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Item 3(b) of the provisional agenda
Reporting from and review of Parties included in Annex I to the Convention
Compilations and syntheses of second and third biennial reports from Parties included in Annex I to the Convention

Compilation and synthesis of third biennial reports of Parties included in Annex I to the Convention

Report by the secretariat

Addendum

Summary

This document contains a compilation and synthesis of the third biennial reports submitted to the secretariat by Parties included in Annex I to the Convention. It provides information on a range of issues relating to the implementation of the Convention, such as quantified economy-wide emission reduction targets and progress towards their achievement, including information on mitigation actions and their effects and estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry activities; greenhouse gas emission projections; and the provision of financial, technological and capacity-building support to developing country Parties.

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Contents

Abbreviations and acronyms

Annex I Party	Party included in Annex I to the Convention
Annex II Party	Party included in Annex II to the Convention
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
EIT Parties	Parties with economies in transition
ESD	effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GDP	gross domestic product
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MBM	market-based mechanism
MRV	measurement, reporting and verification
NA	not applicable
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NF_3	nitrogen trifluoride
non-Annex I Party	Party not included in Annex I to the Convention
non-EIT Parties	Parties that do not have economies in transition
non-ETS	not covered by the European Union Emissions Trading System
N_2O	nitrous oxide
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
OECD DAC	Organisation for Economic Co-operation and Development Development Assistance Committee
OOF	other official flows
PaMs	policies and measures
PFC	perfluorocarbon
PPP	purchasing power parity
RES 2035	Russian Federation's Energy Strategy 2035
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	"UNFCCC biennial reporting guidelines for developed country Parties"
WAM	'with additional measures'
WEM	'with existing measures'
WOM	'without measures'

I. Quantified economy-wide emission reduction targets

A. Overview of targets

1. Annex I Parties[1] report[2] in their BRs information describing their quantified economy-wide emission reduction targets, including any conditions or assumptions that are relevant to the attainment of those targets, as communicated to the secretariat and contained in document FCCC/SB/2011/INF.1/Rev.1 or any update to that document.[3] Each Party is also to report in BRs on progress in the achievement of its target.

2. All Annex I Parties except Turkey pledged targets for the pre-2020 period as part of the Cancun Agreements. Kazakhstan submitted its target on a voluntary basis. Each target is stipulated as a percentage reduction in absolute emissions from a base-year level to be achieved by 2020. Some Parties took on multiple targets: one that is unconditional (independent of future circumstances) and one or more that are conditional (contingent on certain conditions, such as treaty provisions or pledges made by other Parties).

3. Examples of the provisions tied to the conditional targets include achieving a comprehensive global agreement with the participation of all major economies; all Parties contributing their fair share to a cost-effective global emission reduction pathway; and having an effective set of rules for LULUCF and the use of units from MBMs. Table 1 shows Annex I Parties' targets, their base years, the conditionality status of their 2020 targets and their post-2020 targets.

4. The 2020 targets reported in the BR3s are the same as those reported in document FCCC/SBSTA/2014/INF.6, with the exception of those of Belarus[4] and Japan.[5] Box 1 provides more detail on the joint economy-wide emission reduction target of the EU. Additionally, some individual EU member States have domestic 2020 targets that are more ambitious than that for the EU as a whole. Table 1 in annex I presents additional description of Parties' 2020 targets.

5. All Parties pledged post-2020 targets in their NDCs under the Paris Agreement, and some reported those targets in their BR3s. The targets are for 2030 for all Parties except for the United States of America, which has a target for 2025. In most cases the targets submitted in the NDCs update the post-2020 targets submitted under the Cancun Agreements. For consistency, the post-2020 targets are shown in table 1 for all Parties, whether or not they reported them in their BR3s.[6]

6. Since 2016, several Parties have also submitted under the Paris Agreement long-term targets, objectives and strategies that set the long-term direction of their national climate policy.[7] Some Parties included them in their BR3s to outline their trajectories to achieving

[1] Kazakhstan submitted a quantified economy-wide emission reduction target to the secretariat although it is a non-Annex I Party. Unless specified otherwise, information on Kazakhstan is not included in the compilation and synthesis of data presented in this report.

[2] Annex I Parties' BR3s are available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/third-biennial-reports-annex-i.

[3] The latest update is contained in document FCCC/SBSTA/2014/INF.6.

[4] Belarus communicated to the secretariat a conditional target of a 5–10 per cent emission reduction compared with the 1990 level, which is reflected in document FCCC/SBSTA/2014/INF.6; but it communicated a target of 8 per cent in its BR1 and BR2.

[5] After publication of document FCCC/SBSTA/2014/INF.6, Japan formally resubmitted its 2020 emission reduction target as a 3.8 per cent or more emission reduction by 2020 compared with the 2005 level; see http://unfccc.int/focus/mitigation/items/9736.php.

[6] Information on the post-2020 targets presented in NDCs is available at http://www4.unfccc.int/ndcregistry/Pages/All.aspx; information on the post-2020 targets presented in the intended national determined contributions of Parties that have not yet ratified the Paris Agreement is available at http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx.

[7] Information on mid-century, long-term low GHG emission development strategies is available at https://unfccc.int/process/the-paris-agreement/long-term-strategies.

their 2020 targets under the Convention, NDC targets for 2025 and 2030 and long-term strategies until 2050. The long-term targets or goals have also been included in table 1.

Table 1
Annex I Parties' greenhouse gas emission reduction targets

	Quantified economy-wide emission reduction target for 2020 (reduction from base-year emission level)[a]			*GHG emission reduction target for 2030 (reduction from base-year emission level)*[b]			*GHG emission reduction long-term target or objective (reduction from base-year emission level)*	
Party	*Base year*	*Unconditional*	*Conditional*	*Base year*	*Unconditional*	*Conditional*	*Base year*	*Target/objective*
Australia	2000	5%	15–25%	2005		26–28%		
Belarus	1990		5–10%	1990	At least 28%			
Canada	2005		17%	2005	30%		2005	At least 80%
EU	1990	20%	30%	1990	At least 40%		1990	80–95% by 2050
Iceland	1990	20%	30%	1990	40%[c]			
Japan	2005	At least 3.8%[d]		2013	26%		2010	At least 70% by 2050
Kazakhstan	1990	15%		1990	15%	25%	1990	25% by 2050
Liechtenstein	1990	20%	30%	1990	40%			
Monaco	1990	30%		1990	50%		1990	80% and carbon neutral by 2050
New Zealand	1990	5%	10–20%	2005	30%		1990	50% by 2050
Norway	1990	30%	40%	1990	40%		1990	80–95% by 2050 and carbon neutral by 2030
Russian Federation	1990		15–25%	1990		70–75%		
Switzerland	1990	20%	30%	1990	50%		1990	70–85% by 2050
Turkey		No target for 2020			Up to 21% reduction from 'business as usual'			
Ukraine	1990		20%	1990	40%			Low-emission 2050 development strategy to support 2 °C target
United States	2005	In the range of 17%		2005	26–28% by 2025		2005	80% or more by 2050

[a] As communicated to the secretariat and contained in document FCCC/SBSTA/2014/INF.6, unless otherwise specified.
[b] As reported in NDCs under the Paris Agreement, available at http://www4.unfccc.int/ndcregistry/Pages/All.aspx, unless otherwise specified.
[c] Iceland will fulfil its target jointly with the EU and its 28 member States.
[d] Target modified after publication of document FCCC/SBSTA/2014/INF.6 and officially communicated to the secretariat by the Government of Japan.

7. The emission reduction targets (unconditional or unspecified) for 2020[8] range from at least 3.8 per cent below the 2005 emission level (Japan) to 30 per cent below the 1990 emission level (Monaco and Norway[9]). The conditional emission reduction targets for 2020, taken on by Australia, Belarus, Canada, the EU, Iceland, Liechtenstein, New Zealand, Norway, the Russian Federation, Switzerland and Ukraine, range from 5–10 per cent below the 1990 emission level (Belarus) to 30 per cent below the 1990 emission level (EU, Iceland, Liechtenstein and Switzerland) and 40 per cent below that level (Norway).

8. The majority of Parties have 1990 as the base year for their emission reduction targets; while Australia selected 2000, and Japan, Canada and the United States all selected 2005.

9. Where Parties submitted unconditional and conditional targets, they were aiming at increasing the ambition of their target under certain circumstances. However, no information was provided by any Party with a conditional target analysing whether any of the conditions for shifting towards that target had been met so far. Nevertheless, there is an indication that some Parties are well on track to overachieving their conditional targets by a good margin.

Box 1
The European Union's joint economy-wide emission reduction target

Under the Convention the EU committed to contributing to the achievement of a joint economy-wide emission reduction target of 20 per cent below the 1990 level by 2020. Details on the implementation of the joint target are provided in the 2020 EU climate and energy package, adopted in 2009. The package stipulates that the target will be met by the EU and its member States through a 21 per cent reduction below the 2015 level in GHG emissions from installations under the EU ETS and a 10 per cent reduction below the 2005 level in emissions from non-ETS sectors (primarily transport and some industrial processes and product use, agriculture and waste). For emissions covered by the EU ETS, the common EU-wide target applies to all member States as a group. For non-ETS emissions, the ESD provides targets for each member State individually to reduce or limit growth in its GHG emissions in the range of 20 per cent below to 20 per cent above the 2005 level by 2020. The target levels were set on the basis of the relative GDP per capita of the member States. Up to a certain limitation, the ESD allows EU member States flexibility in meeting their annual targets by carrying over overachievements to subsequent years within each member State, transferring annual emission allocations between member States and using international credits (i.e. credits from joint implementation and the clean development mechanism). Emissions and removals from the LULUCF sector are not included in the EU quantified economy-wide emission reduction target.

10. For the post-2020 period, all Parties indicated in their NDCs 2030 as the deadline for their targets, except the United States, which indicated 2025. Some Parties also outlined longer-term targets for until 2050. Most Parties use 1990 as the base year; while Australia, Canada, Japan, New Zealand and the United States use 2005. Japan also described its target against the 2013 financial year. The 2030 targets range from a 15 per cent (Kazakhstan) to a 50 per cent (Monaco and Switzerland) emission reduction below the 1990 level.

11. Some Parties have set long-term targets or objectives and strategies for the post-2020 time-horizon, typically for 2050 (Canada, EU, Japan, Kazakhstan, Monaco, New Zealand, Norway, Switzerland, Ukraine and United States) either, as part of their pledges under the Cancun Agreements, their (intended) NDCs or their long-term strategies under the Paris Agreement. Most Parties mentioned their long-term targets in their BRs.

12. Some Parties outlined in their BRs ambitious trajectories to meeting their long-term goals. Germany has set a goal of being largely carbon neutral by 2050, and its associated

[8] In this report, references to 2020 targets concern the unconditional targets, unless otherwise specified.

[9] Norway reported in its BR3 that its unconditional target under the Convention for 2020 of a 30 per cent emission reduction relative to the 1990 emission level is consistent with its quantified emission limitation or reduction commitment of 84 per cent of the base-year emissions for the period 2013–2020 as defined in the Doha Amendment to the Kyoto Protocol. Therefore, compliance under the Kyoto Protocol should ensure that Norway also meets its 2020 emission reduction target under the Convention.

interim emission reduction targets include at least 55 per cent by 2030 and 70 per cent by 2040 compared with the 1990 level. Sweden has set a net-zero emission goal by 2045 with negative emissions thereafter. Sweden also outlined ambitious interim emission reduction targets for its non-ETS sector of at least 63 per cent by 2030 and at least 75 per cent by 2040 relative to the 1990 level. Similarly, both the Netherlands and France mentioned in their BRs ambitious targets for 2030. The Netherlands has set a 49 per cent emission reduction target by 2030 and France an interim emission reduction target of 40 per cent by 2030 relative to the 1990 level. Such targets, objectives and strategies provide long-term direction to climate policy and ensure that near-term and midterm targets are consistent with that direction. Norway highlighted its target of becoming a low-emission society by 2050 in its BR3, outlining that the aim is to promote the long-term transformation of Norway in a climate-friendly direction. Its target has been translated into a quantitative target of an 80–95 per cent emission reduction below the 1990 level.

B. Description of quantified economy-wide emission reduction targets

13. All Parties communicated their targets as percentage reductions relative to emissions of selected GHGs in the base year, and also reported in their BRs additional descriptive information on the targets, including gases and sectors covered, GWP values used for calculating CO_2 eq emissions, and use of units from MBMs and LULUCF.

14. Most Parties selected 1990 as the base year, except Australia (2000) and Canada, Japan and the United States (2005). For many Parties the base year for F-gases (HFCs, PFCs and SF_6) is the same as for the other gases (CO_2, CH_4 and N_2O), except for Kazakhstan and Monaco.

15. All Parties included CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 in their base-year emissions and targets; and all but Belarus, the EU, Iceland, Kazakhstan and Liechtenstein also included NF_3 in their targets. Only Ukraine[10] has yet to determine its base year for NF_3 (see table 1 in annex I).

