from renewable energy sources such as water, biomass and ethanol, wind and solar energy. Hydroelectric power plants are responsible for approx. 67 % of the electricity generated (Brazil 2016). With approx. 8.6 % of global hydropower capacity Brazil ranks second after China with a 27.9 % share (REN21 2016).

### 5.10.2. Climate policies

In its National Policy on Climate Change launched in 2009 and its National Plan on Climate Change, Brazil aims at both reducing greenhouse gas emissions and strengthening removals by sinks. These plans have been elaborated in a participative process, involving representatives of academia, the scientific community, economic sectors and civil society organisations.

Brazil has addressed all main emitting sectors, but the focus of actions taken has been on forestry laws that help protect native forest. This includes the National Forest Code and the Action Plans for Deforestation Prevention and Control (Climate Action Tracker 2015g).

### 5.10.3. Implementation of the Paris Agreement

According to its INDC submitted in September 2015, Brazil intends to commit itself to the following goals (Brazil 2015):

- reduce greenhouse gas emissions by 37 % below 2005 levels by 2025;
- increase this reduction of emissions to 43 % below 2005 levels by 2030 (indicative goal);

It has to be noted that, unlike other major developing countries, Brazil commits to a substantial absolute reduction of greenhouse gas emissions relative to the base year of 2005. In its INDC, Brazil also points out the importance of adaptation and of the complimentary role of South-South cooperation.

In climate negotiations, Brazil puts forward its position as member of the group of G-77 and China (cf. chapter 6.1). Brazil has been generally cautions about weakening the differentiation between developing and developed countries and pointed out the importance of financial support from developed countries.

The Paris Agreement was signed by Brazil on 22 April 2016. On 12 September 2016, Brazil's President Michel Temer signed the ratification document after approval by both houses of Congress (Reuters 2016c). The instrument of ratification was deposited with the UN Secretary-General on 21 September 2016 (cf. chapter 4.4.3).

## 5.11. Other Parties

In the year 2014 **Saudi Arabia**, which currently has a population of approx. 33 million people, was the eleventh largest emitter of $CO_2$. It is the world's largest oil producer and exporter. As such, Saudi Arabia may be affected by mitigation policies in countries importing fossil fuels ("response measures", cf. Box 17), e.g. through a decreasing demand for oil in the future. Hence, Saudi Arabia was a proponent of a mechanism to support countries affected by response measures. Saudi Arabia faces additional challenges, including a rapid increase in domestic consumption of fossil fuels and youth unemployment. For this reason, Saudi Arabia is nowadays placing more emphasis on economic diversification and raising this as a topic in the UNFCCC negotiations.

In November 2015, Saudi Arabia submitted its INDC (Saudi Arabia 2015) which lays out plans for such diversification, e.g. in the areas of energy efficiency and renewable energies, which are expected to create mitigation co-benefits. Likewise, adaptation measures, such as water management and urban planning, are listed which are also expected to create mitigation co-benefits. During the negotiations in Paris, Saudi Arabia voiced its views prominently

and e.g. opposed the inclusion of terms such as “decarbonisation” and “carbon neutrality” in the Paris Agreement (IISD 2015b).

In the months after COP 21 Saudi Arabia announced wide-ranging plans to move away from oil and diversify its economy in the coming decades (Saudi Arabia 2016). In April, the Deputy Crown Prince Muhammad bin Salman announced an initial public offering of a stake in Saudi Aramco, the national oil company, and investment in a wide range of non-oil industries. In July, the Saudi Arabian Oil Minister stated that the kingdom was fully committed to the Paris Agreement and could formally join it by November 2016 (Climate Home 2016c).

Saudi Arabia has not signed the Paris Agreement by the beginning of October 2016, but sent some public signals that it still intends to sign and ratify it in 2016.

**Mexico** is with approx. 122 million inhabitants the eleventh most populous country in the world and was the twelfth largest emitter of $CO_2$ in 2014. Mexico, besides the Republic of Korea, is the only developing (emerging) country in the Environmental Integrity Group (cf. chapter 6.9). In its INDC submitted in March 2015, Mexico committed itself to an unconditional emission reduction of 25 % compared to business as usual by 2030 (Mexico 2015).

In June 2016 Mexico established (together with the United States and Canada) the “North American Climate, Clean Energy and Environment Partnership”, which aims at generating 50 % of power from “clean energy”, which includes renewable and nuclear energy as well as carbon capture storage, and at a cut in methane emissions by 40-45 %, both to be achieved by the year 2025 (The White House 2016b, 2016c, see also chapter 5.2 and 5.9).

Mexico signed the Paris Agreement in April 2016. The instrument of ratification was deposited with the United Nations Secretary-General on 21 September 2016 (United Nations 2016c).

In 2014 **Indonesia** was the thirteenth largest emitter of $CO_2$. Indonesia currently has a population of approx. 259 million inhabitants, which makes it the fourth most populated country in the world.

The main sector contributing to greenhouse gas emissions is Land Use, Land Use Change and Forestry, followed by energy, peat fire related emissions, waste, agricultural and industry. Indonesia’s final energy consumption has been growing, in line with the country’s economic and population growth, with fossil fuels as the dominant energy source (Indonesia 2011). Loss of annual forest cover has increased over the last decade, with an acceleration of the trend in recent years (Climate Action Tracker 2015h).

In its INDC Indonesia committed to an unconditional reduction of greenhouse gas emissions compared to the business-as-usual scenario of 26 % by 2020 and 29 % by 2030. This reduction will be met without the use of international market mechanisms. With support provided through international cooperation, Indonesia expects to be able to increase its contribution up to 41 % (Indonesia 2015).

Indonesia signed the Paris Agreement in April 2016. Preceding the high-level signature ceremony, the Minister of Environment and Forestry, Siti Nurbaya, indicated that the NDC, which is currently being prepared, should be more ambitious than the initially submitted INDC (WRI Indonesia 2016). Indonesia has publicly signalled its goal to be among the first 55 countries to ratify the Paris Agreement (Minister of Environment and Forestry Indonesia 2016) but has not yet ratified the Agreement by the beginning of October 2016.

**Australia**, with its approx. 24 million inhabitants, is the sixth largest country in the world by surface area. It was the fourteenth largest $CO_2$ emitter in 2014.

Emissions have risen by 24.8 % since 1990. With a share of 77.6 % the energy sector was the largest greenhouse gas emissions source in 2014 (Commonwealth of Australia 2016).

Australia submitted its INDC in August 2015. It is committed to reducing greenhouse gas emissions by 26 to 28 % below 2005 levels by 2030 (Australia 2015). It has to be noted that this would constitute a modest emission reduction (minus 0.5 %) compared to 1990 levels because emissions in 2005 were considerably higher and Australia intends to account for removals from LULUCF activities.

Australia signed the Paris Agreement in April 2016. Australia's Environment Minister aims for the ratification of the Paris Agreement by the end of 2016. At the same time he rejected calls to increase the ambition of its $CO_2$ targets (Climate Home 2016d).

**South Africa** is Africa's largest greenhouse gas emitter and was the fifteenth largest $CO_2$ emitter in 2014 worldwide. South Africa has approx. 56 million inhabitants.

Unlike many other developing countries, South Africa's greenhouse gas emissions arise largely from the energy sector (75.1 % in the year 2010). The energy intensity of South Africa's economy is mainly due to the importance of mining and minerals processing and to a coal-intensive energy system (South Africa 2014).

In its approach to tackle climate change, South Africa has focused mainly on the development of market-based mitigation mechanisms and on the promotion of renewable energy and energy efficiency (LSE 2015).

South Africa submitted its INDC in September 2015. It prominently proposes an adaptation component, with six goals for the period 2020 to 2030 and a support component. On mitigation, South Africa's commitment takes the form of a "peak, plateau and decline" trajectory. For emissions in 2025 and 2030, a wide range is given (approx. 400 to 600 million tonnes of $CO_2$ equivalent) (South Africa 2015).

South Africa signed the Paris Agreement in April 2016, but there is no further information available as to when South Africa will ratify the Paris Agreement.

# 6. GROUPS OF PARTIES

In the negotiations under the UNFCCC, Parties that share similar national circumstances or similar views often bring forward their positions in a coordinated way. Over the years, a number of groups have been established. These groups meet regularly during COPs and subsidiary body sessions to coordinate their positions, appoint negotiators for specific negotiation topics and adopt a common position in the statements prepared in the plenary, which are presented by one member "on behalf of the group".

In the following, a brief overview is given for each of these groups, including the group members and common characteristics. The groups' positions on international climate policies and on the implementation of the Paris Agreement are summarised.

During climate negotiations, the Coalition for Rainforest Nations (CfRN) also meets and contributes statements. This group is not presented here because it focuses on specific aspects such as REDD+ and the member countries of CfRN are part of other groups as well. Similarly, "Small Island Developing States" (SIDS) are a recognised group under the United Nations, but are not described here because in UNFCCC negotiations, the interests of these states are largely represented by the Alliance of Small Island States (AOSIS, see chapter 6.4).

The EU and its Member States coordinate their position in a way that is somewhat similar to other groups of Parties. Representatives of the EU and its Member States meet regularly before and during conferences and subsidiary body sessions. They appoint negotiators, and statements are made on behalf of the EU and its Member States. The position of the EU is presented in chapter 5.3.

Besides the groups of countries presented here, there are other groups and regular meetings of countries (such as the Group of Twenty) which are not directly related to climate negotiations. Nevertheless, the positions of their members and the statements made at such meetings have a high political importance and may affect the general direction of climate negotiations. Such groups and meetings are presented in chapter 7.2.

## 6.1. Group of G-77 and China

The "Group of 77 at the United Nations" (G-77) was founded in 1964 by 77 developing country signatories, in the course of the first United Nations Conference on Trade and Development. Since then, the group has grown to 133 ordinary member countries. The aim of G-77 is to "provide the means for the countries of the South to articulate and promote their collective economic interests and enhance their joint negotiating capacity on all major international economic issues within the United Nations system, and promote South-South cooperation for development" (G-77 2016). In 2016, Thailand acts as presiding country of the G-77.

The Peoples' Republic of China is not a full member of the G-77, but a "special invitee" and associate member (Masters 2014). Hence, the group taking a position in UNFCCC climate negotiations is known as "G-77 and China".

G-77 and China represent a large number of countries with diverse levels of development and diverging views. Many of its members are also affiliated with other groups (see chapters 6.3 to 6.8). Nevertheless, G-77 and China can be characterised through the following common position that it adopts on international climate policies:

The group emphasises the Convention's principle of "common but differentiated responsibilities and respective capabilities": It points out the particular responsibility of the developed countries due to their historically higher emissions and their larger financial, technological and institutional capacities. Consequently, the G-77 and China see that mitigation commitments must be a priority for developed country Parties.

Concerning adaptation, the group focuses on the challenges that its members are facing in adapting to a changing climate and calls for support from the developed countries for loss and damage. G-77 and China see financial support, technology transfer and capacity building as important pillars of the international response to climate change.

**Box 30: The Climate Vulnerable Forum (CVF) and the Vulnerable Twenty (V20) group**

Several G-77 members that are especially vulnerable to climate change founded the Climate Vulnerable Forum (CVF) in 2009. Though the forum did not actively participate as a group in the climate negotiations, it adopted several declarations and presented its activities in the run-up to and during recent COPs.

In October 2015, the finance ministers of twenty CVF member countries founded the Vulnerable Twenty (V20) group. They announced a series of actions to promote investment in climate resilience and low emissions develop At the start of the COP in Paris, the heads of state and senior representatives of the CVF member countries called for an ambitious mitigation goal and focus on adaptation and loss and damage in the "Manila-Paris Declaration" (CVF 2015b).

At the 44th session of the Subsidiary Body for Scientific and Technological Advice (SBSTA, cf. chapter 4.3), developing countries led by G-77 and China expressed their disappointment that no conclusions were reached about the issue of adaptation measures in the agricultural sector (TWN 2016). Considering the vulnerability of the agricultural sector and its importance for the livelihood of millions of people and their food security, adaptation in the agricultural sector to the effects of climate change is one of the key issues for many developing countries.

## 6.2. Umbrella Group

The Umbrella Group comprises a loose coalition of most Annex I Parties outside the EU and its Member States. It is composed of Australia, Canada, Japan, New Zealand, Kazakhstan, Norway, the Russian Federation, Ukraine and the United States, although it is not a group with formal membership such as the G-77. There are also three observer Parties to the Umbrella group: Belarus, Israel and Switzerland (Climate Policy Observer 2016b).

Most members of this group did not commit themselves to quantified emission limitation or reduction commitments in the second commitment period under the Kyoto Protocol (Decision 1/CMP.8). However, Australia, Kazakhstan, Norway, and Ukraine made a commitment. Despite their differences over current mitigation ambition, the members share a number of common positions.

Members of the Umbrella Group are characterised by historically high per-capita greenhouse gas emissions, although most of them have reduced their emissions in recent years. Some have been overtaken by developing countries in overall or per-capita greenhouse gas emissions. Consequently, they argued in the negotiations leading to the Paris Agreement that a strict distinction between developed country Parties and developing countries does not represent the situation as it is today. They emphasise the importance of mitigation not only in developed, but also in developing countries, and they point out the importance of a level playing field, i.e. common rules for all major emitters.

The Umbrella group is critical about issues which may require financial support, i.e. commitments/mechanisms in the areas of adaptation, loss and damage, finance, technology transfer and capacity-building. Umbrella Group members do not oppose such mechanisms, but they aim at limiting the effort needed to introduce and run these mechanisms. The group is in favour of increasing the transparency of these mechanisms, whereas they oppose additional

efforts to increase transparency in areas such as the review of greenhouse gas emission inventories.

For the Umbrella Group it is important that the Paris Agreement encourages developing countries to enhance their mitigation efforts and also provide support if they are in a position to do so. At the same time, they have accepted the outcome that developed countries should continue to take the lead in climate change action and support.

### 6.3. Like-Minded Developing Countries (LMDC)

The group of Like-Minded Developing Countries comprises Asian countries including China, India and Indonesia as well countries from Northern Africa, the Middle East and Latin America. On many topics, its views are similar to those of the G-77 and China, but more pronounced.

Like the G-77 and China, the LMDC emphasise the particular responsibility of developed countries due to their historically high emissions and, in this light, aim at retaining the distinction between developed and developing countries, similar to the distinction between Annex I and non-Annex I countries in the Convention. The group advocates financial support for developing countries, including support for loss and damage.