16. Most Parties used GWP values from the AR4 for calculating their GHG emissions, except for Belarus and Ukraine, which used those from the AR2.[11]

17. With regard to the sectoral coverage of the targets, all Parties included in their targets emissions from energy, transport, industrial processes,[12] agriculture and waste; while the EU target also includes emissions from international aviation, which are covered by the EU ETS.

18. Australia, Canada, Iceland, Japan, Liechtenstein, New Zealand, Norway, Switzerland and the United States included the LULUCF sector in their targets, but with different accounting approaches (see table 2 as well as table 1 in annex I). Some Parties will use the Kyoto Protocol activity-based approach to LULUCF accounting, which defines activities such as afforestation, reforestation, deforestation and forest management. Other Parties, such as Liechtenstein, Monaco and the United States, will use a comprehensive land-based approach. However, outside the Kyoto Protocol, there are no agreed accounting rules on how emissions and removals estimated using either a land-based or an activity-based approach could contribute to the achievement of targets. Some Parties have not yet provided information on the LULUCF accounting approach that they will use.

19. Whether Parties are accounting for the use of units from MBMs (i.e. acquired certified emission reductions, emission reduction units, assigned amount units, carry-over units under the Kyoto Protocol and units from other mechanisms under the Convention) in achieving their targets varies. Belarus, Kazakhstan, the Russian Federation and the United States indicated that they will not use MBMs, and Canada reported that this is still to be determined (see table 1 in annex I). The EU, Liechtenstein, Norway and Switzerland were the only Parties that reported using such units in the period 2014–2016 (see table 2). There are no agreed

[10] For Ukraine, data were taken from its BR1 since at the time of the preparation of this report it had not yet submitted its BR3.

[11] Based on Ukraine's BR1 and Belarus' BR2.

[12] Industrial processes refers to the industrial processes and solvent and other product use sectors.

accounting rules outside the Kyoto Protocol on how the use of units from MBMs can contribute to the achievement of targets.

20. The EU and its member States have retained the option to use units from MBMs in achieving their targets under the Convention, including under the ESD, which allocated specific targets to the EU member States for non-ETS sectors (see table 2 in annex I). Belgium, Italy and the United Kingdom of Great Britain and Northern Ireland reported using MBMs in the period 2014–2016.

21. Although Parties are required to report ex post information relevant to assessing progress towards their targets,[13] including total annual GHG emissions and the contribution from LULUCF and MBMs, there is no specific guidance outside the Kyoto Protocol rules on accounting for such emissions and contributions to demonstrate the achievement of the 2020 targets, which would ensure, for instance, the avoidance of double counting of units from MBMs across Parties.

II. Progress in achieving the quantified economy-wide emission reduction targets and use of units from market-based mechanisms

A. Overview

22. In their BR3s Parties reported on progress in achieving their targets in terms of their mitigation actions and the results achieved as reflected in their GHG emission trends and use of units from MBMs and LULUCF activities.

23. The GHG emissions of 43 Annex I Parties[14] are discussed in this chapter. Emission data are taken from the 2018 annual GHG inventory submissions received as at 27 May 2018. Total aggregate GHG emissions, emissions by gas, emissions by sector and emission data for individual Annex I Parties are presented for three distinct periods: (1) the entire 1990–2016 period; (2) 1990–2000, when the difference in emission trends between EIT and non-EIT Parties was more prominent; and (3) 2000–2016, representing recent emission trends.

24. To provide some context on drivers influencing emission trends, this chapter presents trends in two key indicators related to GHG emissions: GHG emissions per capita and GHG emissions per GDP unit using PPP. It also presents the use of LULUCF activities and units from MBMs in meeting targets, and concludes with a summary of Parties' progress up to the latest reported year in meeting their targets.

25. Parties reported information on mitigation actions and their effects in the context of progress towards their targets (see chapter III below).

26. As outlined in the Paris Agreement, Parties are expected to pursue the highest possible mitigation effort in the pre-2020 period. The 2020 targets are therefore part of a broader effort to lay a solid foundation for enhanced post-2020 ambition. As such, it is important to assess progress towards meeting those targets in the context of a long-term trajectory and whether Parties are on track to achieving the long-term goal of the Paris Agreement.

B. Greenhouse gas emission trends

27. For all Annex I Parties taken together, total aggregate GHG emissions decreased over the period 1990–2016: without LULUCF by 13.0 per cent, from 19,694 to 17,127 Mt CO_2 eq;

[13] In CTF tables 4, 4(a)I, 4(a)II and 4(b).

[14] "Annex I Parties" refers to the 43 Parties included in Annex I to the Convention. All Annex I Parties, except Belarus, Ukraine and the United States, had submitted their BR3s before the publication of this report. Unless specified otherwise, information provided on Ukraine in this report refers to Ukraine's BR1. Reference to "Parties" in this report means Annex I Parties and Kazakhstan, which, in accordance with the request of the Conference of the Parties at its twelfth session (see document FCCC/CP/2006/5, paragraph 96), follows the reporting requirements for Annex I Parties.

with LULUCF by 18.5 per cent, from 18,675 to 15,219 Mt CO_2 eq. These trends are marked by the difference in emissions of EIT and non-EIT Parties, which was more prominent during the 1990s when EIT Parties were undergoing a process of transition from planned to market-based economies that affected their GHG emissions, as well as by the difference in the total GHG emission trends for the periods 1990–2000 and 2000–2016.

28. From 1990 to 2016, GHG emissions of EIT Parties decreased by 37.6 per cent without LULUCF and by 49.6 per cent with LULUCF. Between 1990 and 2000, there was a sizable decrease in their emissions (by 41.7 per cent without LULUCF and by 51.0 per cent with LULUCF) because of the steep decline in the economies of those Parties (GDP decreased by 18 per cent in the period 1990–2000). Following the economic recovery from around 2000, emissions remained stable annually until 2008, but dropped by more than 5 per cent in 2009 due to the global financial and economic crisis. From 2010, emissions began to slightly increase, but a downward trend was observed from 2013. Emissions between 2000 and 2016 rose by 7.1 per cent without LULUCF and by 2.8 per cent with LULUCF. Overall, EIT Parties' emission growth has been much smaller than their economic growth, reflecting the impacts of economic restructuring and of PaMs since the late 2000s.

29. For non-EIT Parties, GHG emissions decreased over the period 1990–2016, by 1.3 per cent without LULUCF and by 2.5 per cent with LULUCF, despite the Parties' economic growth measured in terms of their GDP (which rose by 64.4 per cent). Emissions between 1990 and 2000 increased by 8.7 per cent both with and without LULUCF, followed by a significant decrease in emissions in the period 2000–2016 (by 9.2 per cent without LULUCF and by 10.3 per cent with LULUCF), underlining the effect of PaMs implemented by many non-EIT Parties.

30. Overall, the emission trends show that the total emissions of Annex I Parties were highest in 1990, mostly thanks to the high emissions of EIT Parties. After 1990, the large decrease in emissions of EIT Parties more than offset the slow growth in emissions of non-EIT Parties, which peaked in 2007. This was followed by a steep decline and rebound in Annex I Parties' emissions in 2008–2010, reflecting the impact of the global economic and financial crisis. Since 2010, a relatively steady emission trend of approximately 0.75 per cent reduction per year has been observed.

31. Figures 1 and 2 show the total GHG emission levels and trends in the period 1990–2016 for all Annex I Parties taken together, for EIT Parties and for non-EIT Parties.

Figure 1

Greenhouse gas emissions without land use, land-use change and forestry for Annex I Parties, 1990–2016

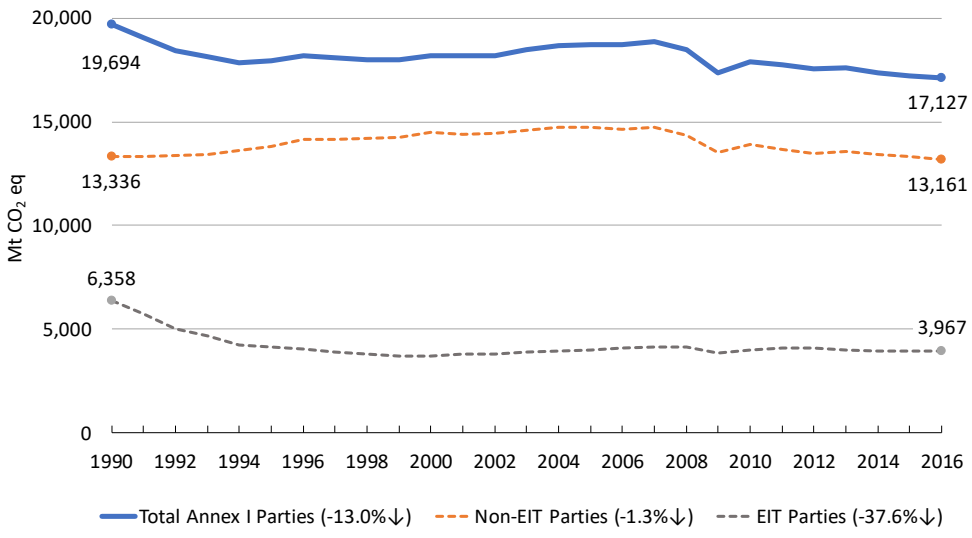
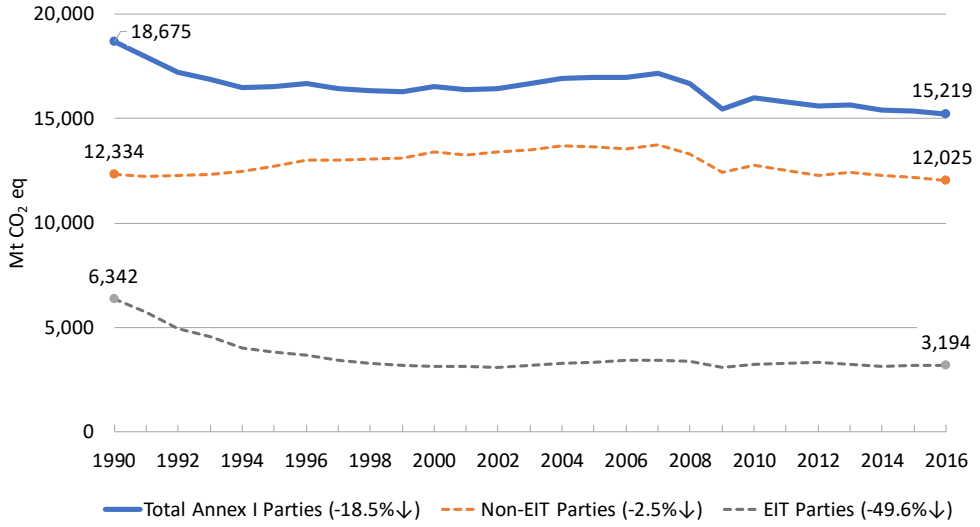


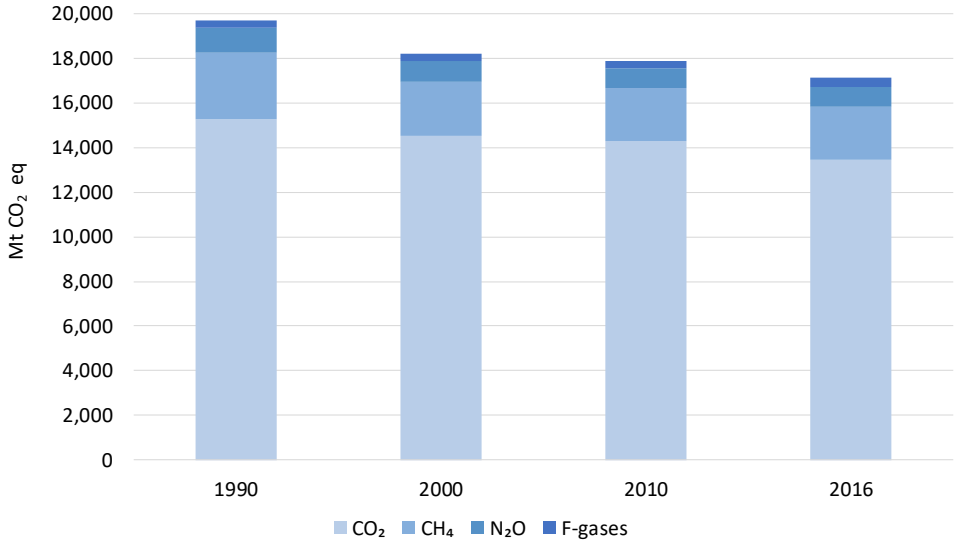
Figure 2
Greenhouse gas emissions with land use, land-use change and forestry for Annex I Parties, 1990–2016



C. Greenhouse gas emissions by gas

32. Emissions of CO_2, CH_4 and N_2O decreased over the three time periods (1990–2016, 1990–2000 and 2000–2016) discussed in this report. However, emissions of HFCs, PFCs, SF_6 and NF_3 taken together increased over all three periods, owing mainly to the increase in emissions of HFCs used as a substitute for ozone-depleting substances controlled by the Montreal Protocol. The changes in emissions of each GHG are displayed in figure 3.

Figure 3
Greenhouse gas emissions by gas for Annex I Parties, 1990, 2000, 2010 and 2016



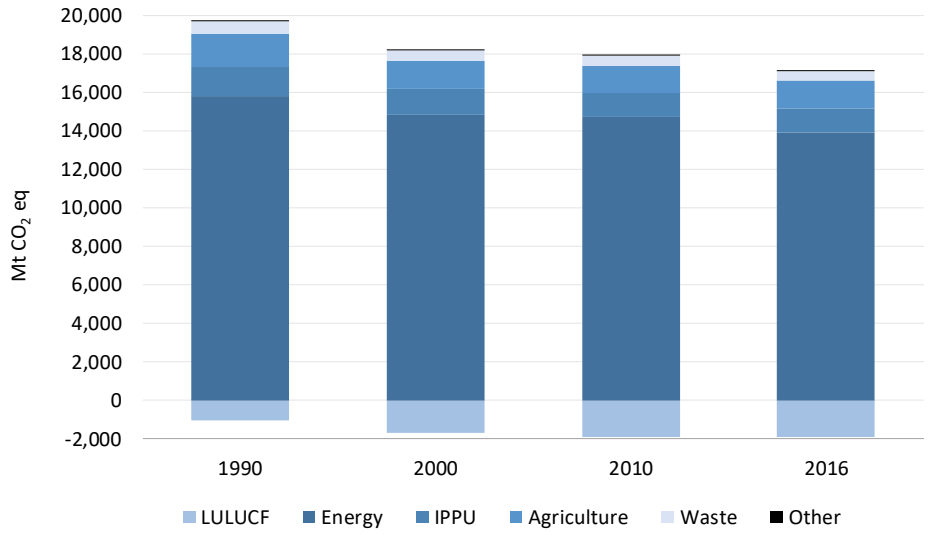
33. In 1990–2016 the shares of the individual gases in the total emissions remained generally the same, with CO_2 continuously accounting for the largest share (see figure 3). In 2016, CO_2 contributed 78.7 per cent of total emissions, while the contributions of CH_4 and N_2O were 13.9 and 5.1 per cent, respectively. The sum of HFCs, PFCs, SF_6, unspecified mix of HFCs and PFCs, and NF_3 accounted for approximately 1.9 per cent of the total emissions in 1990–2016.

D. Greenhouse gas emissions by sector

34. Emissions from all sectors had decreased by 2016 compared with the 1990 level, with the largest reduction in the waste sector (–22.4 per cent). The sectors industrial processes and product use and agriculture underwent the second-largest decrease in the same period (about –16 per cent each), followed by energy (–12.0 per cent). Net GHG removals from LULUCF increased by 87.3 per cent. Figure 4 shows the total emissions of each sector.

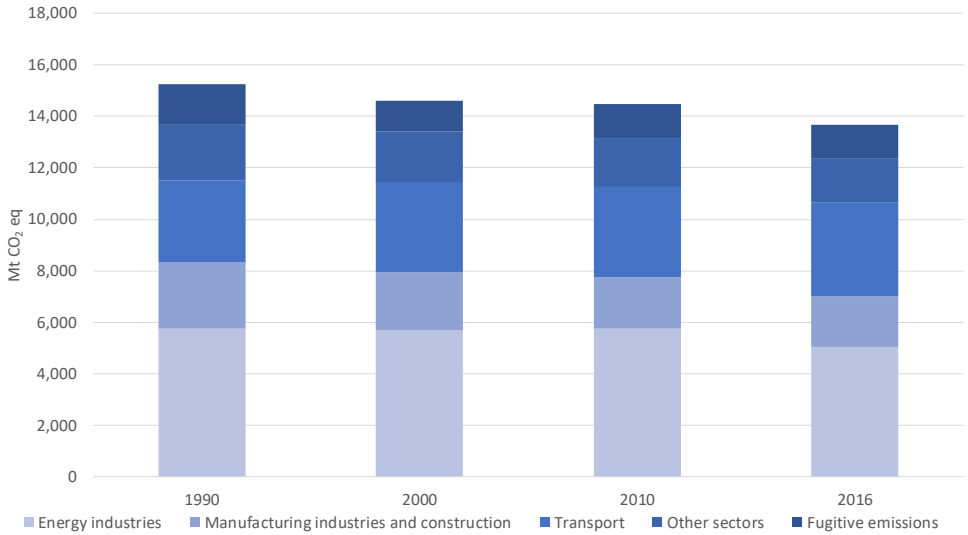
35. Between 1990 and 2000, there was a decline in emissions from all sectors, with the largest decrease occurring in the agriculture sector (–17.2 per cent) and the smallest in the waste sector (–6.0 per cent). From 2000 to 2016, emissions remained on a downward trend, except for those from the agriculture sector, which slightly increased by 1.3 per cent. Moreover, the increase in net GHG removals from LULUCF (by 12.8 per cent) was much lower than in the other periods.

Figure 4
Greenhouse gas emissions and removals by sector for Annex I Parties, 1990, 2000, 2010 and 2016



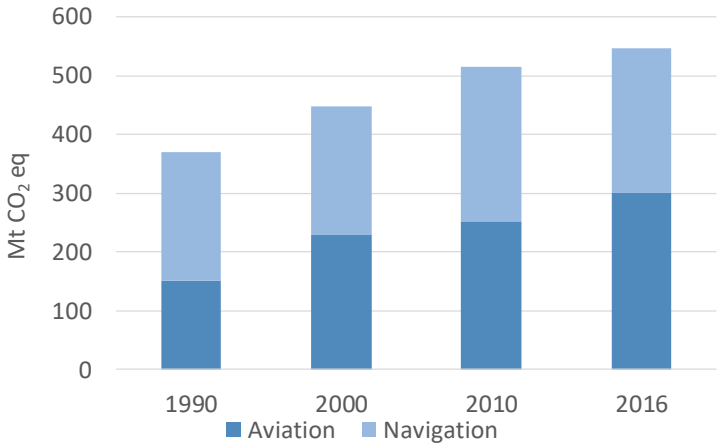
36. The overall emissions from the energy sector conceal the differences in trends in the energy subsectors. Emissions from all subsectors decreased in 1990–2016, but at different rates, while transport showed a notable emission increase of 14.5 per cent (see figure 5). The emission pattern was similar in the period 1990–2000, when only emissions from transport increased, by 11.2 per cent, while emissions from all other energy subsectors decreased. Fugitive emissions experienced the largest reduction (–25.1 per cent). Between 2000 and 2016, emissions from energy industries, manufacturing industries and construction and other sectors decreased, whereas emissions from the subsectors transport and fugitive emissions increased. It is worth noting that the growth in emissions from transport in 2000–2016 (3.0 per cent) was much lower than in 1990–2000 (11.2 per cent).

Figure 5
Greenhouse gas emissions from energy subsectors for Annex I Parties, 1990, 2000, 2010 and 2016



37. Emissions related to fuel sold for use in international bunkers increased between 1990 and 2016: for aviation, emissions almost doubled (an increase of 98.3 per cent); for marine, emissions rose by 13.0 per cent. Between 1990 and 2000, emissions from aviation rose, whereas emissions from marine slightly decreased. Over the period 2000–2016, emissions from international aviation and marine bunkers increased by 30.4 and 13.2 per cent, respectively (see figure 6).

Figure 6
Greenhouse gas emissions from international bunkers for Annex I Parties, 1990, 2000, 2010 and 2016



E. Emission data for individual Annex I Parties

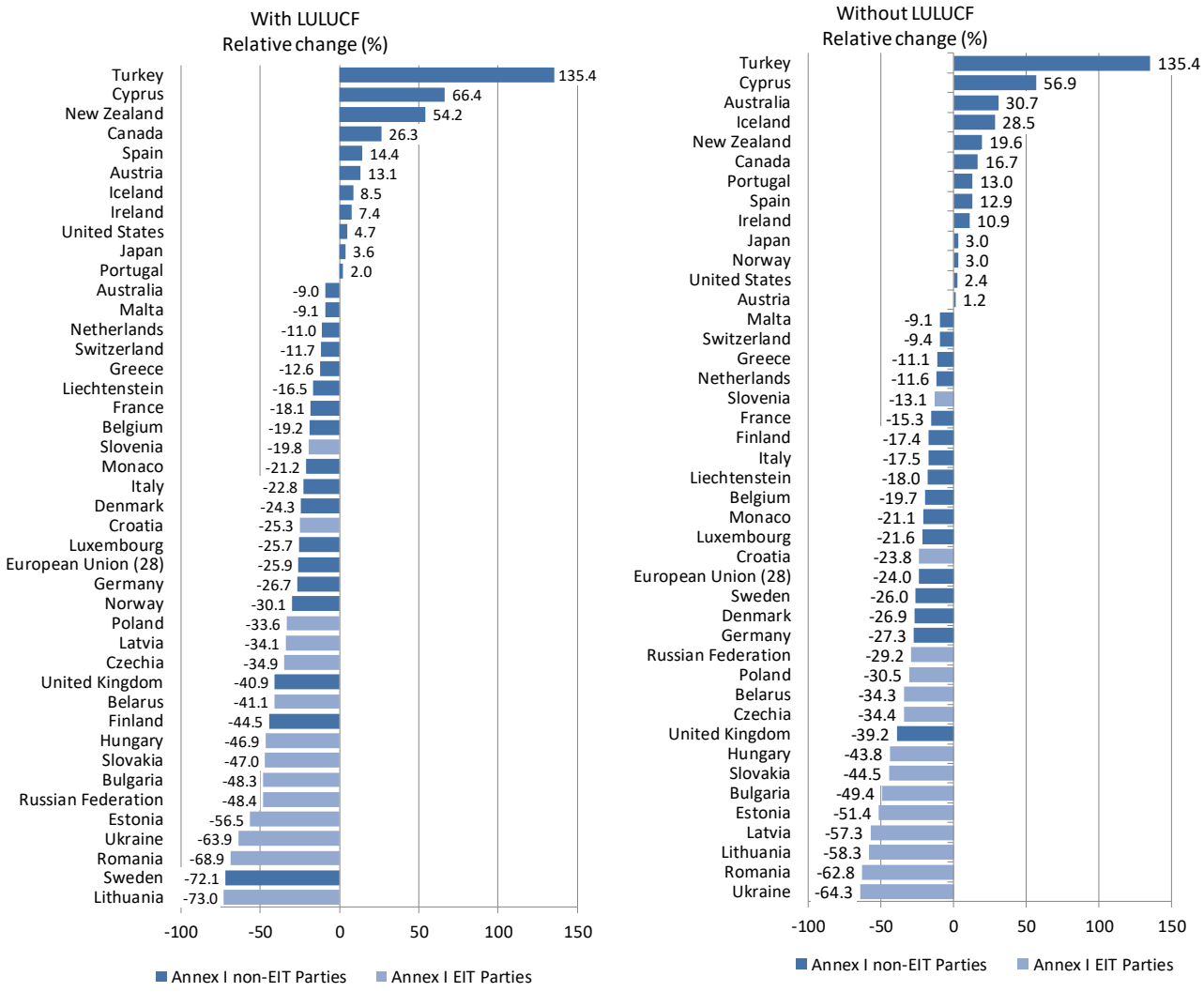
38. Total aggregate GHG emissions with and without emissions and removals from LULUCF for each Annex I Party are provided in tables 3 and 4 in annex I. Data are provided for 1990, 2000, 2010 and 2016. The percentage changes in emissions were calculated using exact (not rounded) values and may therefore differ from ratios calculated using the rounded numbers provided in the tables.

39. The changes in total GHG emissions over the period 1990–2016 varied considerably across Parties (see figure 7). Ukraine experienced the largest decrease in emissions without LULUCF (–64.3 per cent), followed by Romania, Lithuania, Latvia and Estonia, with emission reductions of more than 50 per cent. On the other hand, the greatest increase in

emissions without LULUCF occurred in Turkey (135.4 per cent), followed by Cyprus with an increase in emissions of 56.9 per cent. Overall, emissions without LULUCF increased by more than 10 per cent in 9 Parties and decreased by more than 10 per cent in all 14 EIT Parties and in 14 non-EIT Parties (Belgium, Denmark, EU, Finland, France, Germany, Greece, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, Sweden and United Kingdom). Total aggregate GHG emissions with LULUCF over the period 1990–2016 increased in 11 Parties and decreased in 32 Parties.

40. From 1990 to 2000, emissions without LULUCF decreased in 22 Parties and increased in 21 Parties; emissions with LULUCF decreased in 25 Parties and increased in 18 Parties. In the period 2000–2016, a decrease in emissions without LULUCF occurred in 31 Parties, whereas an increase occurred in 12 Parties. Emissions with LULUCF decreased in 29 Parties and increased in 14 Parties.

Figure 7
Changes in total emissions of individual Annex I Parties, 1990–2016



F. Development of greenhouse gas emission trends since 2014

41. Following the decreasing trend in total GHG emissions in the period 1990–2014 presented in the previous compilation and synthesis report,[15] total aggregate GHG emissions

[15] FCCC/SBI/2016/INF.10/Add.1.