As the group includes oil-exporting countries that will be affected by a future decrease in fossil fuel use, it also points out the importance of reducing the impact of the implementation of response measures (cf. Box 17).

Throughout the negotiations in 2015, the LMDC stressed that loss and damage should play an important part in the new agreement. Their efforts have, inter alia, led to loss and damage being included as a separate Article of the Paris Agreement, reflecting the international community's growing understanding of the issue.

### 6.4. Alliance of Small Island States (AOSIS)

The Alliance of Small Island States brings together small islands and low-lying coastal countries and sees itself as their voice in the negotiations within the United Nations system (AOSIS 2016a). The alliance has 44 members and observers.

The key concern of AOSIS members is their vulnerability to the adverse effects of global climate change, such as sea level rise and changes in weather patterns. Hence, the group called for ambitious mitigation action, including increasing pre-2020 mitigation efforts and aiming at limiting the global temperature increase to 1.5 degrees C (Waqa 2014).

The mentioning of a long-term goal of 1.5 degrees C in the Paris Agreement can be seen as a success for AOSIS and the role of its members in the "high ambition coalition" during the negotiations (cf. chapter 3.1). Nevertheless, after the adoption of the Paris Agreement, AOSIS stressed the importance of fulfilling the commitments made with a time horizon of 2020. In particular, AOSIS sees the rapid ratification of the Doha Amendment as a crucial next step, together with the scaling up of climate finance, especially for the implementation of adaptation actions, to USD 100 billion (TWN 2016).

Besides the ambitious temperature goal, the introduction of a separate Article on loss and damage in the Paris Agreement is recognised as a great achievement. AOSIS stresses the importance of strengthening the Warsaw International Mechanism on Loss and Damage (WIM, cf. Box 11) (AOSIS 2016b). The review of the WIM will also be one of their main priorities for the COP 22 in Marrakesh.

### 6.5. African Group

The African Group has become increasingly visible in climate negotiations in recent years, laying out its positions regularly in the plenaries of the ADP and the COP. As COP 22 takes

place in Africa, it can be expected that the African Group and its members will aim for high visibility during the conference. One example is the Africa Action Summit, taking place on 8 November 2016 (cf. Box 37).

The African Group emphasises the principle of common but differentiated responsibilities and respective capabilities. It aims at parity between mitigation, adaptation and enhancing support, while referring to the increased burden that adaptation and loss and damage places upon developing countries.

The African Group particularly stresses the responsibilities of developed country Parties in the area of climate finance and technology transfer.

These positions of the African Group have found their way into the Paris Agreement, as it contains comprehensive provisions on adaptation, financing for developing countries with differentiated responsibilities and new provisions for technology transfer and capacity-building (cf. UNDP 2015).

**Box 31: The Africa Renewable Energy Initiative (AREI)**

The Africa Renewable Energy Initiative (AREI) was launched at the Paris Conference in 2015 with the overall goal to produce clean and affordable energy for the electrification of the African continent (PV Magazine 2015).

The AREI aims at supporting the installation of large-scale renewable energy capacity in Africa by 2020. The plan is to raise at least USD 5 billion, from bilateral, multilateral and other sources, including the Green Climate Fund (GCF) between 2016 and 2020, in order to leverage a further USD 15 billion in other investments. The initiative is led by the African Union's Commission, the African Group, the African Development Bank, the UN Environment Program (UNEP) and the International Renewable Energy Agency (IRENA) (UNFCCC 2016n).

## 6.6. Least Developed Countries (LDC)

Under the United Nations, countries are classified as "least developed" according to defined criteria for per capita income, human assets and economic vulnerability. Currently 48 countries are classified as LDC (UNCTAD 2015). These countries form a distinct group in the climate negotiations under the UNFCCC.

The key issues for LDCs that have emerged over the past few years are adaptation and, in particular, loss and damage. The LDC group points out their lack of resources to adapt to the effects of climate change and to compensate loss and damage. Consequently, the group calls for financial support, technology transfer and capacity building in these areas. The group opposes an increase in transparency in some areas as this may make it more burdensome to raise support. As the greenhouse gas emissions of LDCs are comparably small, they expect mitigation efforts to come from developed countries.

At the subsidiary bodies meeting in Bonn in May 2016 (cf. chapter 4.3), Tosi Mpanu-Mpanu, Chair of the LDC group, reiterated the commitment of the Least Developed Countries to play their part in the global energy transformation. He also said that for LDC negotiators, the securing of financial, technological and capacity-building support remains a key priority (LDC 2016). At the end of the Bonn meeting, the LDCs pointed out the lack in progress on adaptation of agriculture (TWN 2016).

At COP 22 in Marrakesh one of the main aims of the LDCs is to strengthen action on renewable energy. Therefore the LDCs are planning to launch the LDC renewable energy and energy efficiency initiative at COP 22 as a concrete mitigation action (LDC 2016).

### 6.7. Bolivarian Alliance for the Peoples of Our America (ALBA)

The Bolivarian Alliance for the Peoples of Our America consists of four South/Central American countries (Bolivia, Ecuador, Venezuela and Nicaragua) and seven Caribbean countries, including Cuba. It is an intergovernmental organisation which, *inter alia*, acts as a negotiating group on climate change issues.

Like other developing country groups, ALBA calls for ambitious mitigation action by developed country Parties and for finance and technology transfer.

In the negotiations on the Paris Agreement, ALBA countries stressed the importance of including non-market mechanisms as one of the options of international cooperation on mitigation (cf. chapter 3.2.1). The preamble to the Paris Agreement was drafted by a working group led by Venezuelan representative Claudia Salerno and it contains references to concepts such “Mother Earth” and “climate justice”, which had been put forward by Bolivia.

Non-market mechanisms and links to the 2030 Agenda for Sustainable Development (cf. chapter 9.1) continue to be important topics for ALBA countries in the implementation of the Paris Agreement (IISD 2016b).

### 6.8. Independent Alliance of Latin America and the Caribbean (AILAC)

The Independent Alliance of Latin America and the Caribbean brings together three South American (Chile, Colombia, Peru) and three Central American countries (Costa Rica, Guatemala, Panama). The group was established as a formal negotiating group in the course of the COP in Doha in 2012.

Unlike ALBA and other developing country groups, AILAC is in favour of global climate goals, rather than a strict distinction between developed and developing countries. On adaptation, AILAC supported the introduction of a global goal for adaptation in the Paris Agreement, along with collective and individual adaptation commitments, means of implementation and institutional arrangements (Mexico and AILAC 2014).

Concerning mitigation, AILAC holds the view that pre-2020 ambition efforts should be supported by enhanced finance, technology transfer and capacity building from developed countries.

### 6.9. Environmental Integrity Group (EIG)

The Environmental Integrity group comprises two large developing (emerging) countries (Mexico and the Republic of Korea) and three small developed countries (Liechtenstein, Monaco and Switzerland) that are neither part of the European Union nor of the Umbrella Group.

Their approach to climate policies can be characterised as more ambitious in several ways than the approach of other comparable Parties. Concerning mitigation, Liechtenstein, Monaco and Switzerland are committed to emission reductions in the second commitment period under the Kyoto Protocol and to further ambitious emission reductions in their INDCs. In areas such as loss and damage, diverse views exist within the group. Against this background, and despite the differences within the group, EIG can play an important role in the negotiations, bringing together different views and engaging in the search for a compromise (Climate Home 2015b).

As an example of the EIG members’ collaboration between developed and developing countries, Mexico joined the United States and Canada in the “North American Climate, Clean Energy and Environment Partnership” (cf. Box 23). Liechtenstein, Monaco and Switzerland may not be able to reach the mitigation goals stated in their INDCs through domestic action only and intend to make use of international cooperation.

## 6.10. Conclusions on the positions of groups

The last two groups mentioned above are good examples of a development observed in recent years which has led to a less strict division between "developing" or "developed" countries. This development was accelerated in the run-up to and during the Paris conference, e.g. in the formation of the "high ambition coalition" (cf. chapter 3.1).

In the Paris Agreement, it was possible to bridge all relevant divides between the groups, and the Agreement does not refer to the Convention's distinction between "Annex I Parties" and "non-Annex I Parties". Nevertheless, the concept of "common but differentiated responsibilities and capabilities" remains valid, and the various groups will continue to put forward their diverging positions in the negotiations.

In the following table, a summary is given of the main negotiating topics and of those groups that put their focus primarily on these topics.

**Table 5: Main negotiation topics and groups focusing on these topics**

| Topic | Group focusing on the topic |
|---|---|
| Ambitious mitigation action – limiting the global temperature increase to 1.5 degrees | AOSIS, LDC, African Group, ALBA |
| Adaptation goal and communication | G-77 and China, LMDC, African Group, AILAC |
| Loss and damage | G-77 and China, LMDC, African Group, AOSIS, ALBA |
| Scaled-up climate finance | G-77 and China, African group, LMDC, LDC, AOSIS, AILAC |
| Technology development and transfer | G-77 and China, African group, LDC, AILAC |
| Capacity-building | African group, LDC, AILAC |
| Transparency of action and support | AOSIS, Umbrella Group (for transparency of support) |

**Source:** IISD 2015b, IISD 2016b, authors' views.

# 7. OTHER STAKEHOLDERS

Besides the Parties to the Convention (196 countries plus the European Union), delegates from observer states and from observer organisations attend meetings under the UNFCCC. Currently, there is one observer state only – the Holy See. The observer organisations include:

- United Nations units and bodies established by the UN, such as the United Nations Environment Programme (UNEP) or the Intergovernmental Panel on Climate Change (IPCC)
- Inter-governmental organisations (IGOs), such as the International Energy Agency (IEA) or the Organisation for Economic Co-operation and Development (OECD)
- Non-governmental organisations (NGOs)

At COP 21 in Paris, participation reached new heights in COP history with over 2 000 admitted observer organisations and over 28 000 participants. Approximately 8 300 participants from such observer organisations were registered, as well as 17 200 participants from the Parties and 2 800 media representatives. In the last five years before Paris the number of admitted participants reached approx. 10 800 on average (UNFCCC 2016o).

In the following, an overview is given of those observer organisations and stakeholders that have figured most prominently in the current discussions on climate change, *inter alia* because they adopted clear positions on the Paris Agreement and its implementation. For the purpose of this report, these stakeholders are divided into three groups:

- NGOs and local government organisations (see chapter 7.1)
- Groups of countries (see chapter 7.2)
- International organisations (see chapter 7.3)

The aims of each of these stakeholders are presented in the following, along with their position on international climate policies, and, as far as available, on the implementation of the Paris Agreement.

## 7.1. NGOs and local government organisations

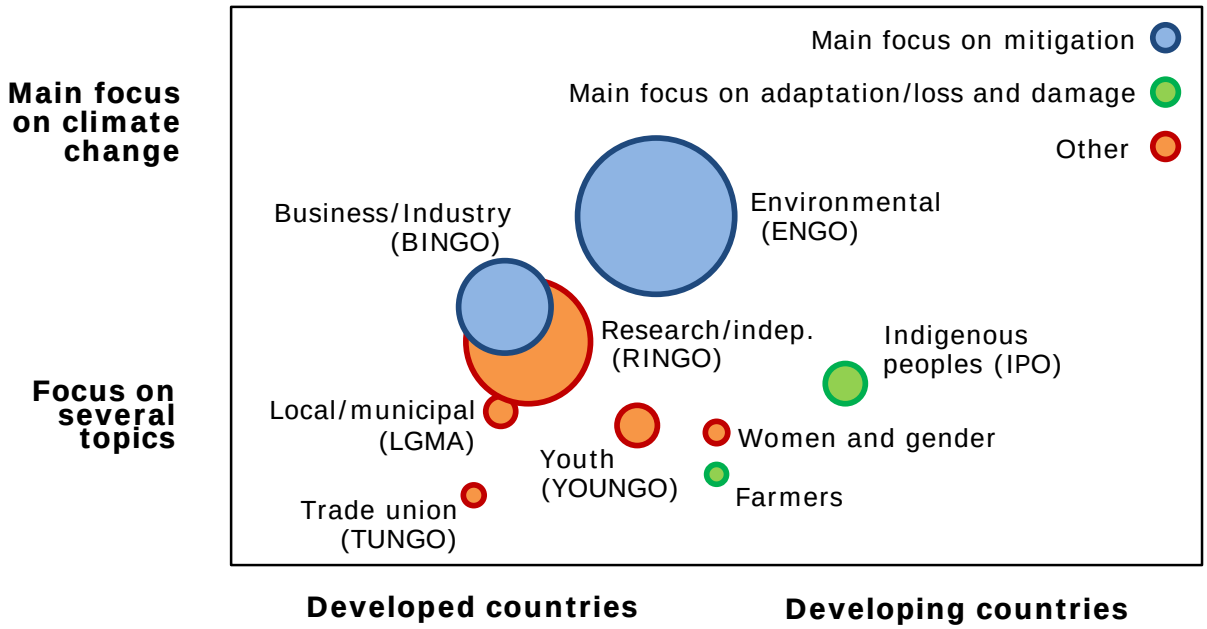
Non-governmental organisations actively participate in climate change conferences, through side events, exhibits and press releases. A total of more than 1 900 such organisations are currently admitted as observers under the UNFCCC.

On UNFCCC level, all organisations except intergovernmental organisations are often referred to as “NGOs” or “civil society”, although they also include local government and municipal authorities (LGMA). In this chapter, these local/municipal authorities are also described alongside with NGOs, as their role is indeed separate from the role of national governments and intergovernmental organisations and closer to NGOs.

Most representatives of the civil society are affiliated to one of nine constituencies (see Figure 5), which act as focal points in the climate negotiation process and in the interaction with the UNFCCC secretariat. Accredited observer status and affiliation to a constituency allow for contributing statements in plenary sessions and written submissions on negotiation topics as well as the organisation of side events.

In the following, these nine constituencies and their positions on international climate negotiations and policies are introduced.

**Figure 5: NGO and local government organisation constituencies**




The size (area) of the circles is proportional to the number of organisations registered under the constituency.

**Source:** Number of NGOs and country affiliations: List of admitted NGOs (UNFCCC 2016p). The division between developed and developing countries is based on the GDP per capita (World Bank Group 2016a). Country affiliation is based on where the head office is; organisations may be active in and represent both developed countries and developing countries. Main focus of work of the constituencies: authors' views.