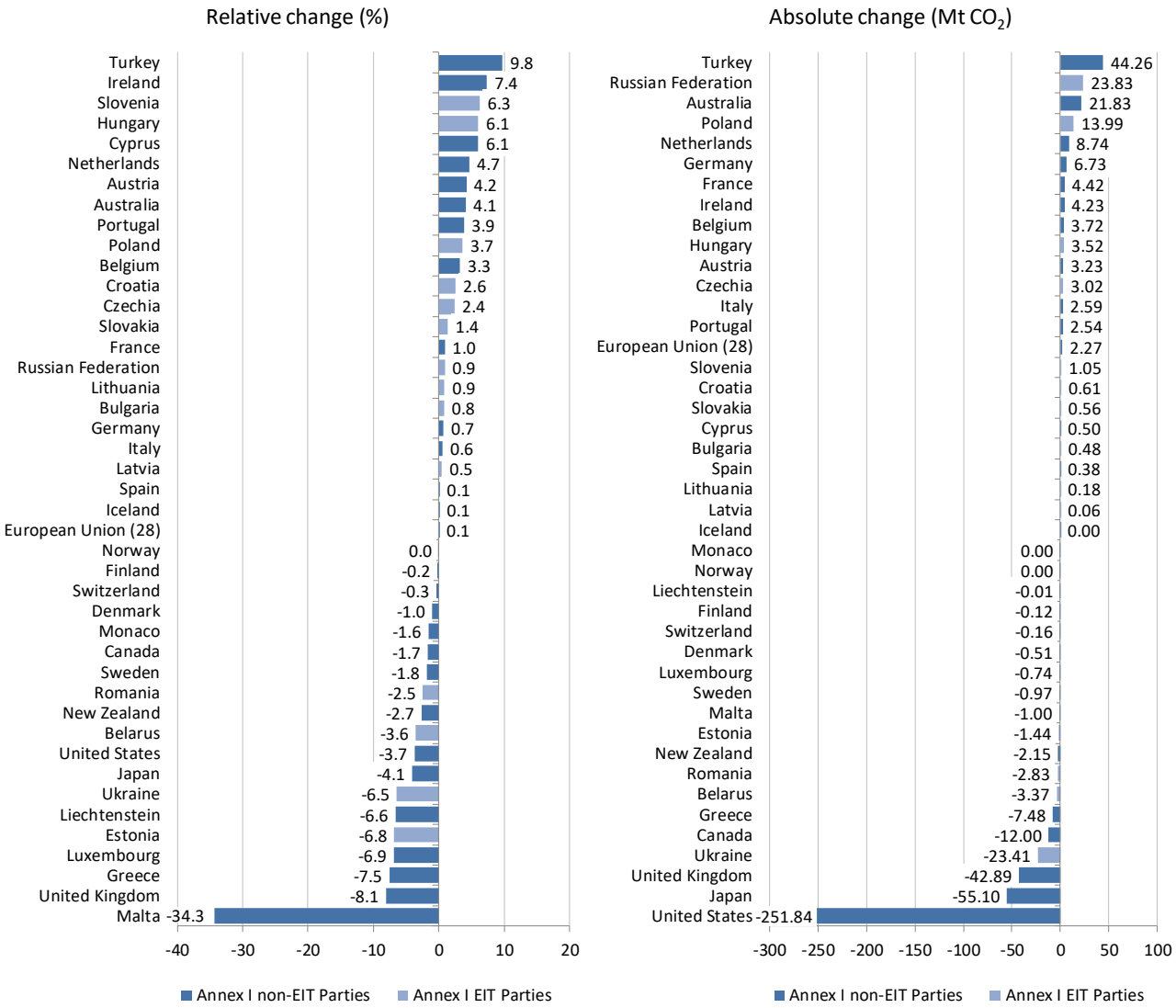
of all Annex I Parties further decreased by 1.5 per cent without LULUCF and 1.3 per cent with LULUCF from 2014 to 2016.

42. Between 2014 and 2016, emissions from all sectors decreased, except in agriculture, where emissions slightly increased (1.5 per cent). A slight decrease (–2.9 per cent) was observed in the period in net GHG removals from LULUCF.

43. GHG emission reductions between 2014 and 2016 occurred in fewer Parties (19 Parties) and emission growth occurred in more Parties (24 Parties). Figure 8 shows the changes in total aggregate GHG emissions from 2014 to 2016 for each Annex I Party.

Figure 8

Changes in total emissions without land use, land-use change and forestry of individual Annex I Parties, 2014–2016



G. Trends in indicators related to greenhouse gas emissions

44. Emissions are driven higher by economic growth and lower by PaMs and efficiency improvements. In this section, the decarbonization of Annex I Parties' societies and economies is presented by means of two aggregate indicators that combine emissions and additional statistical data: the level of GHG emissions per capita and the level of GHG emissions per GDP unit using PPP, an economic comparison that accounts for the difference in the cost of living among countries. These indicators are useful for comparing emission levels among Parties and for evaluating trends. While there are a number of indicators that

can be used to assess GHG emission trends (see box 2), only two are considered in this report, presenting a perspective on how Annex I Parties are progressing towards meeting their GHG emission targets by 2020.

45. The data source for the indicators is the World Bank Open Data,[16] including information on the population and GDP of all Annex I Parties. GHG inventory data are taken from Parties' 2018 GHG inventory submissions.

Box 2
Climate indicators

Indicators are commonly used to identify the level of effort or a trend over a time period. There are macroeconomic indicators that provide insight into the economic performance of a particular country or region, and climate change indicators that show long-term trends related to the causes and effects of climate change. GHG emission indicators allow for the compilation of credible and comparable data inventories of GHG emissions over a period of time and, together with other indicators, can highlight trends in the transition to a low-carbon economy. These indicators are useful in considering what additional effort is needed for Parties to reach their 2020 targets or their midterm and longer-term targets under the Paris Agreement.

Other agencies use indicators to assess progress: in *The Emissions Gap Report 2017* of the United Nations Environment Programme,[a] the trends in key indicators of the transition to a low-carbon economy observed between 1990 and 2014 for the Group of 20 were highlighted. Indicators such as energy-related CO_2 emissions, energy intensity of the economy and GHG emissions were used to illustrate progress towards a low-carbon economy. Furthermore, the World Bank uses Regulatory Indicators for Sustainable Energy to assess countries' policy and regulatory support for each of the three pillars of sustainable energy: access to modern energy, energy efficiency and renewable energy.

Indicators are a useful tool for effectively communicating GHG emission trends as well as for informing the policymaking community of where additional effort is needed.

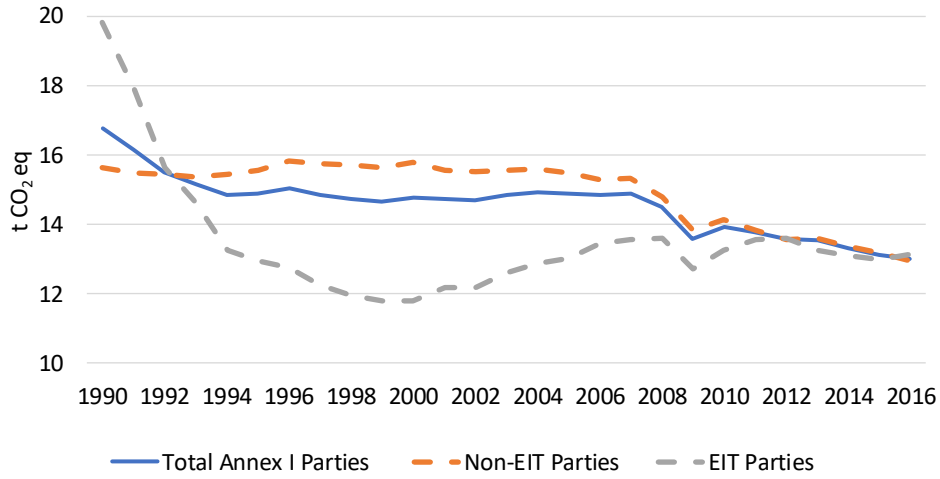
[a] United Nations Environment Programme. 2017. *The Emissions Gap Report 2017: A UN Environment Synthesis Report*. Nairobi: United Nations Environment Programme. Available at https://wedocs.unep.org/bitstream/handle/20.500.11822/22070/EGR_2017.pdf.

46. Overall, from 1990 to 2016, the levels of GHG emissions per capita and GHG emissions per GDP unit using PPP have shown a downward trend for most Parties; only a few Parties have experienced small increases (see figures 9 and 10).

47. From 1990 to 2016, GHG emissions per capita of Annex I Parties[17] dropped by 22.5 per cent, from 16.76 to 12.98 t CO_2 eq. For non-EIT Parties, GHG emissions per capita were mostly steady between 1990 until 2007. For EIT Parties, GHG emissions per capita showed a large decrease between 1990 until 2000, after which they started gradually increasing until 2008. Both non-EIT and EIT Parties saw a sharp decrease in emissions per capita between 2008 and 2009 due to the financial crisis, with emissions per capita increasing again from 2010. In around 2011, emissions per capita started decreasing again for all Parties, with non-EIT and EIT Parties' GHG emissions per capita at roughly the same level (see figure 9). The 1990–2016 demographic context is important here: while the population of EIT Parties decreased by 6 per cent, that of non-EIT Parties increased by 19 per cent, meaning that growth in population was not matched by a proportional increase in GHG emissions.

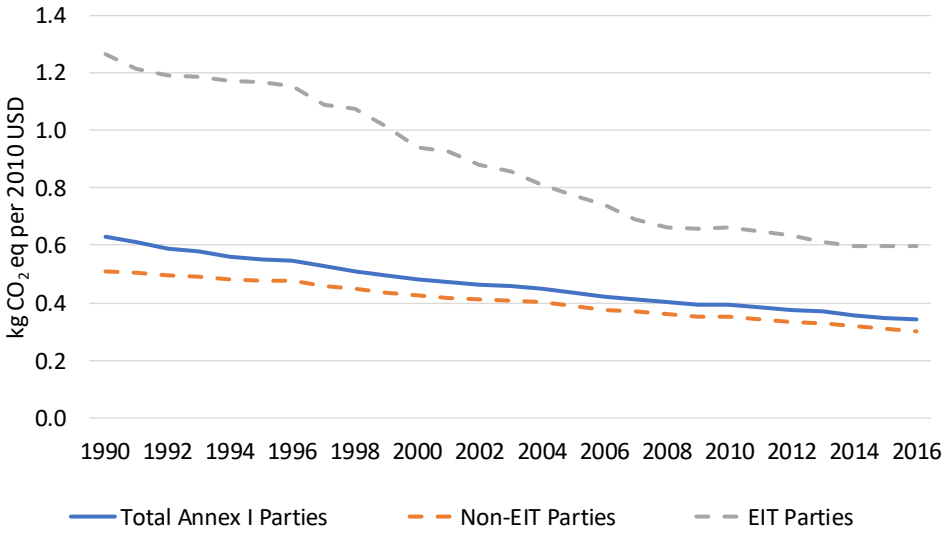
[16] Available at https://data.worldbank.org/.
[17] Excluding Monaco, for which a complete time series was not available.

Figure 9
Greenhouse gas emissions per capita of Annex I Parties, 1990–2016



48. Similarly, Annex I Parties' GHG emissions per unit of GDP using PPP[18] dropped by 46 per cent between 1990 and 2016, from 0.63 to 0.34 kg CO_2 eq per United States dollar (see figure 10). Between 1990 and 2000, there was a significant difference between EIT and non-EIT Parties using this metric. The gap between EIT and non-EIT Parties was large in 1990 (at 1.27 and 0.63 kg CO_2 eq per United States dollar, respectively), but had narrowed to 0.60 and 0.34 kg CO_2 eq per United States dollar, respectively, by 2016. These reductions were realized against the backdrop of GDP growth values of 38.4 and 64.3 per cent, respectively, for EIT and non-EIT Parties between 1990 and 2016. GHG emissions per unit of GDP using PPP continued to decline at the same rate from 2010 for EIT and non-EIT Parties; however, while non-EIT Parties' GHG emissions per unit of GDP using PPP have continued to gradually decline, those of EIT Parties have levelled off since 2012.

Figure 10
Greenhouse gas emissions per unit of gross domestic product using purchasing power parity of Annex I Parties, 1990–2016



49. Overall, it is difficult to accurately attribute GHG emission reductions to specific factors over time using indicators across all Annex I Parties as emission trends have been influenced by a combination of demographic, economy-wide and sector-specific drivers, including, but not limited to, population changes (see para. 47 above); structural changes in Annex I Parties' economies (i.e. the shift in the ratio of manufacturing to services, which was

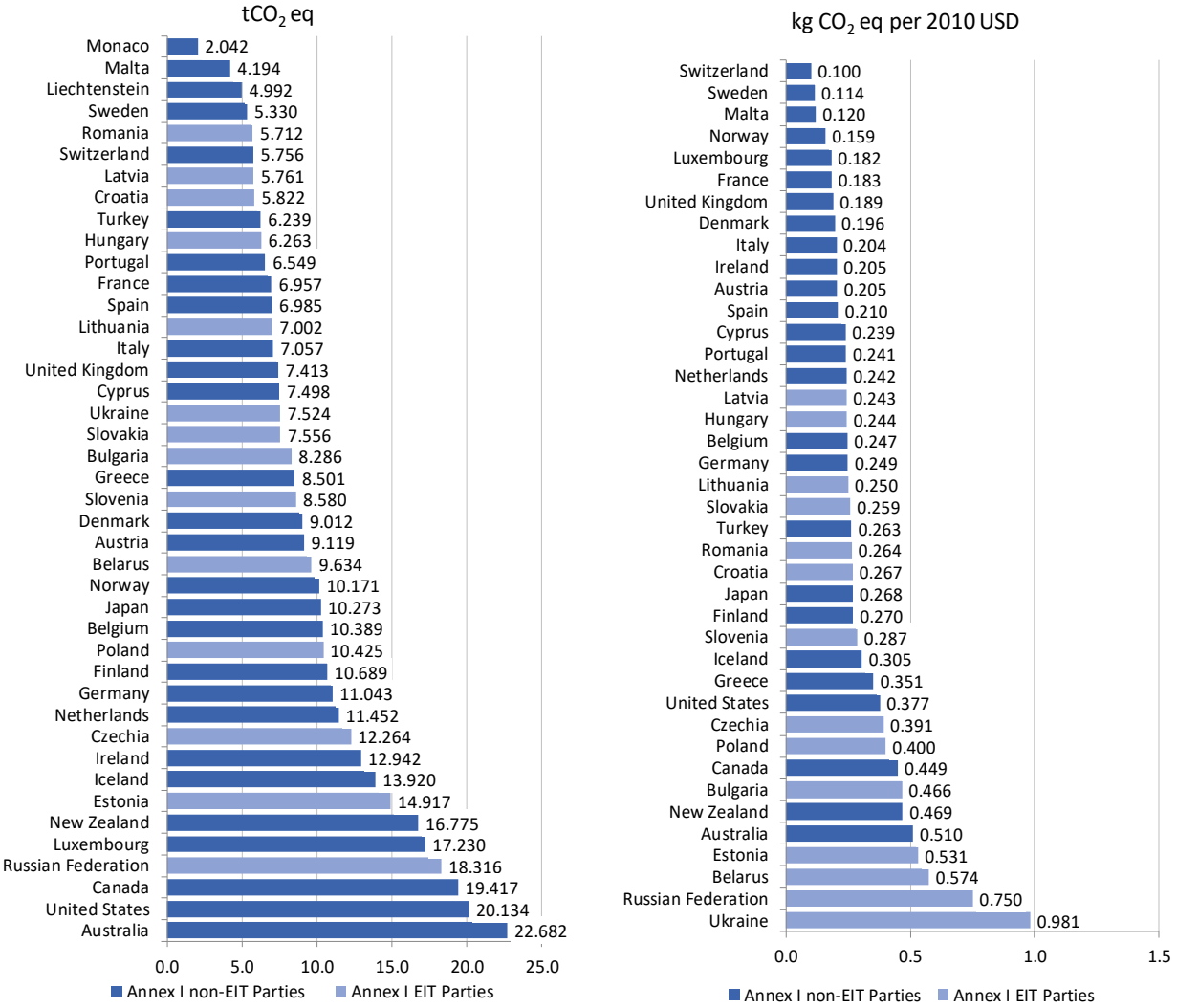
[18] Excluding Liechtenstein and Monaco, for which complete time series were not available.

particularly pronounced in EIT Parties); technological improvements in production processes and the shift to less carbon-intensive fossil fuels (i.e. from coal to natural gas); the increased share of renewable energy sources in electricity and heat generation; and increased energy efficiency.

50. Since 2000, individual Parties have gradually intensified their efforts in implementing mitigation actions aimed at decarbonizing their economies (see chapter III below). The trends show that between 2000 to 2012, GHG emissions per capita of non-EIT and EIT Parties converged, while between 2012 and 2016 they remained roughly the same. GHG emissions per unit of GDP using PPP have continued to decline at approximately the same rate since 2010 for EIT and non-EIT Parties as shown in figure 11.

Figure 11

Greenhouse gas emissions per capita and per unit of gross domestic product using purchasing power parity of Annex I Parties in 2016



H. Summary of progress made by 2015 and efforts needed to achieve the 2020 targets

51. Following previous practice, the assessment of Parties' individual progress in achieving their quantified economy-wide emission reduction targets is based on a comparison of the latest available levels of GHG emissions reported by Parties in CTF table 4 (for 2015 in BR3s), including the contribution of LULUCF and use of units from MBMs, where applicable and available, with the base-year emission level and the targeted emission level

in 2020. In quantitative terms, progress towards a target is assessed as the proportion of the targeted emission reduction achieved by 2015.

52. In this context, and given that all Parties' 2020 targets require a degree of emission reduction below the base-year level, the latest emission levels reported in the BR3s for 2015 can be placed into the following categories:

(a) Below both the 2020 targeted emission level and the base-year emission level, which implies that the 2020 target is likely to be achieved, assuming emissions don't increase in the lead-up to 2020;

(b) Between the base-year emission level and the 2020 targeted emission level, which implies that progress towards the 2020 target has been made but that further efforts are required to achieve it;

(c) Above the base-year emission level, which means that current emission trends diverge from the trajectory towards achieving the 2020 target. This could result from the inadequacy of domestic PaMs in reducing emissions and high marginal mitigation costs. It could also result from systemic constraints, such as almost carbon-free electricity production since the base year, leaving little room for improvement through decarbonization of the power generation mix, or dependence for economic and energy security reasons on carbon-intensive domestic energy supply. Several Parties from this category indicated that they intend to use MBMs to meet their 2020 targets.

53. Taking into account emission levels until 2015 and reported contributions from LULUCF and units from MBMs, where applicable, individual Parties have made varying progress towards their 2020 targets:

(a) The emission levels of Australia, the EU, Japan, Kazakhstan and the Russian Federation were already lower than their respective 2020 targeted emission levels;

(b) The emissions levels in 2015 combined with the contributions from LULUCF and/or units from MBMs, where applicable, of Monaco and Switzerland indicate that while these Parties had made a good deal of the emission reductions needed to attain their 2020 targets, further efforts are needed to achieve those targets. Canada and Liechtenstein reported information that indicates that while they have made progress towards their targets, the bulk of the reductions needed to achieve their 2020 targets remain to be made;

(c) The 2015 emissions of Iceland, New Zealand and Norway were above their base year levels. These Parties intend to use contributions from LULUCF and units from MBMs to meet their respective targets.

54. For 2014–2016, more than half of Parties reported increases in their GHG emissions (see figures 8). Observed inter-annual deviations from long-term emission trends could have been caused by weather conditions, fuel prices, economic circumstances and other factors. Given the relatively short time between now and 2020, it is important that Parties closely assess such deviations to ensure that they are only temporary and not an inflection point (see the changes in Annex I Parties' total GHG emissions for the entire period 1990–2016 (see figure 7).

Table 2
Progress of Annex I Parties towards achieving their quantified economy-wide emission reduction targets
(kt CO_2 eq)

	Base-year emissions	*Targeted emission level in 2020*	*Emissions in 2015*	*LULUCF contribution in 2015*	*Use of units from MBMs in 2015*	*2015 emissions, with LULUCF and MBM contribution*
Australia	554 407[a]	526 686	533 283	–64 997	0	468 286
Belarus	139 151	132 193	89 283[b]	NA	NA	89 283
Canada	701 541[a]	582 279	721 801	–33 544	NE	688 258
EU (28)	5 716 340	4 573 072	4 451 743	NA	23 000	4 474 743
Iceland	3 543	Joint EU target	4 539	NE	NE	4 539
Japan	1 398 824	1 345 668	1 324 718	–57 625	0	1 267 093

	Base-year emissions	*Targeted emission level in 2020*	*Emissions in 2015*	*LULUCF contribution in 2015*	*Use of units from MBMs in 2015*	*2015 emissions, with LULUCF and MBM contribution*
Kazakhstan	375 724	319 365	298 064	NA	NA	298 064
Liechtenstein	232	185	208	2	0	210
Monaco	99	77	82	0	0	82
New Zealand	66 720	63 384	80 155	–12 535	NE	67 620
Norway	51 729	43 452[c]	53 908	0	NE	53 908
Russian Federation	3 767 792	3 202 623	2 651 212	NA	NA	2 651 212
Switzerland	53 707	42 965	48 138	–720	0	47 418
Turkey	No target	–	–	–	–	–
Ukraine[d]	944 353	755 482	402 666[b]	NA	NE	402 666[c]
United States	6 438 281[a]	5 343 773	6 649 701[e]	–858 477	NA	5 791 224

Notes: (1) Targeted emission levels in 2020 were calculated by multiplying each Party's emissions in the base year by the percentage reduction of their 2020 target. Emission values for the base year are not fixed and may change slightly with each new annual GHG emissions inventory submission; (2) "NA" means not applicable because LULUCF is not included in the target or because units from MBMs are not included in the target or because the Party reported that it does not intend to use those units to meet its target.

[a] Includes contributions from LULUCF of 69,565 kt CO_2 eq for Australia, –36,723 kt CO_2 eq for Canada and –886,410 kt CO_2 eq for the United States.

[b] Data for 2012.

[c] The targeted emission level in 2020 for Norway was calculated as an average annual emission level for the period 2013–2020, which equals 84 per cent of the base-year emissions. Norway's unconditional target under the Convention for 2020 of a 30 per cent emission reduction below the 1990 level is consistent with its quantified emission limitation or reduction commitment of 84 per cent of the base-year emissions for the period 2013–2020 as defined in the Doha Amendment to the Kyoto Protocol.

[d] Data from the report of the technical review of the BR1 of Ukraine, contained in document FCCC/TRR.1/UKR.

[e] Data for 2013.

Table 3
Progress of Annex I Parties towards achieving their quantified economy-wide emission reduction targets in 2013–2015
(kt CO_2 eq)

	Base- year emissions	*2013 emissions, with LULUCF and MBM contribution*	*2015 emissions, with LULUCF and MBM contribution*	*Targeted emission level in 2020*	*Reductions in 2013–2015 period*	*Target reductions in the base year to 2020 period*
Australia	554 407[a]	529 472	468 286	526 686	61 187	22 424
Belarus	139 151	89 283[b]	–	132 193	–	6 958
Canada	701 541[a]	699 809	688 258	582 279	11 551	119 262
EU (28)	5 716 340	4 731 777	4 474 743	4 573 072	257 033	1 143 268
Iceland	3 543	4 461	4 539	Joint EU target	–78	709
Japan	1 398 824	1 348 606	1 267 093	1 345 668	81 514	53 155
Kazakhstan	375 724	309 099	298 064	319 365	11 035	56 359
Liechtenstein	232	255	210	185	45	46
Monaco	99	87	82	77	6	22
New Zealand	66 720	70 032	67 620	63 384	2 412	3 336
Norway	51 729	53 538	53 908	43 452[c]	–371	8 277
Russian Federation	3 767 792	2 640 844	2 651 212	3 202 623	–10 368	565 169
Switzerland	53 707	51 957	47 418	42 965	4 540	10 741
Turkey	No target	0	0	–	0	0
Ukraine[d]	944 353	402 666[b]	–	755 482	–	188 871
United States	6 438 281[a]	5 791 224	–	5 343 773	–	1 245 198

Note: Targeted emission levels in 2020 were calculated by multiplying each Party's emissions in the base year by the percentage reduction of their 2020 target. Emission values for the base year are not fixed and may change slightly with each new annual GHG emissions inventory submission.

[a] Includes contributions from LULUCF of 69,565 kt CO_2 eq for Australia, –36,723 kt CO_2 eq for Canada and –886,410 kt CO_2 eq for the United States.

[b] Data for 2012.

[c] The targeted emission level in 2020 for Norway was calculated as an average annual emission level for the period 2013–2020, which equals 84 per cent of the base-year emissions. Norway's unconditional target under the Convention for 2020 of a 30 per cent emission reduction below the 1990 level is consistent with its quantified emission limitation or reduction commitment of 84 per cent of the base-year emissions for the period 2013–2020 as defined in the Doha Amendment to the Kyoto Protocol.

[d] Data from the report of the technical review of the BR1 of Ukraine, contained in document FCCC/TRR.1/UKR.

III. Mitigation actions

A. Overview

55. Annex I Parties have emission targets for 2020, pledged under the Cancun Agreements, and targets for 2030, pledged in their NDCs under the Paris Agreement. Parties reported in their BR3s mitigation actions primarily aimed at meeting their 2020 targets, but considerable attention was given to actions aimed at meeting goals in 2030 and beyond. In addition, under the Paris Agreement, Parties are to formulate and communicate long-term low GHG emission development strategies. These strategies set the context for the formulation and implementation of short- and mid-term PaMs and send a signal to all stakeholders that low-carbon development and climate-resilient societies are feasible.