### 7.1.1. Environmental non-governmental organisations (ENGO)

Almost 700 organisations are registered as ENGOs under the UNFCCC. In the following, three selected ENGOs are presented which are among the most active organisations involved in the process.

The Climate Action Network (CAN) is a worldwide network of over 950 NGOs in more than 110 countries, working to promote government and individual action to limit human-induced climate change to ecologically sustainable levels (CAN 2016a). CAN established regional network hubs that coordinate these efforts around the world. One regional network is CAN Europe with over 120 member organisations in more than 30 European countries.

CAN and its member organisation are visible and outspoken participants of climate change conferences. An important focus of CAN's work is on civil society mobilisation. CAN addresses the linkages between climate change and the 2030 Agenda for Sustainable Development (cf. chapter 9.1) and calls for a transition towards 100 % renewable energy sources (CAN 2016b).

Friends of the Earth International (FoEI) are a grassroots environmental network representing more than 2 million members and supporters in 75 different countries. FoEI campaign on today's most urgent environmental and social issues and seek to change the perception of the public, media and policy makers with well-reasoned policy analysis and promote solutions that will help to create environmentally sustainable and socially just societies (FoEI 2016).

One of FoEI's main concerns is climate justice and to take into account the developed countries' historically high greenhouse gas emission levels and the right of communities to choose their own sustainable energy sources. Hence, FoEI are of the opinion that the provisions under the Paris Agreement are not specific enough to ensure that the developed countries contribute their fair share to climate change action and support (FoEI 2015).

Greenpeace International is a global campaigning organisation, consisting of Greenpeace International in Amsterdam and 26 national and regional offices around the world, with a presence in over 55 countries. Their aim is to change attitudes and behaviour, to protect and conserve the environment and to promote peace (Greenpeace International 2016).

As regards the Paris conference and its outcome, Greenpeace International acknowledges the successful completion of a global agreement and the ambitious temperature goal, but points out that huge efforts are needed to reach this goal. Greenpeace International also welcomes the renewable energy initiatives launched during the conference, such as the International Solar Alliance (ISA, cf. Box 28), the Africa Renewable Energy Initiative (cf. Box 31), or initiatives announced by cities (cf. chapter 7.1.6) (Greenpeace International 2015).

### 7.1.2. Research and independent non-governmental organisations (RINGO)

Research and independent non-governmental organisations (RINGO) are organisations engaged in independent research and analysis that aim at developing sound strategies to address both the causes and consequences of global climate change (RINGOs 2016). The RINGO Steering Committee is composed of representatives from research institutes in the area of climate change, such as the International Institute for Sustainable Development, the University of Zurich or Wageningen University. RINGO representatives play an active part in climate change conferences, e.g. by organising side events to address a wide range of topics.

### 7.1.3. Business and industry non-governmental organisations (BINGO)

The International Chamber of Commerce (ICC) coordinates activities of Business and Industry Non-Governmental organisations (BINGO) related to the UNFCCC process. The aim of the ICC and its Commission on Environment and Energy is to help businesses meet the challenges associated with climate change (ICC 2016). The Carbon Disclosure Project (CDP) is an example of an NGO in the business and industry constituency, which operates a global disclosure system for investors, companies, cities and regions to manage their policies and risks related to climate change (CDP 2016).

Companies play a key role in the development and promotion of low-emission technologies and lifestyles. For examples of climate action initiatives of businesses, see the Non-State Actor Zone for Climate Action (NAZCA) under the Lima-Paris Action Agenda (LPAA, cf. Box 15). Links between energy/commodity markets and climate change are discussed in chapters 9.3 and 9.4.

### 7.1.4. Youth non-governmental organisations (YOUNGO)

During UNFCCC conferences, young people are given the opportunity to attend plenary sessions, to meet with officials and organise side events, exhibits or interviews. Their constituency (Youth non-governmental organisations, YOUNGO) regularly addresses plenaries and makes submissions (UNFCCC 2016q).

### 7.1.5. Indigenous peoples non-governmental organisations (IPO)

Indigenous peoples organisations are united in the International Indigenous Peoples' Forum on Climate Change (IIPFCC). At climate change conferences, IIPFCC representatives voice the concerns of indigenous peoples in areas such as climate change impacts, adaptation, mitigation, finance, recognition of indigenous peoples rights and traditional knowledge, and Free, Prior and Informed Consent (FPIC) (IIPFCC 2016).

### 7.1.6. Local government and municipal authorities (LGMA)

The constituency of local government and municipal authorities is coordinated by "ICLEI – Local Governments for Sustainability" (ICLEI 2016a); ICLEI stands for "International Council for Local Environmental Initiatives".

Both the local and the regional level play an important role in complementing national mitigation and adaptation actions. The Compact of States and Regions is an initiative for providing information on efforts to address climate change on state level and on the level of regional governments. Governments with existing greenhouse gas reduction targets can join the Compact by reporting a public commitment to reduce greenhouse gas emissions and a region-wide greenhouse gas inventory, which has to be updated annually (ICLEI 2016b).

In 2016, the state of California set an example of an ambitious goal on the sub-national level, by adopting a state-wide greenhouse gas emission reduction target of 40 % (compared to the level of 1990) by 2030. This goal was established in a senate bill which was signed by Governor Edmund G. Brown in September 2016 and will become effective in January 2017 (Office of Governor Edmund G. Brown Jr. 2016).

The State of California, together with the German Federal State of Baden-Württemberg, initiated the "Subnational Global Climate Leadership Memorandum of Understanding" ("Under 2 MOU"), which requires its signatories to reduce their greenhouse gas emissions by 80 to 95 %, or to limit them to 2 tonnes $CO_2$ equivalent per capita, by 2050; these emission reductions/limitations are compatible with limiting global temperature increase to less than 2 degrees C by the end of this century. As of September 2016, 135 jurisdictions from 32 countries, representing more than 780 million inhabitants, have signed or endorsed this Memorandum of Understanding (Under 2 MOU 2016).

On city level, the "C40 Cities Climate Leadership group" is a network of large cities collaborating in the areas of climate change mitigation and climate-related risk reduction (C40 2016). Under the leadership of C40, of ICLEI and of the United Cities and Local Governments (UCLG), the Compact of Mayors was launched in 2014 (Compact of Mayors 2016). The aim of the Compact of Mayors is, *inter alia*, to demonstrate the cities' commitment to ambitious global climate action and to accelerate collaborative and sustainable local action.

Another example is the Covenant of Mayors for Climate and Energy, under which more than 6 200 local and regional authorities across the European Union have committed themselves to meeting and exceeding the EU's greenhouse gas reduction target by increasing energy efficiency and developing renewable energy sources (Covenant of Mayors 2016). The current target year is 2030 and the Covenant integrates both mitigation and adaptation actions.

**Box 32: The Global Covenant of Mayors for Climate and Energy**

> In June 2016, the European Covenant of Mayors and the global Compact of Mayors formed a coalition. The aim of this new initiative is to facilitate collaboration between cities worldwide. It will provide a common platform for relevant data on the cities' energy and climate actions, which will allow for a comparison of the cities' achievements to those of other cities, and make them publicly available on a new Global Covenant of Mayors website, to be launched by January 2017 (European Commission 2016f).

Many of these initiatives on the urban and local level have been registered on the UNFCCC's NAZCA platform (UNFCCC 2016f), which was launched in 2014 under the Lima-Paris Action Agenda (cf. Box 15 in chapter 3.2.10).

#### 7.1.7. Women and gender non-governmental organisations

The women and gender constituency comprises 15 women's and environmental civil society organisations working to ensure that women's perspectives are embedded in the processes and results under the UNFCCC (WGC 2016). The topic "gender and climate change" has been on the agenda of climate change conferences since 2013, with discussions under the SBI (cf. Box 3) and in-session workshops.

#### 7.1.8. Trade union non-governmental organisations (TUNGO)

The International Trade Union Confederation (ITUC) works with its affiliates to include the labour movement on the climate agenda by focusing, *inter alia*, on emission reduction targets and differentiated responsibilities, and on developing a comprehensive strategy for a "just transition" for workers and communities to a low-carbon economy (ITUC 2016). With regard to the Paris Agreement, the ITUC has found that topics such as raised ambition and the fact that climate action has a big job potential are missing. Furthermore, it is of the opinion that the outcome is weak in regard to climate finance and support for the most vulnerable, but that a first step has been made, with the inclusion of human rights in the preamble, towards securing a fair transition for workers and their communities (ITUC 2015).

#### 7.1.9. Farmers non-governmental organisations

In UNFCCC negotiations, the farmers' constituency has been represented by varying organisations, most recently by the World Farmers Organisation (WFO). Initiatives such as the Climate Change, Agriculture and Food Security (CCAFS) programme work on strengthening the role of agriculture in areas such as technology transfer or Nationally Appropriate Mitigation Actions (NAMAs). NAMAs were established in the Bali Action Plan (Decision 1/CP.13) to reduce greenhouse gas emissions in developing countries. They are prepared under national governmental initiatives.

The discussion of climate measures in the agricultural sector was initiated at COP 17, followed by workshops and reports within the SBSTA (cf. chapter 4.3.2) and will convene again in Marrakesh at COP 22. The CCAFS initiative is actively contributing to this process, with input on issues such as early warning systems, the risk and vulnerability of agricultural systems and adaptation measures (Dinesh et al. 2016).

### 7.2. Groups of countries

Besides the organisations described above, other groups of countries exist which regularly voice their position on climate change. In this section, groups of countries and high-level dialogues are described.

Besides national governments, actors on the sub-national level (regions or cities) form groups and make their voice heard. In UNFCCC negotiations, representatives of such entities are classified under 'civil society'. They are presented in chapter 7.1.6, above.

#### 7.2.1. The Group of Seven (G7)

The Group of Seven (G7) consists of the major developed countries France, Germany, Italy, Japan, the United Kingdom, the United States and Canada. The European Union also participates in G7 meetings, which are held as annual summits to discuss international political and economic issues.

Climate change was already a main topic at the G7 summit in June 2015 in Germany. In the leaders' declaration (G7 2015), the G7 heads of state affirmed their strong determination to adopt an ambitious agreement, while also naming the 2 degrees C goal as well as making

mitigation commitments. Furthermore, the G7 underlined their commitment to climate finance and declared that a decarbonisation of the global economy is required in the current century.

At the 42nd G7 summit from 26 to 27 May 2016 in Japan the G7 leaders announced, in their declaration (G7 2016), their intent to take over the leadership in efforts towards an early entry into force of the Paris Agreement as well as its effective implementation. The G7 leaders reconfirmed their willingness to actively participate in the regular global stock-take process. Moreover, they committed themselves to the development and communication of long-term low greenhouse gas emission development strategies well before 2020.

The G7 also mentioned that the need to focus on emissions from international aviation was crucial, as were efforts to decide on the Global Market-Based Measure (GMBM), to enable carbon neutral growth from the year 2020 onwards. (For more information on international aviation see chapter 8.1.)

The issues put forward for debate also included energy and its central role in the decarbonisation of the global economy. Furthermore, the G7 renewed their commitment to eliminate inefficient fossil fuel subsidies and encouraged all countries to follow suit by the year 2025. This commitment was criticised for its lack of ambition and NGOs have urged the large countries to phase out subsidies for fossil fuels by 2020 (The Washington Post 2016a).

### 7.2.2. The Group of Twenty (G20)

In the decades since the founding of the G7, the share of this group in the GDP and in greenhouse gas emissions has decreased worldwide, and the share of the large emerging countries has increased in many respects. Hence, the Group of Twenty (G20), which comprises 19 major developed and emerging countries plus the European Union, has been playing an increasingly important role. In addition to the members of the G7, Argentina, Australia, Brazil, China, India, Indonesia, South Korea, Mexico, the Russian Federation, Saudi Arabia, South Africa and Turkey are members of the G20. The group was founded in 1999 and has been meeting regularly since 2008. Its aim is to enable high-level discussions of policy issues, to strengthen policy coordination as well as to promote international financial stability.

In July 2016, G20 Energy Ministers held a meeting in Beijing on sustainable global energy development, renewable energy and energy efficiency. Furthermore, energy technology innovation, energy demand and current policies on energy access were discussed (G20 2016a). Climate action was not a main topic of that meeting, but it moved centre stage when heads of state convened for the G20 summit in September.

On 3 September 2016, the day before the G20 summit, China's President Xi Jinping and U.S. President Barack Obama deposited their instruments of ratification of the Paris Agreement with United Nations Secretary-General Ban Ki-moon (The White House 2016a). This initiative was of exceptional significance for the process towards the entry into force of the Paris Agreement: The two largest emitters of greenhouse gases took the lead among the large economies in the ratification of the Agreement, calling for others to follow suit and causing a substantial leap upwards in the share of emissions covered by the ratifying Parties – which was then just 16 % short of the threshold of the 55 % required for the Agreement to enter into force (for more information on the status of ratification cf. chapter 4.1).

At the end of the G20 summit, on 5 September 2016, the G20 leaders reiterated their commitment to providing strong and effective support and taking action to address climate change. They committed themselves to completing their respective domestic procedures so that they will be able to join the Paris Agreement as soon as their national procedures allow them to do so (G20 2016b).

### 7.2.3. The Major Economies Forum on Energy and Climate (MEF)

Besides the G20, an overlapping group of countries exists which was founded in 2009 with a special focus on climate change – the Major Economies Forum on Energy and Climate (MEF). The MEF has 17 permanent participating economies and its aims are to

- "facilitate a candid dialogue among major developed and developing economies,
- help generate the political leadership necessary to achieve a successful outcome at the annual UN climate negotiations, and
- advance the exploration of concrete initiatives and joint ventures that increase the supply of clean energy while cutting greenhouse gas emissions" (MEF 2016a).

In 2016 the MEF met on 23 and 24 April on the margins of the UN General Assembly and the high-level signature ceremony of the Paris Agreement in New York (MEF 2016b) (For more information on the signature ceremony cf. chapter 4.1). At the centre stage of the MEF meeting was the question of how to continue the momentum initiated by the adoption and the signature ceremony of the Paris Agreement. The MEF representatives discussed their national processes for moving forward with the ratification of the Agreement and the implications of an early entry into force.

The discussions of the meeting also addressed the significance of pre-2020 action and the importance of high-level attention given to climate-related parallel efforts in other fora: the work undertaken to limit emissions from international aviation by the International Civil Aviation Organization (ICAO, cf. chapters 7.3.2 and 8.1) and the efforts made to address fluorinated gases under the Montreal Protocol (cf. chapter 8.3).