56. Overall, the BR3s show a continuation of the trend from previous BRs of a growing, strengthening and diversifying portfolio of mitigation PaMs, particularly enhanced by the increased ambition of the midterm and long-term strategies set out under the Paris Agreement.

57. An effective national or regional portfolio of PaMs has several fundamental elements: top-level political commitment and strong policy capacity; targets and midterm and long-term strategies; a rigorous and comprehensive system of MRV of emissions and the performance of PaMs; and a comprehensive set of PaMs.

58. Most Parties treat climate change mitigation as a core top-level issue in the national policy agenda and have developed substantial policy capacity with legal and institutional frameworks, including top-level interministerial coordinating groups, to reduce emissions.

59. The portfolio of Parties' PaMs is dynamic and in many cases reflects lessons learned from previous policy implementation cycles. The introduction of innovative instruments, the inclusion of new technologies, the broader adoption of PaMs proven effective elsewhere, the reformulation of existing PaMs and the abandonment of older, less effective PaMs have yielded an increasingly effective portfolio. The dynamic nature of the PaMs reflects policymakers' evolving priorities and recognition of the need to further reduce emissions in line with the Paris Agreement, cut costs, diminish the administrative burden and address non-climate objectives (e.g. energy security, job creation, economic competitiveness, air and water quality) as lessons are learned and market and technology conditions evolve.

60. The PaMs across Parties vary highly in their profiles (i.e. gases, sectors and instruments involved) and the scale of their estimated mitigation impacts. Many of the PaMs reported in the BR3s were reported in previous BRs; others were reported for the first time in the BR3s.

61. The PaMs also vary in terms of the governance level at which they are implemented, at regional, national, provincial, state and, increasingly, city level. In many cases, higher levels of government initiate the efforts and devolve responsibilities to lower levels of government. In other cases, provincial or state governments act independently, on their own initiative, which could encourage replication or stronger action at higher levels of government.

62. At a strategic level, Parties are seeking to mitigate emissions using a combination of the following categories of instrument:

(a) Carbon pricing, through energy and carbon taxes, emissions trading systems and competitive tendering of emission reductions from accredited projects, and other fiscal incentives;

(b) Framework targets and burden-sharing commitments that establish either legally binding (i.e. mandatory) or indicative (i.e. voluntary) goals for direct or indirect reduction of GHG emissions (e.g. national emission limitation or reduction targets, multi-year carbon budgets, renewable energy share in final energy consumption, energy efficiency improvement targets);

(c) Sector-specific regulations (e.g. emission, fuel or performance standards, use of best available techniques, management practices);

(d) Voluntary actions, information and education programmes, and research and development.

63. PaMs from the above-listed four categories are used to different extents by Parties depending on their national circumstances and context, but they all play critical and complementary roles in ensuring comprehensive coverage and effective GHG emission mitigation.

64. Economic and fiscal instruments and instruments that attach a price to carbon, such as emissions trading and carbon and energy taxes, deliver by far the most significant emission reductions. Sector-specific regulatory policies have also proven effective in many sectors and are continuing to be developed and strengthened. Many Parties are increasingly adopting or expanding PaMs in the first two categories to capture greater gains and more innovation in a wider range of sectors. Framework targets capture broader climate and energy goals and set overarching strategies. While they have been used most commonly by the EU, other Parties have started using them to define targets such as net-zero emissions by 2050 or long-term renewable energy goals. A less common approach, but one slowly gaining traction, is multi-year carbon budgets setting GHG emission limits over specific time periods.

65. Institutional frameworks, such as a rigorous and comprehensive national or regional system of MRV of emissions and performance of PaMs, are necessary to maximize the relevance, effectiveness, efficiency and sustainability of the PaM portfolio. An effective MRV system has a dual role. First, it helps to ensure and promote progress towards, compliance with and responsibility or accountability for meeting commitments and complying with regulations. This is especially important as more governments (at all levels) and private sector organizations take on formal responsibilities and commitments for mitigating climate change. Second, it alerts to the need for possible mid-course revision or strengthening of PaMs if the results differ from the expected performance.

B. Profile of reported mitigation actions

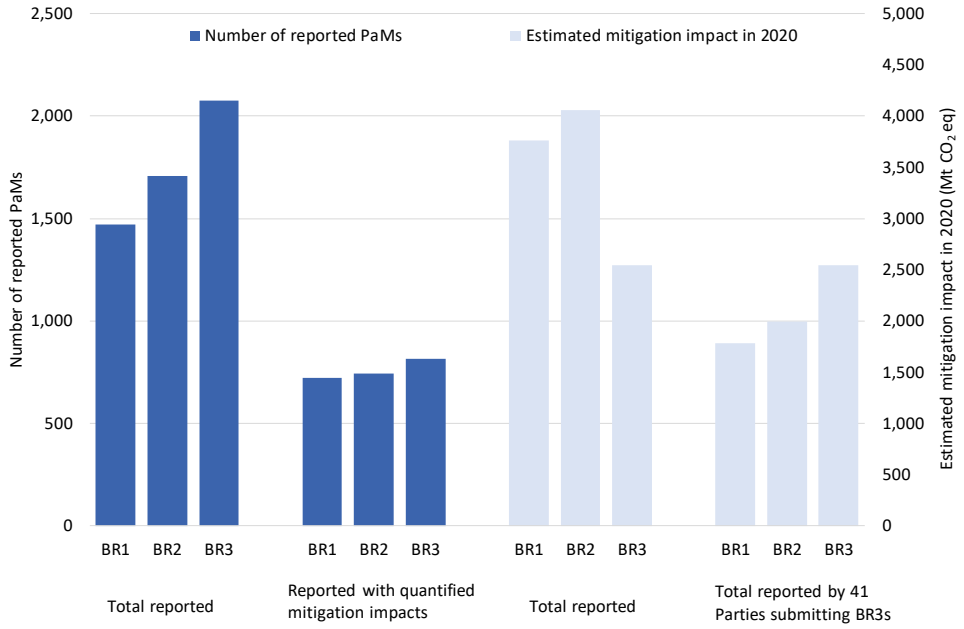
1. Reporting trends

66. The 41 Annex I Parties that have submitted their BR3s reported on 2,012 PaMs to mitigate climate change. Most of the PaMs pertain to regional (e.g. EU) and national jurisdictions, but some, particularly in Belgium and Canada, apply to state or provincial jurisdictions. For about 40 per cent of the reported PaMs estimated mitigation impacts in 2020 were provided, totalling 2,548 Mt CO_2 eq. Since not all Parties provided estimated mitigation impacts, this should not be interpreted as the total estimated mitigation impact of all reported PaMs. The trends in the reporting of PaMs for all Parties across the three biennial reporting cycles are shown in figure 12.

67. Comparing only for the 41 Parties that have submitted BR3s, the estimated impact in 2020 of the PaMs reported in the BR3s is 30 per cent higher than that of the PaMs reported in the BR2s. Thus, at least among the Parties that have submitted BR3s, there appears to have been some strengthening of PaMs to reduce GHG emissions.

Figure 12

Trends in the reporting of policies and measures for all reporting Parties across the three biennial reporting cycles



Notes: (1) The methodology used for estimated impacts of PaMs is described in annex II; (2) A total of 41 Annex I Parties have submitted BR3s, 42 Parties have submitted BR2s and 43 Parties have submitted BR1s.

68. The profiles of the PaMs and their estimated mitigation impacts presented in the BR3s differ from those in the BR1s and BR2s. This is due in part to actual changes in the PaMs and changes in how they are reported, but also to differences in the number of Parties submitting BRs in each cycle and in the number of Parties providing estimates of mitigation impact and changes therein for individual PaMs. The estimated emission reductions by 2020 due to mitigation actions reported with quantified effects in BRs are shown in table 4. The methodology for estimating the mitigation impacts of individual policies and measures for this report is found in annex II.

Table 4

Estimated emission reductions by 2020 due to mitigation actions reported with quantified effects in biennial reports

(kt CO_2 eq)

Party	*BR3*	*BR2*	*BR1*
Australia	41 663	17 900	175 600
Belarus	Not submitted	1 250	25 010
Canada	165 745	119 972	104 288
European Union	1 724 923	1 692 450	2 846 150
European Union 28 member States	710 278 (Portugal and Sweden did not provide impact estimates for PaMs; Denmark and Romania provided impact estimates for clusters of PaMs)	904 726	954 489
Iceland	Estimate not provided	215	328
Japan	180 338	67 474	48 960
Kazakhstan	50 685	247 365	314
Liechtenstein	10	64	12
Monaco	Estimate not provided	21	14

Party	*BR3*	*BR2*	*BR1*
New Zealand	6 713	5 329	1 922
Norway	21 408	320	1 120
Russian Federation	863 500	125 625	–
Switzerland	13 220	14 170	1 005
Turkey	Estimate not provided	Estimate not provided	Not submitted
Ukraine	Not submitted	Not submitted	69 120
United States	Not submitted	2 060 023	1 888 530
Total[a]	**2 547 560**	**4 058 454**	**3 764 711**

[a] The sum of a Party's estimated impacts does not equal the total, which was calculated: (a) on the basis of all reporting Annex I Parties, including EU member States but excluding the EU as a Party to avoid double counting;(b) excluding the impacts of the EU ETS as reported by EU member States, but including its EU-wide impacts, estimated at 494 Mt CO2 eq, of which 483 Mt CO2 eq in the energy sector and 11 Mt CO2 eq in the transport sector, classified as a regulatory and economic policy instrument; (c) excluding the impacts of the Order of the President of the Russian Federation on the reduction of GHG emissions (2013) and the Party's Action Plan on the Provision of Greenhouse Gas Emission Reduction by 2020, for which a total national GHG emission reduction target of at least 75 per cent of the 1990 level by 2020 was reported in the Russian Federation's BR3, with an estimated emission reduction impact by 2020 of 942 Mt CO2 eq

2. Profile overview

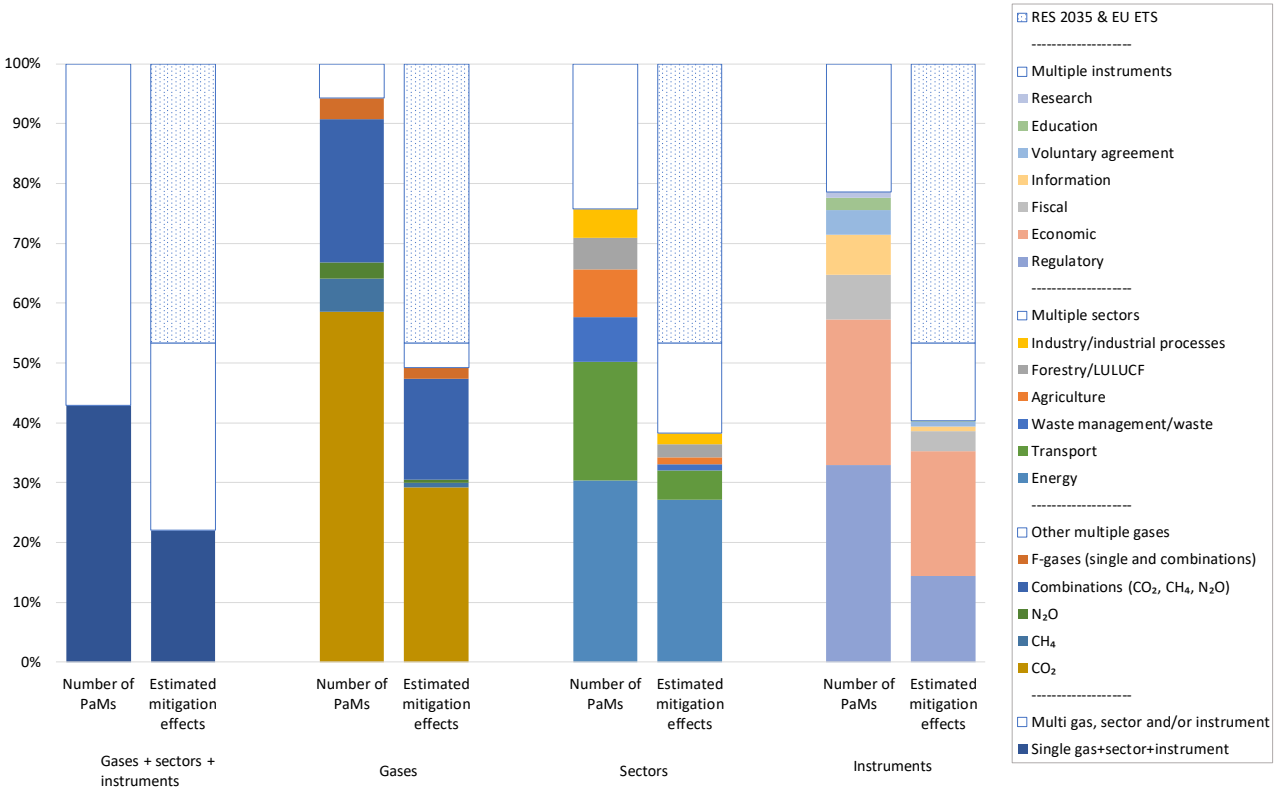
69. The PaM profile varies widely among Parties (i.e. in terms of implementation stage, gases and sectors covered, and type of instrument). The implementation categories are implemented, adopted, planned, and expired but still contributing emission reductions.[19] The PaMs overall target all gases and sectors. The instrument categories are economic, fiscal, voluntary agreement, regulatory, information, education, research and other.