On 23 September the MEF met again on the sidelines of the UN General Assembly and discussed the implementation of the Paris Agreement and the preparation of COP 22, as well as links between climate change and global security (IISD 2016d).

### 7.2.4. Petersberg Climate Dialogue

The Petersberg Climate Dialogue is an informal meeting of ministers, chaired by Germany and the president of the upcoming COP, which has been taking place annually since 2010, when it was initiated at Petersberg near Bonn. It has since then provided an opportunity for Parties to exchange experiences about international climate policies in support of the UNFCCC negotiating process (BMUB 2016a).

At the seventh Petersberg Climate Dialogue in Berlin, Ministers and representatives from 35 countries met from 4 to 5 July 2016. The main outcomes of the meeting are summarised in the co-chairs' conclusions (BMUB 2016b). The main issues discussed were, *inter alia*, the importance of placing a focus on promoting an ambitious and swift implementation of the Paris Agreement, the importance of the development of mid-century long term strategies as well as the significance of financial markets in the attempt to work towards a low carbon and climate-resilient future.

At the Petersberg Dialogue, Germany announced an initiative to support developing countries with the implementation of their NDCs, by offering guidance in their institutional and political landscape, on their sectoral approaches as well as on financing and transparency. This "NDC Partnership" aims at accomplishing better harmonisation between various donor programmes and at combining existing climate and development goals. For links between climate change action and support and the UN Sustainable Development Goals, see chapter 9.1.

## 7.3. International organisations

### 7.3.1. Intergovernmental Panel on Climate Change (IPCC)

The Intergovernmental Panel on Climate Change (IPCC) is a scientific body established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to provide a scientific view on the current state of knowledge of climate change and its potential environmental and socio-economic impacts (IPCC 2016b). As an intergovernmental body, it is open to 195 member countries of the United Nations and the WMO. The Panel itself consists of representatives appointed by governments and holds plenary sessions once or twice a year.

The IPCC follows the aim to review and assess the most recent scientific information relevant to the understanding of climate change, but does not conduct its own research. Thousands of scientists from all over the world contribute to the work of the IPCC on a voluntary basis. Ensuring an objective and complete assessment of current information is an essential part of the IPCC process.

One of the main IPCC activities is the preparation of comprehensive Assessment Reports which compile state-of-the-art scientific knowledge to provide a basis for discussions on adaptation and mitigation solutions. The assessment is aligned along three topics respectively shared among three Working Groups.

**Table 6: IPCC Working Groups**

| Group | Topics assessed |
|---|---|
| Working Group I | Physical scientific aspects of the climate system and climate change |
| Working Group II | Vulnerability of socio-economic and natural systems to climate change, consequences of climate change, and options for adaptation |
| Working Group III | Options for mitigating climate change |

**Source:** IPCC (2016b; 2016c).

Since its inception in 1988 the IPCC has prepared five multivolume Assessment Reports. The Fifth Assessment Report (AR5) was released first in September 2013, with the complete version of the Synthesis Report published in March 2015 (IPCC 2015). Key findings of the Synthesis Report are that human influence on the climate system is clear, that continued emissions of greenhouse gases will cause further warming and long-lasting changes to all components of the climate system, and that adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change.

Over 830 scientists from over 80 countries were selected to form the author teams producing the AR5. They, in turn, drew on the work of over 1 000 contributing authors and over 1 000 expert reviewers. AR5 assessed over 30 000 scientific papers.

The IPCC is currently in its sixth assessment cycle, during which three Working Group contributions to the Sixth Assessment Report (AR6) are expected to be released in 2020 and 2021, and a Synthesis Report is expected to be completed in the year 2022.

The IPCC also produces Special Reports and Methodology Reports which provide practical guidelines for the preparation of greenhouse gas inventories. In the Decision on the Paris Agreement (Decision 1/CP.21) the IPCC was invited to provide a Special Report on the "im-

pacts of global warming of 1.5 degrees C above pre-industrial levels and related global greenhouse gas emission pathways". This report will form the scientific basis for the facilitative dialogue in 2018 (cf. chapter 3.2.8).

The scoping meeting for this Special Report was held in August 2016 (IISD 2016e). The 1.5 degrees C Special Report will integrate knowledge and perspectives from all the three Working Groups. The IPCC strives to make this report relevant for policymakers and at the same times easily understandable for a non-scientific audience. In the scoping meeting, the draft outline was decided on which includes the chapters suggested with a proposed content. It was published on the IPCC website in mid-September 2016 (IPCC 2016d). The IPCC will modify and decide on the proposed content at its next plenary meeting, which will be held from 17 to 20 October 2016 (after the completion date of the present study). Information on the outcome of this meeting can be found at website of the IPCC secretariat (IPCC 2016a).

Two other Special Reports are currently being prepared, the first one on "oceans and the cryosphere" and the second on land surface issues, namely "desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems". It is currently planned that these two reports will be finalised in 2019 (IPCC 2016e).

Information on the IPCC plenary meeting which took place in April 2016 can be found in chapter 4.4.1.

### 7.3.2. International Civil Aviation Organization (ICAO)

The International Civil Aviation Organization (ICAO), founded in 1944, is a specialised agency of the United Nations based in Montreal. Currently the ICAO has 191 Member States. Its objective is to serve as the global forum of states for international civil aviation. It develops international standards and recommends practices in the area of aviation (ICAO 2016a).

The ICAO's permanent body, the Council, is composed of 36 Member State representatives elected by the Assembly every three years. It is split into three "parts" (or clusters): firstly, states of chief importance in air transport; secondly, states which make the largest contribution to the provision of facilities for international civil air navigation; and thirdly, states that ensure geographic representation in the Council (ICAO 2016b).

After the adoption of the Paris Agreement in December 2015, the ICAO pointed out that the fact that greenhouse gas emissions from international aviation were not included in the Agreement would reinforce confidence in ICAO's own achievements in combating climate change (ICAO 2016c). ICAO's 2016 Environmental Report (ICAO 2016d) gives an overview of available mitigation options, including aircraft technology, operational improvement, market-based measures and alternative fuels, as well as discussing climate change adaptation and resilience in the context of the aviation industry. The Global Market-based Mechanism adopted at the 39th ICAO assembly in October 2016, but also the projected large emission increase in the aviation sector, is discussed in chapter 8.1.

### 7.3.3. International Maritime Organization (IMO)

The International Maritime Organization (IMO), founded in 1948, is a United Nations' specialised agency based in London. It is responsible for setting standards for safety, security and environmental performance in international shipping. As of 2016 the IMO has 171 Member States and three Associate Members (IMO 2016a).

The Marine Environment Protection Committee (MEPC) is IMO's senior technical body on marine pollution related matters. It is supported by various sub-committees, such as the Sub-Committee on Pollution Prevention and Response (IMO 2016b). Besides the requirements related to water and air pollutants, IMO has recently adopted energy efficiency standards for

new ships and mandatory operational measures to reduce emissions from existing ships (IMO 2016c).

In September 2015, ahead of COP 21, the IMO's Secretary-General, Koji Sekimizu, raised objections to some measures aimed specifically at reducing shipping's overall contribution to $CO_2$ emissions. He pointed out that the role of shipping was part of the world economy and argued that the development of further measures in this sector was the responsibility of the IMO (IMO 2015). After the adoption of the Paris Agreement in December 2015, when shipping was indeed not explicitly included in the Agreement text, Mr. Sekimizu stated that the IMO would continue to work on the issue of greenhouse gas emissions from ships (IMO 2016d). It has to be noted that, unlike ICAO, the IMO has up to now not come forward with concrete proposals such as market-based measures (MBM).

Further developments with regard to the IMO and international shipping are presented in chapter 8.2.

### 7.3.4. The World Bank Group

The World Bank Group is one of the agencies managing projects under the Global Environment Facility (GEF, cf. Box 16) and in recent years has become an outspoken stakeholder in the international discussion on climate change.

The World Bank Group, established in 1944, comprises five international organisations: the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), the Multilateral Investment Guarantee Agency (MIGA) and the International Centre for Settlement of Investment Disputes (ICSID). Two entities thereof, the IBRD and IDA, jointly form the organisation which is generally referred to as "the World Bank". It is headquartered in Washington, D.C. and has an observer status at the United Nations. The World Bank operates as international financial institution, whose main function is to provide loans to developing countries. The World Bank is owned by the governments of the 189 member countries, which have the decision-making power within the organisations (The World Bank Group 2016b, 2016c, 2016d, United Nations 2015a).

In 2013, the World Bank Group set itself two goals: to end extreme poverty by decreasing the number of people living on less than USD 1.25 per day to 3 % and to promote prosperity by supporting the income growth of the lowest 40 % in each country, both to be achieved by 2030 (World Bank Group 2015a). In the year 2015 the World Bank Group spent USD 65.6 billion in total on credits, capital investments, grants, technical assistance and guarantees for countries and businesses worldwide (World Bank Group 2015a). The 2015 annual meeting of the World Bank Group and the International Monetary Fund (IMF) was held in Lima (World Bank Group 2015b). In the course of this meeting, the World Bank Group pledged to increase the share of climate-related finance in the group's overall funding from 21 to 28 % by the year 2020.

In April 2016 a new Climate Change Action Plan was approved (World Bank Group 2016e). According to the World Bank Group, impacts of climate change could mean that an additional 100 million people will live in poverty by the year 2030. Therefore, one of the key aspects of the plan is to integrate climate change across the whole operations of the Group. Other priorities within the Climate Change Action Plan are to help developing countries to implement their NDCs, shape national investment plans as well as to leverage the resources of the private sector. The new plan reaffirms the World Bank Group's announcement from 2015 to increase its climate related investments to potentially up to USD 29 billion per year, leveraged co-financing already taken into account, by the year 2020.

In August 2016, after almost four years of work, the Board of the World Bank Group adopted a new environmental and social framework in order to streamline its work and increase the outcome of its development efforts. The aim is to improve and expand the level of protection for people and the environment under future investment projects. The framework of the guidelines is expected to come into effect in the year 2018 (World Bank Group 2016f). The World Bank Group's previous safeguards had little to do with climate change. By contrast, the new framework establishes requirements for assessing the greenhouse gas emissions of each project as well as the potential impact of climate change on the project's success (WRI 2016).

The World Bank Group has published reports on a range of topics related to climate change, such as the impacts of climate change on poverty (Hallegatte et al. 2015), climate resilience (Cervini et al. 2015) or disaster risk management (McDermott 2016). The World Bank Group also hosts a "Climate Change Knowledge Portal" (World Bank Group 2016g) with adaptation and mitigation data sources and tools.

# 8. OTHER SECTORAL AGREEMENTS

The Paris Agreement requires all Parties to contribute to reaching its ambitious temperature and emission goals. However, two sectors are not directly covered by the Agreement – international aviation and international maritime transport. As both sectors contribute a considerable share to global greenhouse gas emissions, action in these areas is critical, in particular for reaching the long-term goal of achieving a balance between emissions by sources and removals by sinks (cf. chapter 3.2.1). Negotiations on climate change mitigation in these sectors are underway under two UN bodies, the International Civil Aviation Organization (ICAO, cf. chapter 7.3.2) and the International Maritime Organization (IMO, cf. chapter 7.3.3).

In addition, the year 2016 saw negotiations under the Montreal Protocol on the phasing down of certain fluorinated gases, which increasingly contribute to global greenhouse gas emissions. The following sections 8.1 to 8.3 give an overview of these negotiations on international aviation, international maritime transport and fluorinated gases.

It should be noted that comprehensive policies and measures already exist on the European level in these sectors (see Table 7).

**Table 7: Main policies and measures on the EU level, relating to international transport and fluorinated gases**

| Sector | Main policies and measures |
|---|---|
| **International aviation** (see chapter 8.1) | From 2012 onwards, aviation has been covered by the EU Emissions Trading System (ETS, Directive 2009/29). This includes all flights within the European Economic Area (EEA). For flights to and from other countries the ETS has been suspended for the period 2013 to 2016 (Decision No 377/2013/EU). |
| **International shipping** (see chapter 8.2) | As a step towards a global market-based mechanism, a Regulation was adopted on the monitoring, reporting and verification (MRV) of $CO_2$ emissions from maritime transport (Regulation (EU) 2015/757). Large ships (over 5 000 gross tonnes) calling at EU ports are required to collect and later publish verified annual $CO_2$ emission data and other relevant information. |
| **Fluorinated gases** (see chapter 8.3) | A Regulation (Regulation (EU) No 517/2014) is in place which, *inter alia*, limits and gradually reduces the placing on the market of hydrofluorocarbons (HFCs) by 79 % (to be achieved by 2030). |

**Source:** Directive, Decision and Regulations as referenced above.

## 8.1. International aviation

Between 1990 and 2013, $CO_2$ emissions from international aviation increased by almost 90 % (IEA 2015b) and in 2012 international aviation had a 1.3 % share in the global $CO_2$ emissions (Cames et al. 2015). If domestic emissions are included, aviation accounts for more than 2 % of global $CO_2$ emissions. What is even more important is that emissions from international aviation are projected to increase from approx. 450 megatonnes (Mt) in 2010 to approx. 1 800 Mt in 2050 (ICAO 2013), even when taking technological and operational improvements into account. Such a continued increase is in strong disagreement with the goals of the Paris Agreement – which aim for global peaking of greenhouse gas emissions as soon as possible and for achieving a balance between anthropogenic emissions by sources and

removals by sinks in the second half of the century. Therefore, measures to mitigate greenhouse gas emissions from international aviation have been called for, and the European Parliament is one of the proponents of such measures (European Parliament 2015).

The International Civil Aviation Organization (cf. chapter 7.3.2) decided in 2001 that an emissions trading system (ETS) would be the most appropriate instrument to address greenhouse gas emissions from international aviation. In the following years little progress had been made until 2010 when ICAO, at its 37th Assembly, agreed on a global aspirational goal of carbon neutral growth by 2020 (ICAO 2010).

In 2013, ICAO finally established a working group for the development of a Global Market-Based Measure (GMBM) to reach this goal. The inclusion of aviation in the EU Emissions Trading System (EU ETS) in 2012 and other ETSs established for domestic aviation in South Korea, New Zealand and possibly China in the near future have doubtlessly pushed this development (ICSA 2016a).