70. Of the 2,012 PaMs reported in the BR3s, 80 per cent have already been implemented, 6 per cent have been adopted, 11 per cent are planned and 3 per cent have expired but are still contributing emission reductions.

71. Some 43 per cent (889) of the PaMs cover a single gas, a single sector and a single instrument, accounting for 22 per cent of the total estimated mitigation impact. The other PaMs cover multiple gases (655 PaMs), multiple sectors (503 PaMs) and/or multiple instruments (444 PaMs) and these PaMs with at least one multiple characteristic account for the remaining 78 per cent of the total estimated mitigation impact. Most, but not all, of that effect is due to the two largest PaMs, RES 2035 and the EU ETS, which both cover multiple sectors, instruments and/or gases and together account for 47 per cent of the total estimated mitigation impact (1,190 Mt CO_2 eq). Therefore, the other multicharacteristic PaMs account for about 33 per cent of the total reported mitigation impact. The distribution of PaMs by gas, sector and instrument reported in BR3s is shown in figure 13.

[19] For implemented PaMs, one or more of the following applies: (1) national legislation is in force; (2) one or more voluntary agreements have been established; (3) financial resources have been allocated; and (4) human resources have been mobilized; for adopted PaMs, an official government decision has been made and there is a clear commitment to proceed with implementation; while planned PaMs are those with options under discussion or that have been announced and have a realistic chance of being adopted and implemented in the future by governments at the national, state, provincial, regional or local level.

Figure 13
Distribution of policies and measures by gas, sector and instrument reported in third biennial reports



Note: The methodology used for estimated impacts of PaMs is described in annex II.

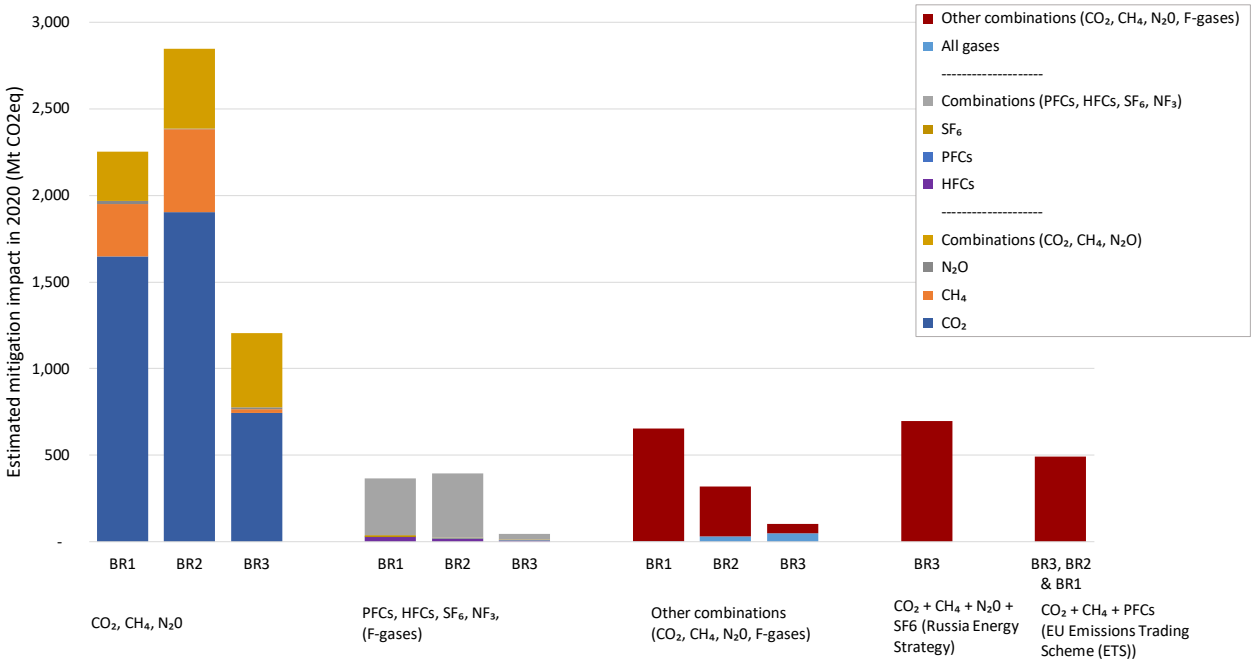
3. Gases

72. Some 68 per cent of the reported PaMs target a single gas. Over half (59 per cent) target CO_2 alone, and an additional 24 per cent target CO_2 in combination with CH_4 and N_2O. Some 5 per cent target only CH_4; 3 per cent target only N_2O; and 2 per cent target only F-gases (HFCs, PFCs, SF_6 and NF_3). Almost 4 per cent target all the gases at the same time.

73. In terms of reported estimated mitigation impacts, RES 2035 and the EU ETS, both of which target CO_2 and CH_4 in combination with other gases, dominate with 47 per cent of the impacts. The PaMs targeting only CO_2 account for 29 per cent of the impacts, while those targeting some combination of CO_2, CH_4 and N_2O account for 17 per cent of the impacts.

74. In comparison with those reported in the BR2s (adjusted to reflect only the 41 Parties that have submitted BR3s), the estimated reported impacts for all gas categories, except N_2O, were lower in the BR3s. The estimated mitigation impacts of PaMs targeting CO_2 fell by 146 Mt CO_2 eq, CH_4 fell by 85 Mt CO_2 eq and F-gases fell by 11 Mt CO_2 eq. These differences could be due in part to actual changes in the PaMs and how they are reported, as well as to the number of Parties providing estimates of mitigation impact and changes therein for individual PaMs. The trends in PaMs, by gas, for all reporting Parties across the three biennial reporting cycles are shown in figure 14.

Figure 14
Trends in policies and measures, by gas, for all reporting Parties across the three biennial reporting cycles



Notes: (1) The methodology used for estimated impacts of PaMs is described in annex II; (2) A total of 41 Annex I Parties have submitted BR3s, 42 Parties have submitted BR2s and 43 Parties have submitted BR1s.

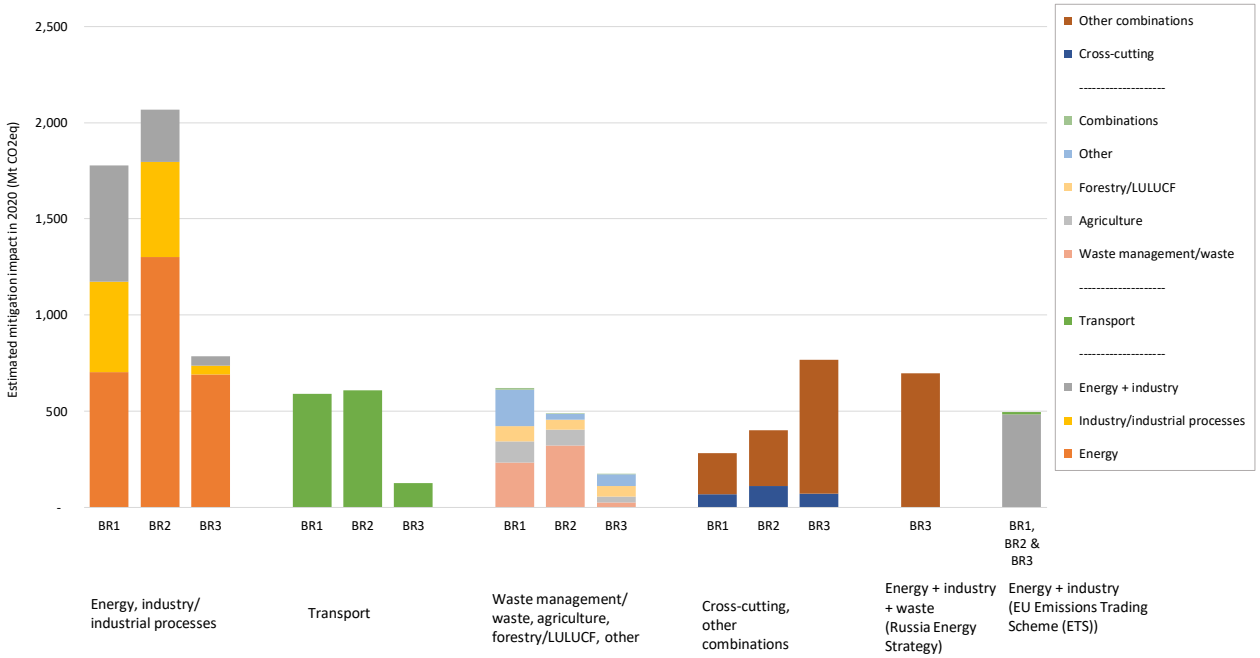
4. Sectors

75. Some 76 per cent of the reported PaMs target a single sector. About half of the PaMs target only energy (30 per cent) and only transport (20 per cent). Considerably fewer PaMs are aimed at the other sectors: waste management or waste (8 per cent), agriculture (8 per cent), LULUCF (5 per cent) and industry or industrial processes (5 per cent).

76. RES 2035 and the EU ETS, which target multiple sectors (combinations of energy, industry and waste), dominate the reported estimated mitigation impacts by sector. The PaMs targeting only energy account for 27 per cent of the impacts, while those targeting transport account for 5 per cent. Multisector PaMs, apart from RES 2035 and the EU ETS, account for 15 per cent of the impacts.

77. In comparison with those reported in the BR2s (adjusted to reflect only the 41 Parties that have submitted BR3s), the estimated mitigation impacts of PaMs targeting only energy have risen by 141 Mt CO_2 eq and those targeting only agriculture by 19 Mt CO_2 eq. The declines in estimated impact from the level reported in the BR2s for the PaMs targeting only transport (7 Mt CO_2 eq), only industry (14 Mt CO_2 eq) and only waste (16 Mt CO_2 eq) are much lower. These differences could be due in part to actual changes in the PaMs and how they are reported, as well as to the number of Parties providing estimates of mitigation impact and changes therein for individual PaMs. The trends in PaMs, by sector, for all reporting Parties across the three biennial reporting cycles are shown in figure 15.

Figure 15
Trends in policies and measures, by sector, for all reporting Parties across the three biennial reporting cycles



Notes: (1) The methodology used for estimated impacts of PaMs is described in annex II. (2) A total of 41 Annex I Parties have submitted BR3s, 42 Parties have submitted BR2s and 43 Parties have submitted BR1s.

5. Instruments

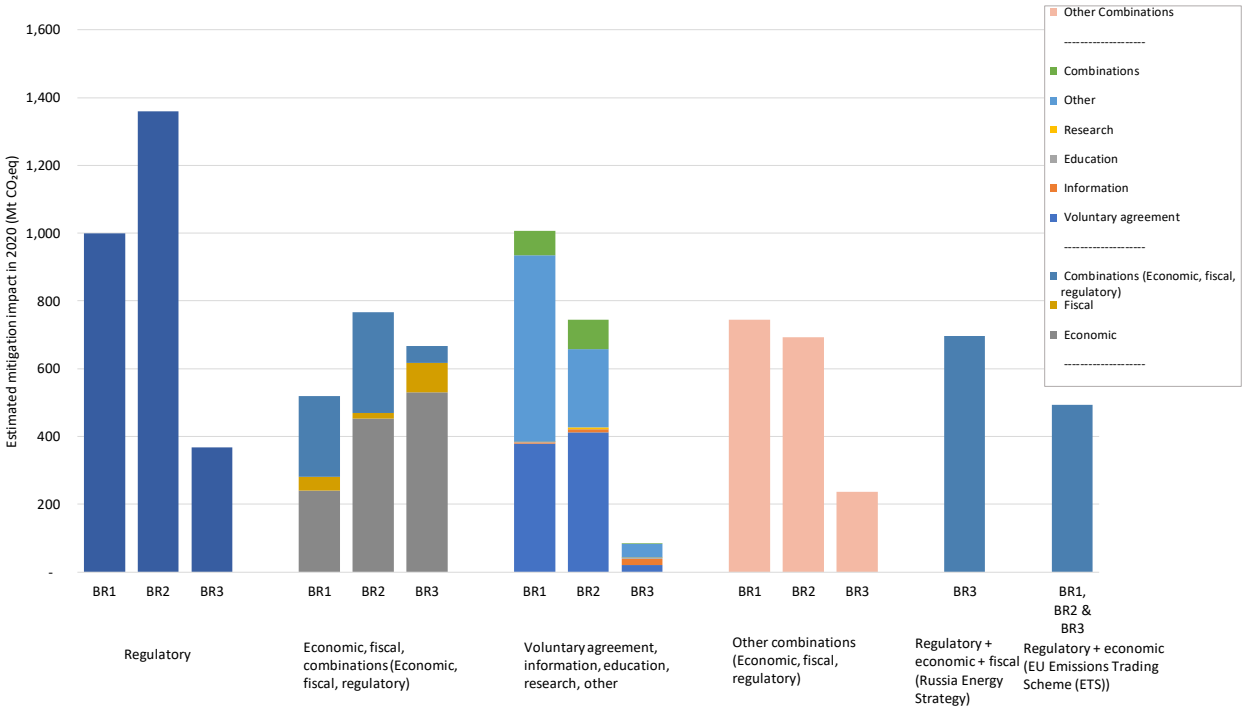
78. Some 79 per cent of the reported PaMs are based on a single instrument type: 33 per cent use only regulatory instruments, 24 per cent economic instruments, 7 per cent fiscal instruments, 7 per cent information instruments and 4 per cent voluntary agreements.