**Box 33: The International Coalition for Sustainable Aviation (ICSA)**

In 1998 a group of national and international environmental NGOs established the International Coalition for Sustainable Aviation (ICSA), functioning as official observers at the ICAO (ICSA 2016b).

On 8 July 2016 ICSA released a progress report on the ICAO GMBM (ICSA 2016c). In the report the most recent draft Assembly Resolution text of the global MBM is checked against a checklist for an "effective Plan to Cut Aviation Global Warming Pollution". The ICSA's checklist outlines what a measure with a high degree of environmental integrity should contain. This includes, *inter alia*, a cap at 2020 levels, regular reviews to align aviation with the Paris Agreement temperature goals, transparent accounting and governance.

In March 2014 the ICAO Council established the Environment Advisory Group (EAG) responsible for overseeing the development of the GMBM. In technical and analytical aspects the EAG is supported by the Global MBM Technical Task Force (GMTF) of the ICAO Committee on Aviation Environmental Protection (CAEP). In addition, the GMTF develops emission unit eligibility and rules for monitoring, reporting and verification (MRV) of $CO_2$ emissions (ICAO 2016d).

The ICAO installed the Global Aviation Dialogues (GLADs) bringing together all states and stakeholders in a forum for information and exchange of ideas and thus also reaching out to states that are not directly active in the ICAO (ICAO 2016f). The second round of GLADs took place from 20 March to 8 April 2016. At five venues across the ICAO regions the draft assembly resolution text was presented to states and stakeholders and opportunities for feedback were provided.

Besides these activities, a proposal was finalised for the first binding fuel efficiency and emission reduction standards for new aircraft and presented at the tenth meeting of ICAO's Committee for Environmental Protection in February 2016. In 2028 the standards for new aircraft will be effective. On average a 4 % reduction in cruise fuel consumption compared to aircraft delivered in 2015 will be required (ICCT 2016).

**Box 34: ICAO's Global Market-based Measure (GMBM) to control $CO_2$ emissions from international aviation**

On 6 October 2016, the ICAO assembly adopted a resolution on a Global Market-based Measure (GMBM; ICAO 2016g). From 2021 onwards, countries voluntarily participate in a pilot phase of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). This scheme addresses any annual increase in total $CO_2$ emissions from international aviation (i.e. flights that depart in one country and arrive in a different country) above the 2020 levels. After a voluntary first phase from 2024 onwards, the scheme will apply worldwide from 2027 onwards, with exceptions for least developed countries, small island developing states, landlocked developing countries and states with very low levels of international aviation activity. 65 countries, including 18 out of the 20 largest aviation nations, will participate from 2021 onwards (European Commission 2016g).

All aircraft operators in participating countries have to offset a share of their emissions in a given year, which equals the aviation sector's total emission growth rate between 2020 and the given year. Offsets are carried out by purchasing emissions units (corresponding to emission reductions in other sectors), which have to fulfil the criteria agreed upon by the ICAO's Committee on Aviation Environmental Protection.

The agreement reached at the 39th ICAO assembly constitutes an important step in addressing greenhouse gas emissions from international aviation, but it was criticised for the late start of the mandatory phase and for lacking a link to the long-term goals of the Paris Agreement (Climate Home 2016e). The measure adopted by ICAO does not include reduction targets, but only requires the offsetting of emissions above the level of 2020. This measure therefore lacks an aspect which is central to the Paris Agreement, the reduction of emissions and subsequent balancing of all global emissions by sources and removals by sinks in the long term.

## 8.2. International shipping

Between 1990 and 2013, emissions from international shipping increased by approx. 64 % (IEA 2015b). In 2012 international shipping had a 2.2 % share in the global $CO_2$ emissions (IMO 2014). In 2011, the IMO adopted two efficiency measures to deal with GHG emissions: The Energy Efficiency Design Index (EEDI) sets mandatory energy efficiency standards for ships built after 2013, while the Ship Energy Efficiency Management Plan (SEEMP) is an approach for monitoring and optimising ship efficiency performance (IMO 2016c).

Even when taking these measures into account, $CO_2$ emission from international shipping are still projected to be six times higher in 2050 compared to their 1990 level (IMO 2014, Cames et al. 2015).

The IMO's Marine Environment Protection Committee (MEPC) held its 69th session in April 2016 (IMO 2016e). During this session, the MEPC approved mandatory requirements for ships above 5 000 gross tonnage. For these ships, consumption data will have to be recorded and reported for each type of fuel they use together with additional data e.g. on proxies for the transport undertaken. The mandatory data collected in this first step will be analysed in a second step. IMO intends to use these data for a policy debate to assess the need of additional measures for addressing greenhouse gas emissions and energy efficiency in the field of international shipping (IMO 2016f).

The draft mandatory data collection requirements will be put forward for adoption at the 70th MEPC session, to be held from 24 to 28 October 2016 in London. They may enter into force

in 2018. Information on the outcome of this meeting (which will be held after the completion date of the present study) can be found at the website of the IMO (2016g).

At MEPC 70 the correspondence group is expected to make recommendations on whether the Energy Efficiency Design Index needs to be adjusted in terms of time periods, relevant ship types and reduction rates. As already stated in chapter 7.3.3, the IMO has not yet come forward with proposals such as market-based measures for mitigating the increasing $CO_2$ emissions from international maritime transport.

### 8.3. Fluorinated gases

The Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP 1987) is an international treaty, adopted in 1987, which sets the framework for phasing out the production and consumption of ozone depleting substances (ODS). These substances include, among others, chlorofluorocarbons (CFCs), for which the global phase-out will be completed in 2016 (UNEP 2016a) and hydrochlorofluorocarbons (HCFCs), for which production and consumption have been frozen and total phase-out is scheduled for 2020 for developed countries and 2030 for developing countries.

Another group of chemicals, the hydrofluorocarbons (HFCs), have partly replaced the ozone depleting substances largely phased out under the Montreal Protocol, e.g. in refrigeration and air conditioning. HFCs, a sub-group of fluorinated gases, do not deplete the ozone layer, but they are potent greenhouse gases. As they have similar uses as the substances regulated under the Montreal Protocol, an amendment to the Protocol was proposed to address the phase-down of HFCs.

Four proposals were put forward – from the European Union, from North American countries, from a number of island states and from India. These proposals differed with respect to their time schedules for a freeze and subsequent phase-down of the production and consumption of HFCs. At the 27th Meeting of the Parties to the Montreal Protocol in Dubai in November 2015, the Parties agreed on working towards an amendment addressing the phase-down of HFCs, with a view to adopting this amendment at an extraordinary meeting in 2016 (UNEP 2015b).

From 4 to 8 April 2016, the Parties under the Montreal Protocol convened in Geneva for an open-ended working group meeting. The discussions covered flexibility in implementation, legal aspects, intellectual property rights, and possible exemptions for countries with high ambient temperatures, where the replacement of HFCs is technically more challenging (IISD 2016f).

From 15 to 23 July 2016, two sessions of the open-ended working group and an extraordinary meeting under the Montreal Protocol took place in Vienna. At the end of these talks, almost 100 Parties, including developed countries, island states and the African Group supported a proposal to reduce the production and consumption of HFCs in developed countries from 2019 onwards and to freeze HFC production and consumption in developing countries in 2021. Other, mostly Asian and Latin American countries supported a freeze later in the 2020s, whereas India aimed at postponing the freeze until 2031 (IISD 2016g).

In September 2016, on the sidelines of the UN General Assembly (cf. chapter 4.4.3), leaders from over 100 countries, including all EU and African countries, several American countries and various island states, called for securing an ambitious amendment with an “early freeze date”. In addition, a group of 16 donor countries, including 9 EU Member States, and a number of philanthropists announced their intent to provide financial support for countries in need of assistance for the implementation of an ambitious amendment and the improvement of energy efficiency (The White House 2016d).

With bilateral meetings underway to bridge the remaining gaps, it is possible that the amendment will be finalised and adopted at the 28th Meeting of the Parties to the Montreal Protocol. This meeting takes place in Kigali (Rwanda) from 10 to 14 October 2016 (after the completion date of the present study). Information on the outcome of this meeting can be found at the website of the UNEP Ozone Secretariat (UNEP 2016b).

# 9. OTHER DEVELOPMENTS

Climate action and support are affected by a variety of external factors. In the following, important global developments are discussed which are closely interlinked with climate change and the climate negotiation process. The following developments are covered:

- The UN Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction, which were adopted in the same year as the Paris Agreement and show a number of links and parallels.
- Energy markets, energy policies and commodity markets, which will impede and/or support the transition to a low-carbon economy in the future.
- Recent global and European crises which have diverted attention from climate change issues, but which also show links to climate change mitigation and adaptation.

Two particularly important events of 2016 have already been discussed in the chapters on the Parties concerned: The U.S. presidential elections in chapter 5.2 and the United Kingdom's vote on leaving the European Union in chapter 5.3.

The external factors discussed here have various positive or negative effects on climate change action and support. For a simplified overview, these effects on the various climate-related topics are shown in Figure 6 to Figure 12. It goes without saying that many factors have both positive and negative effects and that additional links exist. Nevertheless, Figures 6-12 show the numerous interactions between these developments and climate change action and support.

## 9.1. UN Sustainable Development Goals (SDGs)

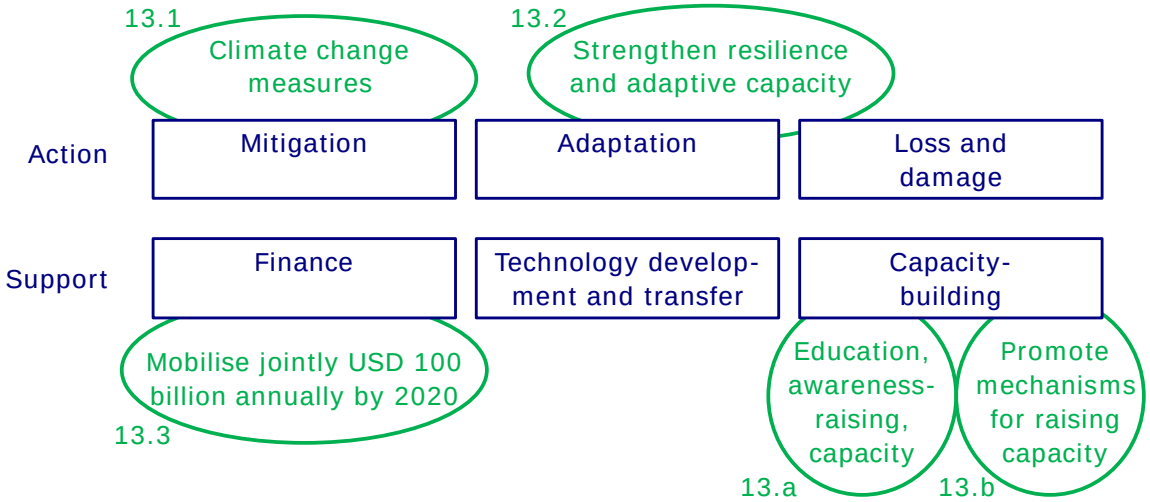
In September 2015, the UN General Assembly adopted the "2030 Agenda for Sustainable Development" (United Nations 2015b), a plan for action that seeks to build on the Millennium Development Goals (United Nations 2016e) and is relevant for all countries, not just for the developing countries. It consists of 17 Sustainable Development Goals (SDGs), each with a set of specific targets, adding up to a total of 169 targets.

One of the SDGs is to "take urgent action to combat climate change and its impact". The 2030 Agenda for Sustainable Development acknowledges that the UNFCCC is the primary international, intergovernmental forum for negotiating the global response to climate change. Nevertheless, the SDG is an important signal that "climate action" (as this goal is known in short) has a place of its own on the 2030 Agenda.

This chapter gives an overview of the close links between the goals and topics covered under the UNFCCC (including the Paris Agreement) and the Sustainable Development Goals. First, the links to the specific targets under the "climate action" SDG are discussed, then additional links to other SDGs are pointed out.

Under the "climate action" SDG, the 2030 Agenda lists five targets. The links between these targets and the topics of climate action and support (as introduced in chapter 3.2, Figure 1) are shown in Figure 6.

**Figure 6: Links between the specific targets under the Sustainable Development Goal "climate action" and climate change action and support**




**Source:** United Nations 2015b; authors' views.

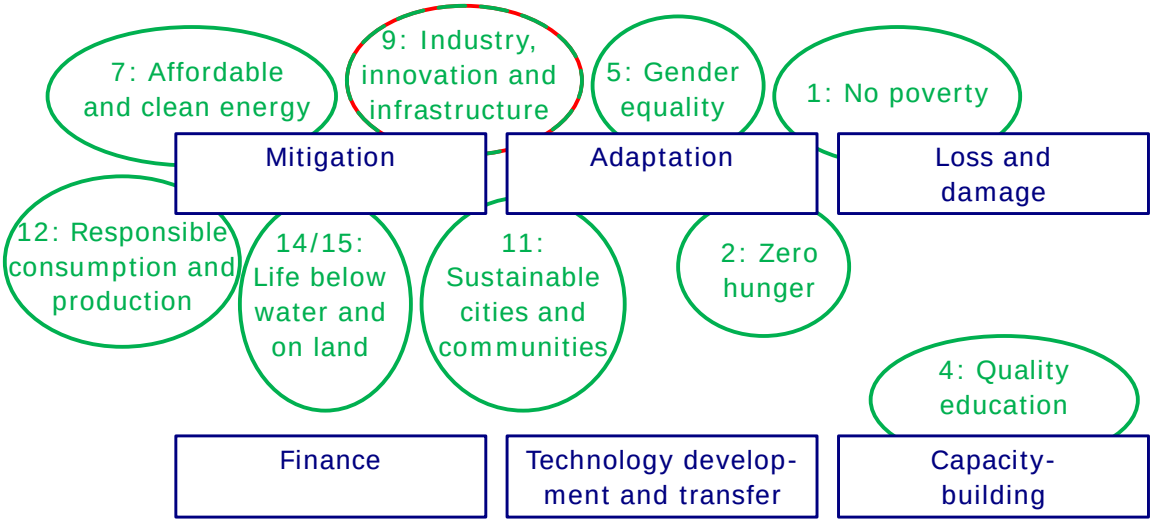
The five targets (which are numbered 13.1-3 and 13.a-b in the 2030 Agenda and are depicted as bubbles in the figure) fit well into the structure of climate change action and support (shown as squares) which evolved under the UNFCCC and can be found in the Paris Agreement. There is a specific mitigation and a specific adaptation target; the latter also addresses aspects which – in Article 8 of the Paris Agreement – are associated with averting loss and damage, namely the issue of resilience to climate-related hazards.

One of the targets is the very specific commitment given by developed country Parties under the UNFCCC to mobilise jointly USD 100 billion of climate finance a year by 2020. This target emerged during the last session of the "UN General Assembly Open Working Group on Sustainable Development Goals" in 2014 (IISD 2014). During that session, other quantitative targets (such as a temperature goal) were discussed but not agreed, and the USD 100 billion target remained in place, possibly because developed country Parties had already committed themselves to it earlier under the UNFCCC.

Finally, the "climate action" SDG includes two targets relating to education and capacity-building; target 13.b specifically addresses least developed countries and small island developing states.

Besides the "climate action" goal, several other SDGs are related to climate change action and support, as depicted in Figure 7.

**Figure 7: Links between various Sustainable Development Goals and climate change action and support**




Goal 9 (Industry, innovation and infrastructure) is marked in green and red, as there may be conflicts, in some cases, with mitigation goals under the UNFCCC.

**Source:** United Nations 2015b; authors' views.

As Figure 7 shows, several SDGs are linked with and may reinforce the UNFCCC and the Paris Agreement mitigation goals. They include (7) affordable and clean energy, (12) responsible consumption and production, (11) sustainable cities and communities and (9) industry, innovation and infrastructure. Goal 9 may generate conflicts with mitigation efforts if developments of industry, innovation and infrastructure lead to higher emissions of greenhouse gases; or if mitigation actions make it harder for countries to industrialise or improve their infrastructure (cf. Box 17 – "impacts of response measures" in chapter 3.3). However, it is important to note that the focus of goal 9 is on reliable, sustainable and resilient infrastructure and on sustainable industrialisation (United Nations 2015b). Finally, mitigation efforts help in the pursuit of goals 14 and 15, the protection of life below water and on land.

A number of goals can help reinforce adaptation efforts and possibly minimise loss and damage: (9) industry, innovation and infrastructure, (11) sustainable cities and communities, and (1) no poverty. Communities which successfully adapt to climate change may find it easier to pursue the goals (2) zero hunger and (5) gender equality – the latter because women in developing countries are often more vulnerable to climate change (UNEP 2011). Finally, the goal (4) quality education can be seen as a prerequisite for successful capacity building.

Now that both the Sustainable Development Goals and the Paris Agreement have been adopted, it will be interesting to track their progress in the coming years. Although SDG progress cannot be quantified and monitored as closely as e.g. the commitments of the Parties as stated in their Nationally Determined Contributions (cf. Box 10 in chapter 3.2.1), the "2030 Agenda for Sustainable Development" foresees a follow-up and review framework which, although intended to be voluntary and participatory in nature, will at the same time be effective and transparent (United Nations 2015b).

To conclude, the Sustainable Development Goals are closely linked to the topics and goals of the Paris Agreement. This, by itself, is not surprising. The message is rather that the goals crucially depend on (and mainly reinforce) each other: Climate change will make it harder to fulfil the Sustainable Development Goals; mitigation and adaptation efforts will be needed to fulfil the SDGs, and many of the SDGs will support effective mitigation and adaptation.

Looking at the long term developments, the findings of the IPCC's 5th Assessment Report suggest that it will be more challenging in the years after 2030 to meet the Sustainable Development Goals as the temperature increase will continue beyond that time horizon and climate change risks are going to increase throughout the 21st century.

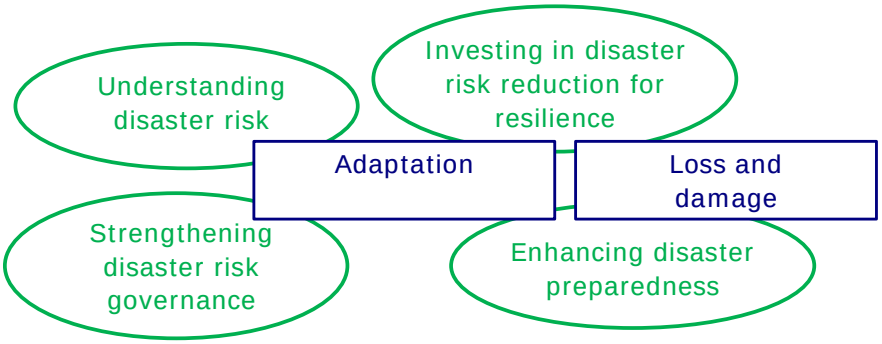
## 9.2. The Sendai Framework for Disaster Risk Reduction

In March 2015, the "Sendai Framework for Disaster Risk Reduction 2015-2030" (United Nations 2015c) was adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai (Japan). The Framework introduces seven targets, with the aim to achieve "a substantial reduction of disaster risk and losses of lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries".

This goal is to be achieved through four priorities for action, i.e. understanding disaster risk, strengthening disaster risk governance to manage disaster risk, investing in disaster risk reduction for resilience, and enhancing disaster preparedness for effective response.

The framework acknowledges that many disasters are exacerbated by climate change and that climate change is one of the underlying drivers for disaster risk. It states that addressing climate change represents an opportunity to reduce disaster risk in a meaningful and coherent manner, but it also respects the mandate of the UNFCCC in this area.

**Figure 8: Selected links between the priorities of the Sendai Framework for Disaster Risk Reduction and climate change action**




**Source:** United Nations 2015c, authors' views.

As Figure 8 shows, the four priorities of the Sendai Framework are linked to climate change action. Understanding disaster risk and strengthening disaster risk governance in order to manage such risks can be seen as an integral part of adaptation to a changing climate. Investing in disaster risk reduction for resilience (priority 3), enhancing disaster preparedness for effective response and embedding the "build back better" principle into recovery, rehabilitation and reconstruction (priority 4) are also a part of adaptation and a way of addressing climate change induced loss and damage.

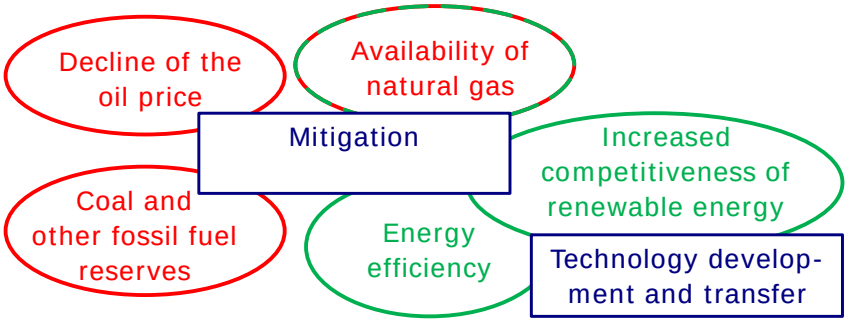
These linkages are due to the fact that a significant number of disasters results from extreme weather events that are becoming more severe as a result of climate change. Therefore, it is unlikely that the goals under the Sendai Framework will be met without appropriate climate change risk management. One of the national goals for adaptation could be to help avoid that extreme weather events become disasters. Disasters resulting from extreme weather events should thus become one of the entry points for enhanced adaptation action.

## 9.3. Energy markets and policies

Various energy sources are associated with different carbon intensities, i.e. $CO_2$ emissions per unit of energy. The various forms of coal have the highest carbon intensity, followed by liquid fossil fuels and natural gas. Non-fuel renewable energy generation is associated with $CO_2$ emissions from the production, maintenance and disposal of equipment, but not from energy production itself. However, biomass for energy purposes (heat and power generation, biofuels) needs to be produced in a sustainable manner; otherwise, the overall greenhouse gas emissions associated with biomass (including its production) might be similar to those of fossil fuels.

Due to different energy intensities, the ability of the global community to meet the goals of the Paris Agreement will depend on the mix of energy sources in the future, a mix which will be shaped by energy markets and their developments, which in turn will be affected by the decisions of policy makers, operators, investors and consumers.

**Figure 9: Selected links between energy markets / policies and climate change action and support**




Interactions which are mostly positive are marked in green. Interactions which are mostly negative are marked in red.

**Source:** authors' views.

Between June 2014 and February 2016, crude oil prices decreased by more than 70 % and currently they are around half their previous highs (Bloomberg 2016). This has had wide-spread effects on other energy sources which have become less competitive. On the other hand, due to the lower energy prices, the share of oil in global energy investments declined from 2014 to 2015 and the share of investments in renewable energy sources increased (IEA 2016a).

Renewable energy sources (biomass, hydro, solar, wind and geothermal) account for approx. 14 % of global primary energy production (IEA 2015c). The year 2015 saw, compared to the previous year, double-digit increases in wind and solar power capacities installed worldwide (REN21 2016). Wind and solar projects have been subsidised by specific schemes in many countries, but are becoming more competitive, despite the recent drop in fossil fuel prices. In August 2016, a contract for providing electricity from a 120 megawatt solar power plant was awarded at a price below USD 0.03 per kilowatt hour in Chile, outcompeting fossil fuels and slightly below the prices for solar power in Mexico and in Dubai contracted earlier this year (The Washington Post 2016b).

The use of natural gas for electricity generation has increased in recent years, in particular in the United States, where shale gas production has become widespread (cf. chapter 5.2), leading to a decrease in prices for natural gas in North America. However, in Europe electricity generation from natural gas has fallen recently due to low electricity market prices and low ETS emission allowance prices, leading to a reduced competitiveness of gas against coal.

Natural gas has been named a "transitional fuel" on the path from high to low carbon intensities. Gas turbines can adjust their output more quickly than other thermal power generators

and therefore play an important role in balancing the intermittent supply from renewable energy sources – unless large-scale electricity transmission and storage capacity is available. However, it has been pointed out that in most countries, producing electricity from existing gas power plants may become more expensive than building and operating wind and solar farms in the next decade already (Bloomberg New Energy Finance 2016). In addition, unabated burning of natural gas – a fossil fuel – is not in line with the long-term goal of the Paris Agreement which is to "achieve a balance between anthropogenic emissions by sources and removals by sinks in the second half of the century" (cf. chapter 3.2.1).

The increased availability of natural gas and the low oil price lead to a reduced use of coal for electricity generation in the United States (cf. chapter 5.2) but to an increased consumption elsewhere. Coal is still an important energy source in European countries such as Poland. The use of coal in China may be reaching its peak (cf. chapter 5.1), due to (amongst others) strict air pollution policies, but is projected to increase considerably in other Asian countries such as India (Bloomberg New Energy Finance 2016).

Despite their negative effects on climate change – and often on local and regional air quality – fossil fuels are still heavily subsidised in many parts of the world. The IEA's latest estimates indicate that fossil-fuel consumption subsidies worldwide amounted to USD 493 billion in 2014, outweighing the subsidies for renewable energy sources by considerable amounts. According to a recent IMF study (IMF 2015), energy subsidies are projected to reach USD 5.3 trillion in 2015, or 6.5 % of global GDP. This estimate also includes the negative external effects on human health and on the environment which are not internalised in the energy prices in many countries, as most countries tend to set energy taxes below levels that fully reflect the environmental damage associated with energy consumption.

Nuclear power does not emit greenhouse gases during energy generation. In 2013, nuclear energy accounted for 4.8 % of global primary energy production (IEA 2015c). According to recent studies (e.g. IEA 2016b, Bloomberg New Energy Finance 2016), this share is not expected to change considerably in the coming years. Many nuclear power plants will be decommissioned in the coming years and it is not expected that this technology will be competitive and technically feasible on a large scale in regions where the projected growth rate in energy demand is the highest, such as India or Southeast Asia.

In order to reach a balance between anthropogenic emissions by sources and removals by sinks in the second half of the century, Carbon Capture and Storage (CCS) may be used to prevent $CO_2$ emissions from power generation. A number of carbon capture and storage projects are in operation, but there were no new known investment decisions or advanced plans for projects in 2015 (IEA 2016b).

**Box 35: Fossil fuel reserves and power generating capacities as stranded assets**

Besides the effects of energy markets on the progress of climate change mitigation, energy markets and investments are in turn influenced by climate policy. The adoption of the Paris Agreement was seen by many as a signal to investors to move away from fossil to renewable energy sources in their long-term investments (e.g. Kerry 2015).

For an emission pathway in line with the goals of the Paris Agreement, the amount of fossil fuels burned needs to be reduced considerably in the coming decades. Provided that Parties continue their commitment and adjust their Nationally Determined Contributions accordingly, a large share of the known reserves of fossil fuels will have to remain in the ground. Using a precautionary approach, it was estimated that only 20 % of the indicated fossil fuel reserves can be burned by 2050 for an emission pathway in line with the 2 degrees C goal (Carbon Tracker 2013). Therefore, it has been pointed out that fossil fuel companies and their investors are faced with risks which had previously been undervalued and that their fossil fuel reserves may turn into stranded assets (Fulton et al. 2015).

Besides the fossil fuel reserves, power plants constitute large assets with lifetimes of several decades. Profound changes in the fuel mix within the timeframe until 2030 and 2050 will affect owners and operators of a number of fossil fuel power plants. In Europe, a considerable number of power plants are near the end of their lifetimes. Further extension of these lifetimes would lead to overcapacities of fossil fuel power plants by 2030 (EEA 2016b), which would not be in line with the EU's decarbonisation efforts as laid out in the energy roadmap for 2050 (cf. chapter 5.3.2).

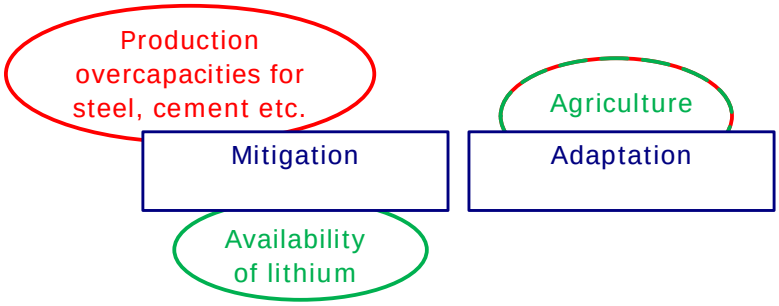
To conclude, low-carbon and renewable energy sources look set to become widely competitive in the medium to long term, whereas energy production based on fossil fuels may face considerable cost disadvantages and financial risks. However, it is important to note that market forces alone are not expected to lead to decarbonisation in line with the ambitious goals of the Paris Agreement (Bloomberg New Energy Finance 2016). Additional actions by policy makers will be essential to support and accelerate the decarbonisation of the world's energy supply.

## 9.4. Commodity markets

In addition to fossil fuel prices (discussed in section 9.3 above), prices of other commodities have decreased in recent years. In particular, the price of steel has decreased due to overcapacities in China which are expected to remain in China's steel sector in the coming years (Financial Times 2016).

Generally speaking, lower prices of commodities such as steel or cement may lead to increased use of these commodities, and their production and use are associated with greenhouse gas emissions. Globally, cement production accounts for approx. 8 % of all $CO_2$ emissions (total of process and energy-related emissions) and iron and steel production is another major source of $CO_2$ emissions (Olivier et al. 2015).

**Figure 10: Selected links between commodity markets and climate change action**




Interactions with fossil fuel markets are depicted in Figure 9 and discussed in Chapter 9.3 above. Interactions which are mostly positive are marked in green. Interactions which are mostly negative are marked in red.

**Source:** authors' views.

### Box 36: Mitigating $CO_2$ emissions from cement and iron/steel production

A considerable amount of $CO_2$ emissions from cement and iron/steel production are process emissions, i.e. they result from chemical reactions inherent in the production process. These emissions remain even if fossil fuels are replaced by fuels from renewable sources. During cement production carbon, which is part of a raw material (limestone), is emitted as $CO_2$. Carbon Capture and Storage is an option to abate these emissions.

In iron and steel production, carbon is released mainly from the reducing agents, such as coke. In order to abate process emissions of $CO_2$, reducing agents based on renewable sources may be used. Methane, which has a lower carbon intensity than coke, can be used for Direct Reduced Iron (DRI) production, which is becoming more widespread, e.g. in the United States. In the long run, hydrogen ($H_2$) produced from renewable sources could be used as reducing agent, lowering greenhouse gas emissions of iron production considerably. A shift to secondary (recycled) steel production reduces energy intensity (EIA 2016) and $CO_2$ emissions may be reduced in electric steel production if electricity from renewable energy sources is available (EEA 2016b).

Another group of commodities are various metals which play a role in the new technologies, including energy storage. Prices for lithium have gone up recently in response to the demand for car batteries, but the supplies from mines in Australia and South America have increased accordingly (Financial Post 2016).

Batteries will play a key role in future energy grids, to store energy from intermittent sources such as wind and solar, and to power electric vehicles. In 2015, the total number of electric cars crossed the threshold of one million, and sales were up by 70 % compared to the previous year (IEA 2016b). Vehicle-to-grid also offers a promising system in which plug-in electric vehicles communicate with the power grid to sell demand-response services by either returning electricity to the grid or by throttling their charging rate.

Unlike commodities such as metals, agricultural commodities are linked to climate change mainly because they are susceptible to weather patterns and will be affected by a changing climate. The El Niño phase of 2015-2016 highlighted the need for disaster risk reduction and resilience in regions from Latin America to Africa (IISD 2016h). In the long run, it can be expected that agricultural production in many areas of the world will have to adapt to a changing climate, i.e. that the types of crops will have to be changed or – in the worst case – that certain agricultural areas will have to be given up.

On the other hand, additional areas in cooler climates will become available for agriculture. The conversion of such areas to arable land constitutes a land use change which, in turn, may lead to increased $CO_2$ emissions (cf. Box 19).

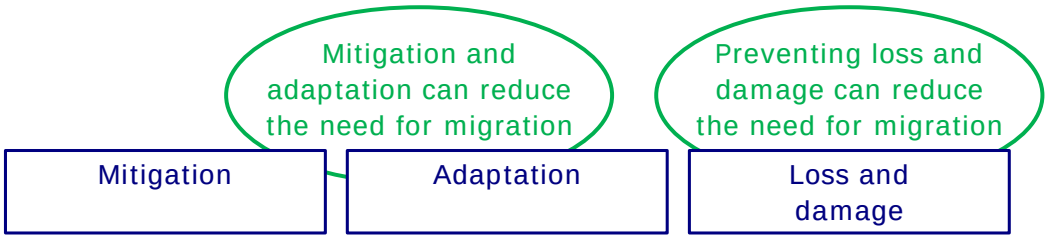
## 9.5. Refugee crisis and migration

In Europe, the refugee crisis has been one of the main political challenges in 2015 and 2016. It was a dominating topic and diverted attention from other topics such as climate change. Amongst other aspects, is has been argued that drought and water scarcity may have been a contributing factor to the start of the conflict in Syria (UNCCD 2016). On a general note, it is important to distinguish between the current crises leading to refugees on the one hand, and long-term developments on the other hand, as climate change and its impacts can (if too little action is taken against it) increase various forms of migration.

Climate change has large-scale impacts on ecosystems, which will subsequently have effects on habitability worldwide. Adaptation to these changes will not be possible in some areas. For example, the projected rise of the sea level by about one metre within this century is a severe threat to low lying island states, which are on an average only about two metres above the sea level and thus only have a limited area for relocation within the island (Tong 2016). Temperature increases and water scarcity may also contribute to migration from regions such as the Middle East or Northern Africa. Similarly, climate-induced loss and damage can lead to displacement and migration. An overview of the links between climate change, environmental degradation and migration is provided in a European Commission Staff Working Paper (European Commission 2013). The IPCC's Fifth Assessment Report (IPCC 2015) states that climate change is projected to increase the displacement of people, but it also notes that exposure and vulnerability are influenced by a wide range of factors that make quantitative assessments of future trends difficult.

Figure 11 gives a schematic representation of selected links between migration and climate change action.

**Figure 11: Selected links between migration and climate change action**




**Source:** authors' views.

The Center for Participatory Research and Development (CPRD) released a policy paper in 2015 with arguments in favour of a "new legal Protocol under the UNFCCC" to address climate-induced displacement and migration. The main elements of the proposed Protocol on climate-induced migrants are listed below (Shamsuddoha 2015):

- Addressing causes of displacement and migration;
- relocation within the country;
- ensuring economic well-being of the trapped and most vulnerable groups;
- ensuring human rights-based protection for the climate migrants;
- provision of cross border (ex-situ) adaptation;
- entire community migration.

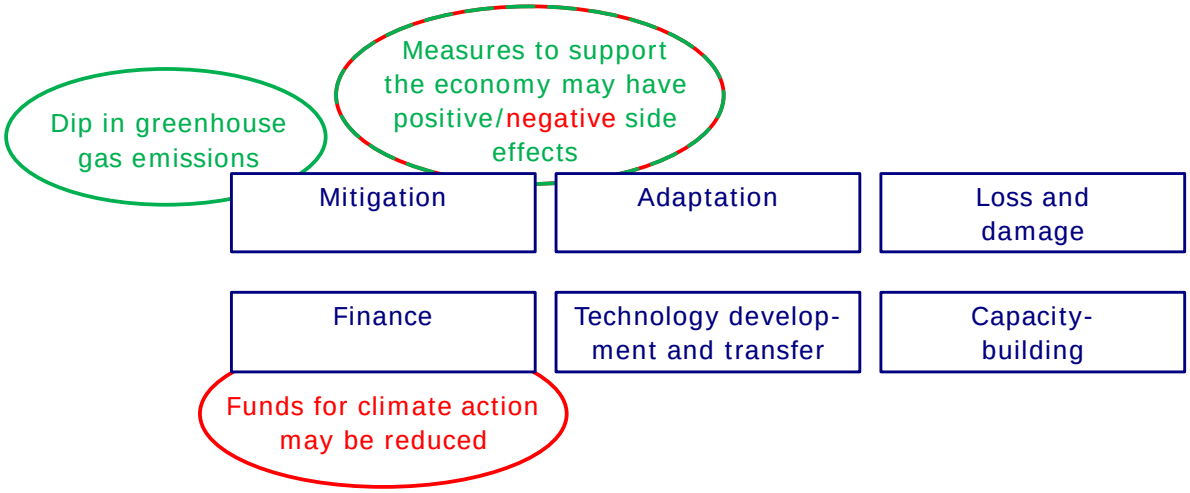
The International Organization for Migration (IOM) also calls for more consideration of migration in the climate change negotiations (Climate Home 2014). Climate change, as well as its adverse consequences for livelihoods, public health, food security, and water availability,

will have a major impact on human mobility, and is likely to substantially increase its scale. The IOM points out that both the slow climate processes such as sea level rise and desertification resulting in food insecurity and the sudden climate events such as storms and flooding are already substantially influencing population movements.

## 9.6. The global financial and economic crisis

The financial crisis of 2008 and its aftermath affected the economy and public budgets across the globe. The fiscal stimulus packages which were adopted in the wake of the financial crisis included a considerable amount of "green" investments (Dröge 2009). However, the effect of these measures on greenhouse gas emissions is difficult to quantify and some measures may have been counter-productive from a perspective of climate change mitigation. In the years following the crisis, reduced tax revenues have affected the budgets available for climate change action and support.

**Figure 12: Selected links between the financial crisis and climate change action and support**




Interactions which are mostly positive are marked in green. Interactions which are mostly negative are marked in red.

**Source:** authors' views.

The global economic crisis and the associated decrease in industrial production and trade also resulted in a dip in greenhouse gas emissions in many developed countries in 2009 (Olivier et al. 2015). Emissions picked up slowly thereafter. However, it has to be noted that the slowdown of emissions after the financial crisis was a temporary effect only and did not constitute a structural change in itself. Further action on the part of policy makers, investors and consumers will be needed for a fundamental and sustainable reversal in global greenhouse gas emission trends.

# 10. OUTLOOK: THE COP IN MARRAKESH AND BEYOND

The 22nd Conference of the Parties in November 2016 takes place at a time when climate change is in the international spotlight in several respects. The conference starts a few weeks after a large number of Parties have ratified the Paris Agreement and a mere three days after the entry into force of the Agreement (cf. chapter 4.1.3). The progress made in October 2016 in international negotiations in the areas of aviation and fluorinated gases (cf. chapter 8) and the 44th IPCC plenary meeting (cf. chapter 7.3.1) also reflect the current momentum in addressing climate change.

## 10.1. The conference in Marrakesh

In 2001, when the COP convened in Marrakesh for the first time, a comprehensive set of rules for the implementation of the Kyoto Protocol was adopted (cf. chapter 2.2). The situation in 2016 is profoundly different, as the Paris Agreement encompasses a much wider scope and negotiations on the specific sets of rules under the Agreement have only just started.

From 7 to 18 November of this year, the 22nd Conference of the Parties (COP 22) under the United Nations Framework Convention on Climate Change will be held. The conference will also serve as the 12th meeting of the Parties to the Kyoto Protocol (CMP 12). In addition, according to Article 16 of the Paris Agreement, the "Conference of the Parties serving as the meeting of the Parties to the Paris Agreement" (CMA, cf. Box 14), shall convene at the first COP following entry into force of the Agreement.

It is expected that the CMA will convene in Marrakesh but will be suspended, to be continued at COP 23 in 2017. This is because the CMA was mandated by Decision 1/CP.21 with adopting a number of Decisions at its first session; these Decisions cover topics such as the features of Nationally Determined Contributions, methodologies for accounting for greenhouse gas emissions and removals, and methodologies for assessing adaptation needs. Work on these topics is still on-going in the subsidiary bodies under the Convention and therefore the corresponding Decisions cannot be adopted yet but only in 2017.

The following subsidiary bodies will meet in Marrakesh:

- The Ad Hoc Working Group on the Paris Agreement (APA, cf. chapter 4.2), which met for the first time in May 2016 and will resume its first session; therefore its meeting is referred to as APA 1-2.
- The Subsidiary Body for Implementation and the Subsidiary Body for Scientific and Technological Advice, which had been meeting semi-annually since the 1990s (cf. Box 3) and will hold their 45th meeting, known as SBI 45 and SBSTA 45.

The APA, SBI and SBSTA will meet from 7 to 14 November. The results of their negotiations, such as draft decisions, will be forwarded to the COP for further negotiations and adoption. Topics related to the Kyoto Protocol (such as accounting rules under the Clean Development Mechanism, cf. chapter 4.3.1) will be forwarded to the CMP.

On 15 November, the High-Level Segment (HLS) starts, when ministers and heads of delegation meet, with the aim of steering the negotiations towards a successful conclusion. As the COP in Marrakesh is the first conference after entry into force of the Paris Agreement, it can be expected that many heads of state (including those of large countries) will attend the opening of the High-Level Segment on 15 November. The final plenary of the COP and CMP is scheduled for 18 November 2016.

Salaheddine Mezouar, the Moroccan Minister of Foreign Affairs and Cooperation, will be the president of COP 22. The new UNFCCC Executive Secretary is Patricia Espinosa, who took over this position from Christiana Figueres in July 2016.

An overview schedule of the conference is available from the UNFCCC secretariat (UNFCCC 2016r) and links to detailed agendas, background documents and lists of events are available from the UNFCCC's main conference webpage (UNFCCC 2016s). Additional information on the conference and its events is available at the Moroccan Government's website (COP 22 2016c). Besides the negotiations, the COP serves as a forum for other events. An overview of the most important events is given in Box 37.

**Box 37: Main events besides the negotiations at COP 22 in Marrakesh**

On 17 November, a "high-level event on global climate action" will take place, which will provide an opportunity to announce new or strengthened efforts, initiatives and coalitions. This event was foreseen in the Decision accompanying the Paris Agreement as one of several initiatives to enhance action prior to 2020. Before the event, a summary for policy makers will be made available on the main conference webpage (UNFCCC 2016s), prepared by the "high-level champions" Laurence Tubiana and Hakima El Haite (cf. chapter 3.2.10). With a focus on pre-2020 action, several "Global Climate Action" (GCA) events are also planned, covering relevant showcases and dialogues.

Besides the high-level event on enhancing climate action, two other events were mandated by earlier COP Decisions: The second ministerial high-level event on climate finance on 16 November and a facilitative dialogue on enhancing ambition and support on 11 and 16 November (UNFCCC 2016t).

On 8 November, an "Africa Action Summit" will take place (COP 22 2016c) and from 14 to 16 November, the COP 22 Low-Emissions Solutions Conference will be held. The aim of this conference is to assist countries in the technical preparation of their Nationally Determined Contributions (NDCs) and Low Emission Development Strategies (LEDSs) by bringing together technical experts and representatives from business, academia and civil society (UN-SDSN 2016).

In addition, special events will be taking place twice every day during the conference. During these events, the progress of various working groups and mechanisms under the Convention will be presented, including e.g. the Technology Mechanism or the Least Developed Countries Expert Group (LEG). These special events are listed in the overview schedule (UNFCCC 2016r, UNFCCC 2016s).

Like in previous climate change conferences, the Parties' National Communications and Biennial (Update) Reports (cf. Figure 2) will be discussed – in the course of a "multilateral assessment" for developed countries (cf. chapter 3.3) and a "facilitative sharing of views" for developing countries (cf. chapter 4.3.7).

Parties and other participating stakeholders (NGOs, international organisations etc.) are also given the opportunity to hold side events. These include presentations and discussions on a wide range of topics related to climate change. The side events at COP 22 are organised under the common theme "Accelerating implementation of the Paris Agreement". They are categorised under the three topics "enhancing ambition", "promoting implementation" and "providing support to developing countries". The schedule of the side events is available at the UNFCCC's COP 22 webpage (UNFCCC 2016u).

Parties and stakeholders will also display exhibits on the conference grounds. A list of exhibits is available at the same COP 22 webpage. For an overview of the various stakeholders, see chapter 7.

## 10.2. Key topics in Marrakesh

The negotiations in Marrakesh will focus on the implementation of the Paris Agreement, i.e. on agreeing the specific rules under the framework of the Agreement and on delivering in line with the commitments made. This concerns in particular the support for developing countries, i.e. finance, technology development and transfer, and capacity-building.

Important topics with respect to negotiations include:

- Enhanced action prior to 2020 (cf. chapter 3.2.10);
- the contents of Nationally Determined Contributions (cf. Box 10);
- the type of information to be contained in the adaptation communications (cf. chapter 4.3.2);
- the modalities and rules for cooperative mechanisms (cf. chapter 4.3.1);
- modalities of the global stocktake and preparation for the facilitative dialogue in 2018 (cf. chapter 3.2.8);
- the transparency framework (cf. chapters 3.2.7 and 4.3.7).

The progress of the negotiations is summarised in the "progress tracker", a document updated regularly by the UNFCCC secretariat (UNFCCC 2016j).

Besides the progress of the negotiations, it will be interesting to see whether additional Parties will use the time period around the COP for finalising and communicating their ratification of the Paris Agreement. Information on the current progress of ratification can be found at the UNFCCC's website (UNFCCC 2016h, cf. also chapter 4.1).

The COP is also a venue where countries and organisations make announcements about their recent support activities, including finance. Progress with financial resource mobilisation will be assessed critically by NGOs and developing countries. Now that the goal of mobilising USD 100 billion per year has been extended from 2020 to 2025, there will be discussions about how far donor countries still have to go to reach the goal in 2020.

**Box 38: Reaching the 2020-2025 climate finance goal**

According to the Decision accompanying the Paris Agreement, developed country Parties shall collectively mobilise USD 100 billion in climate finance per year from 2020 to 2025 (cf. chapter 3.2.4). In addition to direct funding coming from the Parties and dedicated climate funds (cf. Box 16), Parties may also mobilise private sector finance.

It has to be noted that there is an ambiguity about which financing activities may be counted towards the USD 100 billion goal. The Organisation for Economic Co-operation and Development (OECD) estimated that in 2014, a total of USD 62 billion was mobilised in public and private climate-related finance, more than 70 % of which were public funds (OECD 2015).

Besides the events in Marrakesh, other developments may have an effect on the negotiations at this COP and beyond. Table 8 lists some key developments.

**Table 8: Other developments to watch out for**

| Topic | Status | Implications for the international climate negotiations |
|---|---|---|
| **Sectoral agreements** (cf. chapter 8) | Agreements in the areas of international transport and fluorinated gases are being negotiated in 2016. | In areas where the progress is slow or the results are below the expectations of some Parties, there may be calls for additional action under the UNFCCC. |
| **Brexit** (cf. chapter 5.3) | The United Kingdom is planning to leave the European Union and to start the two-year withdrawal process in March 2017. | The European Union and the United Kingdom will have to find arrangements to fulfil their common obligations under the Paris Agreement.<br>The United Kingdom may emerge as a separate actor in international climate negotiations. |
| **U.S. presidential elections** (cf. chapter 5.2) | The U.S. presidential elections will be held on 8 November 2016, the second day of the COP. | If Donald Trump is elected president, it can be expected that some or all of the executive orders issued by the outgoing president Obama to implement the Paris Agreement will be revoked.<br>The United States may decide to withdraw from the Paris Agreement, which is possible at any time after three years from the date of entry into force, according to Article 28 of the Agreement. |

Despite the importance of these external developments, it can be expected that the progress of the conference will mainly be driven by the negotiations and the interactions between the Parties and groups of Parties. In 2015, the Paris terrorist attacks and the difficult geopolitical situation did not prevent the international community from bringing the negotiations in Paris to a successful close. However, external factors will continue to be important (cf. also chapter 9) and new ones may emerge to shape future negotiations.

### 10.3. Beyond Marrakesh – Work in 2017 and beyond

The Paris Agreement enters into force in November 2016, which is earlier than many had expected. Therefore, the subsidiary bodies will be faced with a busy schedule in 2017 preparing the draft Decisions to be adopted by the CMA.

In addition, negotiations on other topics will be in full swing in 2017, because they will have to be completed by 2018 according to Decision 1/CP.21. These topics include the modalities for the accounting of the financial resources provided and mobilised through public interventions, and the modalities, procedures and guidelines for transparency of action and support.

The main negotiations under the Convention in 2017 will be the meeting of the subsidiary bodies (APA, SBSTA and SBI) in Bonn from 8 to 18 May 2017 and the 23rd session of the Conference of the Parties (COP 23), which will meet in Asia from 6 to 17 November 2017 at a location to be determined.

From there, it will be just one more year until the facilitative dialogue in 2018 (cf. chapter 3.2.8). In 2018, the IPCC will present its Special Report on the impacts of global warming of 1.5 degrees C above pre-industrial levels and related global greenhouse gas emission pathways. This report will be used as a key input to the facilitative dialogue, which will be carried out during COP 24 and where Parties will take stock of the collective efforts communicated so far. This event will put the Parties' contributions and the goals and mechanisms of the Paris Agreement to the first important test.

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# ANNEX 1: CONTENTS OF THE PARIS AGREEMENT

**Table 9: Key contents of the Paris Agreement by topic**

| Topic | Key contents |
|---|---|
| **Long-term goals** (for more information, see chapter 3.2) | Holding the increase in the global average temperature to well below 2 degrees C above pre-industrial levels and to pursue efforts to limit this increase to 1.5 degrees C.<br>Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development.<br>Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development (Article 2). |
| **Mitigation** (see chapter 3.2.1) | All Parties undertake and communicate ambitious efforts, progressing over time ("Nationally Determined Contributions", Article 3).<br>Parties aim at achieving the long-term temperature goal by reaching global peaking of greenhouse gas emissions as soon as possible and achieving a balance between anthropogenic emissions by sources and removals by sinks in the second half of the century (Article 4).<br>The Agreement provides for voluntary cooperation between Parties to fulfil their Nationally Determined Contributions (Article 6). |
| **Adaptation** (See chapter 3.2.2) | A global goal for adaptation is established. It includes the enhancement of adaptive capacity, the strengthening of resilience and the reduction of vulnerability to climate change. Each Party shall, as appropriate, engage in adaptation planning and in the implementation of actions (Article 7). |
| **Loss and damage** (See chapter 3.2.3) | Parties recognise the importance of averting, minimising and addressing loss and damage associated with the adverse effects of climate change. The existing Warsaw International Mechanism for Loss and Damage is strengthened and will continue to operate under the Paris Agreement (Article 8). |
| **Finance** (see chapter 3.2.4) | Developed country Parties shall provide financial resources to assist developing country Parties in mitigation and adaptation. Other Parties are encouraged to provide such support voluntarily (Article 9). |
| **Technology development and transfer** (see chapter 3.2.5) | A technology framework is established to support the existing technology mechanism under the Convention. It aims at promoting and facilitating technology development and transfer (Article 10). |

| Topic | Key contents |
|---|---|
| **Capacity-building** (see chapter 3.2.6) | The capacity and ability of developing country Parties to take effective action should be enhanced. Such capacity-building should be country driven and progress shall be regularly communicated. Developed country Parties should enhance their support and capacity-building activities shall be enhanced through appropriate institutional arrangements (Article 11). |
| **Transparency of action and support** (see chapter 3.2.7) | In order to build mutual trust and confidence and to promote effective implementation, a transparency framework is established. It builds on the experiences of the transparency arrangements under the Convention, such as National Communications, but also introduces national inventory reports and reviews for all Parties (Article 13). |
| **Global stocktake and increasing ambition** (see chapter 3.2.8) | Collective progress towards achieving the purpose and the long-term goals of the Paris Agreement is assessed every five years, starting in 2023. The outcome of this stocktake shall inform Parities in enhancing national actions and international cooperation (Article 14). |
| **Compliance, meetings, entry into force** (see chapter 3.2.9) | An expert-based committee will be established to facilitate implementation of the Agreement and to promote compliance with its provisions (Article 15).<br>Once the Paris Agreement has entered into force, the Conference of the Parties under the Convention will serve as the meeting of the Parties to the Paris Agreement (CMA) (Article 16).<br>The Agreement is open for signature and subject to ratification, acceptance or approval by Parties to the UNFCCC. It is open for signature for one year starting on 22 April 2016. Thereafter, it will be open for accession (Article 20).<br>The Paris Agreement enters into force on the 30$^{th}$ day after the date on which at least 55 Parties accounting in total for at least 55 % of the global greenhouse gas emissions have deposited their instrument of ratification (Article 21). |

**Source:** UNFCCC 2015e.

# ANNEX 2: ELEMENTS OF THE DECISION ACCOMPANYING THE PARIS AGREEMENT

**Table 10: Important elements of Decision 1/CP.21**

| Topic | Key contents |
|---|---|
| **Adoption of the Paris Agreement** (see chapter 3.1) | The Conference of the Parties adopts the Paris Agreement, which is presented as an Annex to the Decision (Paragraph 1). |
| **Ad Hoc Working Group on the Paris Agreement** (see chapter 4.2) | The Ad Hoc Working Group on the Paris Agreement (APA) is established, which shall prepare for the entry into force of the Agreement (Paragraphs 7 to 11). |
| **Intended Nationally Determined Contributions** (see Box 8) | The contributions which were communicated by Parties ahead of the Paris conference are welcomed, but it is noted with concern that much greater efforts will be required to meet the temperature goals of the Paris Agreement (Paragraphs 12 and 17). |
| **Facilitative dialogue in 2018** (see chapter 3.2.8) | In 2018, a facilitative dialogue is convened to take stock of the collective efforts of Parties towards the long-term goals of the Agreement (Paragraph 20). |
| **Long-term low emission development strategies** (see chapter 3.2.1) | Parties are invited to communicate, by 2020, mid-century long-term low greenhouse gas emission development strategies (Paragraph 35). |
| **Loss and damage** (see chapter 3.2.3) | The provisions on loss and damage do not involve or provide a basis for any liability or compensation (Paragraph 51). |
| **Finance** (see chapter 3.2.4) | Developed country Parties collectively mobilise USD 100 billion climate finance per year from 2020 to 2025. Afterwards, a new goal shall be set from a floor of USD 100 billion (Paragraph 53). |
| **Paris Committee on Capacity-building** (see chapter 3.2.6) | The Paris Committee on Capacity-building is established. Its aim will be to address gaps and needs in implementing capacity-building in developing country Parties. Its aim will also be to further enhance capacity-building efforts (Paragraph 71). |

| Topic | Key contents |
|---|---|
| **Enhanced action prior to 2020**<br>(see chapter 3.2.10) | The existing technical examination process on mitigation is strengthened. This process highlights policies, practices and technologies with a high mitigation potential, using the format of technical expert meetings (Paragraph 109).<br>The engagement of non-Party stakeholders is pointed out and encouraged (Paragraphs 117 to 119).<br>A high-level event at each COP from 2016 to 2020 provides an opportunity for announcing new or strengthened efforts, initiatives and coalitions (Paragraph 120).<br>High-level champions are appointed to facilitate and scale up current mitigation and adaptation efforts (Paragraph 121).<br>A technical examination process on adaptation is launched for the period 2016 to 2020 (Paragraphs 124 to 132). |
| **Non-Party stakeholders**<br>(see chapters 3.2.10 and 7) | Non-Party stakeholders, including those of civil society, the private sector, financial institutions, cities and other sub-national authorities are invited to scale up their mitigation and adaptation efforts (Paragraph 134). |

**Source:** Decision 1/CP.21.

# ANNEX 3: STATUS OF RATIFICATION BY MAIN PARTIES

**Table 11: Overview of the main Parties' progress with respect to ratification of the Paris Agreement**

| Party | Status of progress as of 7 October 2016 | | |
|---|---|---|---|
| China | | | The instrument of ratification was deposited with the UN Secretary-General on 3 September 2016. |
| United States | | | The instrument of ratification was deposited with the UN Secretary-General on 3 September 2016. |
| European Union | | | The instrument of ratification of the European Union and seven of its Member States was deposited with the UN Secretary-General on 5 October 2016. |
| India | | | The instrument of ratification was deposited with the UN Secretary-General on 2 October 2016. |
| Russian Federation | The Paris Agreement has been signed, but not yet ratified. There are indications that Russia does not plan an early ratification of the Paris Agreement. | | |
| Japan | | The Paris Agreement has been signed, but not yet ratified. Japan signalled its intent to ratify the agreement by the end of 2016. | |

| Party | Status of progress as of 7 October 2016 | | |
|---|---|---|---|
| Islamic Republic of Iran | | The Paris Agreement has been ratified by the Cabinet of Ministers, but is yet to be approved by the Maijles and signed by the president before it is deposited with the UN Secretary-General. | |
| Republic of Korea | The Paris Agreement has been signed, but not yet ratified. Korea signalled that it would ratify swiftly, but no timeline has been announced. | | |
| Canada | | | The instrument of ratification was deposited with the UN Secretary-General on 5 October 2016. |
| Brazil | | | The instrument of ratification was deposited with the UN Secretary-General on 21 September 2016. |

**Source:** UNFCCC 2016h, announcements and articles as referenced in chapters 5.1 to 5.10. The classification into three different stages is a result of a qualitative assessment.

# NOTES

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