79. Again, RES 2035 and the EU ETS, which use multiple instruments (combinations of regulatory, economic and fiscal), dominate the estimated mitigation impacts by instrument. The PaMs based on economic instruments account for 20 per cent of the impacts, while those using regulatory instruments account for 14 per cent. PaMs that make use of multiple instruments, apart from RES 2035 and the EU ETS, account for 13 per cent of the impacts.

80. In comparison with those reported in the BR2s (adjusted to reflect only the 41 Parties that have submitted BR3s), the estimated mitigation impacts by instrument of PaMs reported in the BR3s are considerably different: for PaMs using economic instruments, a 208 Mt CO_2 eq increase; for those using regulatory instruments, a 19 Mt CO_2 eq increase; and for voluntary agreements, no change). This indicates that Parties are continuing to increase their use of economic instruments and maintain their use of regulatory methods and that the use of voluntary agreements is to an extent masked by the raw reporting. The trends in PaMs by type of policy instrument are shown in figure 16.

Figure 16

Trends in policies and measures, by type of policy instrument, for all reporting Parties across the three biennial reporting cycles



Notes: (1) The methodology used for estimated impacts of PaMs is described in annex II. (2) A total of 41 Annex I Parties have submitted BR3s, 42 Parties have submitted BR2s and 43 Parties have submitted BR1s.

6. Previously versus newly reported policies and measures

81. Of the 2,012 PaMs reported in the BR3s, about half were similar in description to the PaMs reported in the BR2s. The other half were newly reported or their description has been significantly revised, suggesting possible changes to PaMs.

82. The characteristics and estimated impacts of the existing PaMs might also have been revised but, on the basis of their description, are essentially the same as those reported in the BR2s. RES 2035, with an estimated mitigation impact of 696 Mt CO_2 eq in 2020, is listed as an existing policy because it follows on from the Energy Strategy 2030 reported in the Russian Federation's BR2. However, in the BR2 it was reported without an estimated mitigation impact.

83. Apart from RES 2035 and the EU ETS, the new PaMs account for about 29 per cent of the total reported mitigation impact in 2020 and 63 per cent in 2030, as shown in figure 18. This indicates that Parties are already pursuing strategies and PaMs to meet their post-2020 goals.

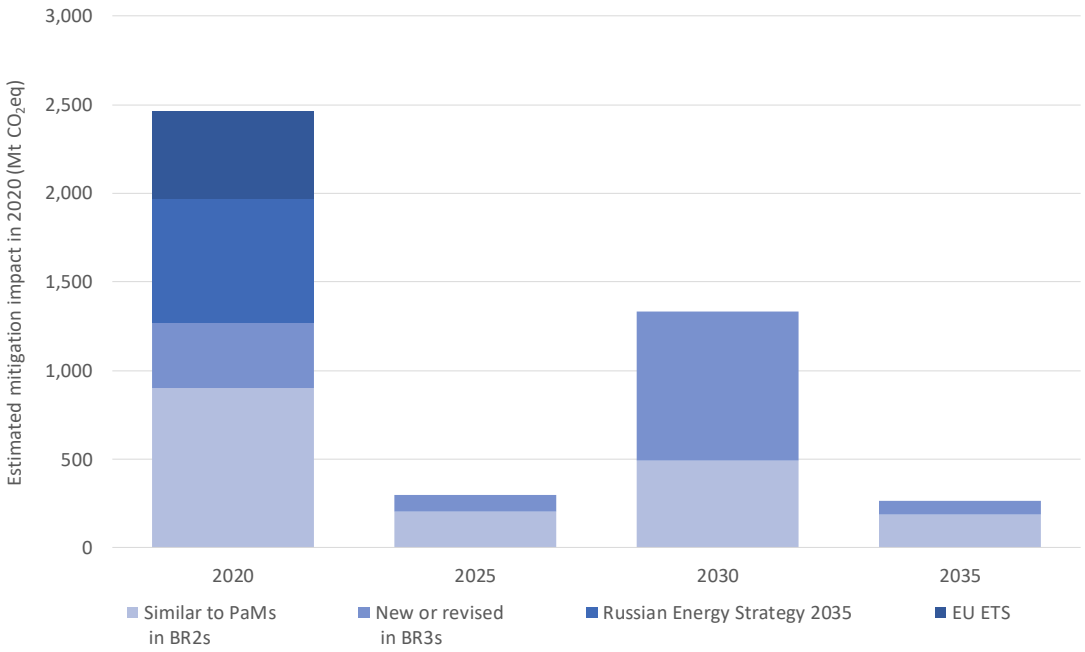
84. In general, the newly reported PaMs have smaller estimated mitigation impacts and thus do not have an impact range as wide as the existing PaMs. The six of them with the largest estimated impacts (ranging from 10 to 27 Mt CO_2 eq) account for 20 per cent of the total impact; the following 71 (with impacts ranging from 1 to 10 Mt CO_2 eq) account for 46 per cent of the total impact.

85. The new PaMs have roughly the same gas-sector-instrument profile as the existing PaMs. However, some characteristics differ between the two sets of PaMs. The new PaMs have proportionally higher estimated mitigation impacts in the transport, agriculture, waste and industry sectors, and proportionally lower multisectoral impacts. In terms of instruments, the new PaMs have proportionally higher estimated mitigation impacts for regulatory, voluntary and information instruments, and proportionally lower estimated impacts for economic and fiscal. The less attention paid to new economic instruments might reflect that many such instruments already exist and that expanding and strengthening them only requires

change in scope, not additional PaMs. See figure 17. The PaMs newly reported in the BR3s with the largest estimated mitigation impacts are shown in table 5.

Figure 17

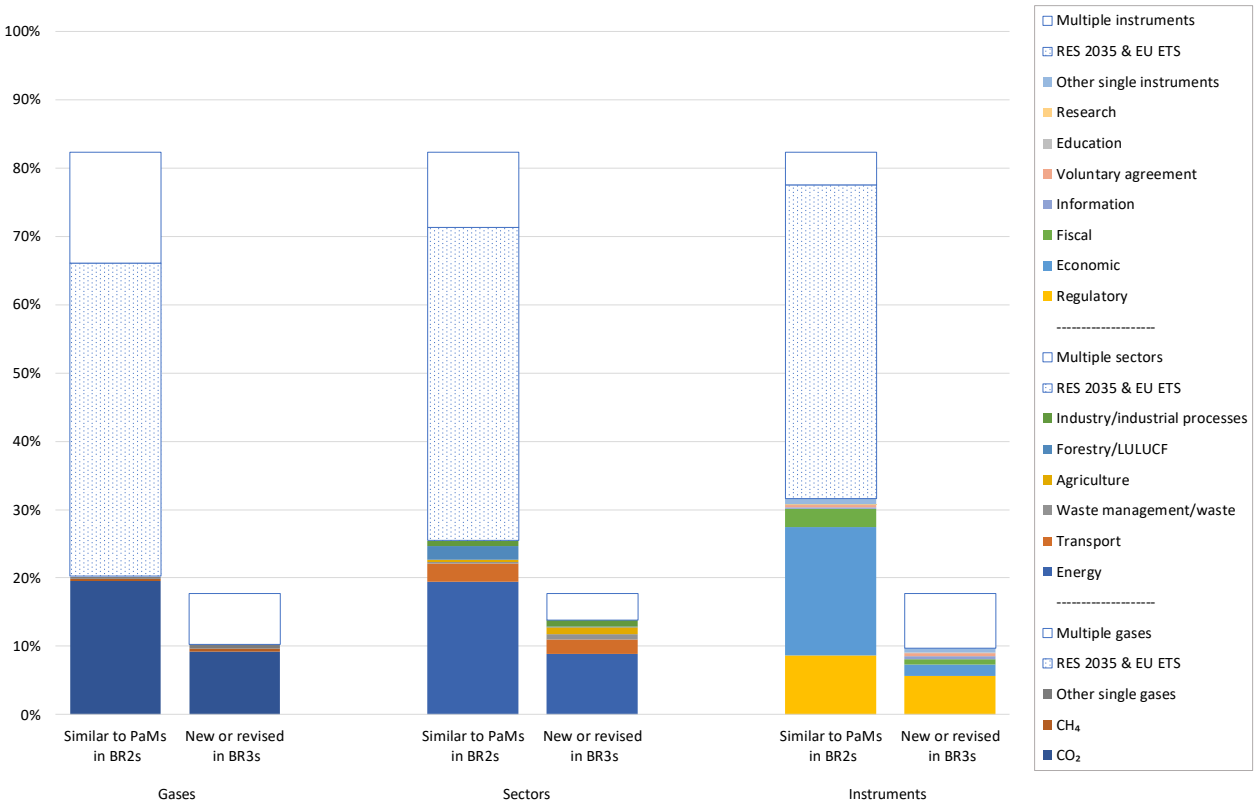
Outlook for the impacts of policies and measures in 2020, 2025, 2030 and 2035 reported in third biennial reports



Note: The methodology used for estimated impacts of PaMs is described in annex II.

Figure 18

Distribution in 2020 of estimated mitigation impacts of policies and measures, by gas, sector and instrument, reported in third biennial reports



Note: The methodology used for estimated impacts of PaMs is described in annex II.

Table 5
Policies and measures newly reported in third biennial reports with the largest estimated mitigation impacts

Party	*Policy or measure*	*Estimated impact by 2020 (kt CO_2 eq)*	*Type of policy instrument*
Kazakhstan	Implementation of projects in the field of renewable energy sources	26 500	Regulatory
Australia	Large-scale renewable energy target	19 838	Regulatory
Greece	Improvement of the conventional power generation system	15 000	Economic, fiscal, regulatory
Kazakhstan	Combating degradation and desertification of soils	13 000	Regulatory
Greece	Improvement of the conventional power generation system	11 700	Regulatory
Germany	Security reserve (lignite plants) (Energy Act, Article 13(g))	10 000	Regulatory
Germany	EU ETS[a]	9 003	Economic
Japan	Diffusion of highly energy-efficient equipment and devices (commercial and other sector)	8 030	Fiscal
Japan	F-gas measures	7 900	Fiscal, regulatory, information
Finland	Promotion of the use of forest chips and other wood-based energy	7 629	Economic, fiscal, information

[a] Reported in the BR3 of Germany but not included in the total estimated impacts of PaMs and the sector and policy instrument rankings of PaMs in this chapter (see footnote 19).

C. Key elements of mitigation actions for an effective portfolio of policies and measures

1. Top-level political commitment and strong policy capacity

86. Most Parties treat climate change mitigation as a core top-level issue in the national policy agenda and have developed substantial policy capacity with legal and institutional frameworks such as climate acts, including top-level interministerial coordinating groups, to reduce emissions.

87. Furthermore, the institutional and policy frameworks on climate change established under the Convention as outlined in the BR3s will be further strengthened by the commitments under the Paris Agreement. In presenting their NDCs, Parties outlined how they will build on and embed their commitments into existing climate change or development strategies, policies and legislation. Some Parties stressed the need to strengthen their institutional arrangements and administrative procedures in relation to the monitoring and evaluation of climate change related targets.

88. In its BR3 **Canada** reported on its December 2016 adoption of the **Pan-Canadian Framework on Clean Growth and Climate Change**, a comprehensive plan to reduce emissions across all sectors of the economy, stimulate clean economic growth and build resilience to the impacts of climate change. It builds on the early climate action leadership of provinces and territories and the diverse array of PaMs already in place across Canada to

reduce GHG emissions in all sectors of the economy. The Pan-Canadian Framework was designed to achieve the behavioural and structural changes needed to facilitate Canada's transition to a low-carbon economy and comprises four pillars: pricing carbon pollution; complementary measures to further reduce emissions across the economy; measures to adapt to the impacts of climate change and build resilience; and actions to accelerate innovation, support clean technology and create jobs. Governance and reporting mechanisms are in place to ensure ongoing collaboration across federal, provincial and territorial governments, to track progress in implementing measures and to identify opportunities for further action. Regularly revisiting progress and assessing the effectiveness of actions will encourage continual improvement and increase in ambition over time, in accordance with the Paris Agreement.

89. **Japan** reported on strengthening its policy capacity by establishing its **Plan for Global Warming Countermeasures** (Cabinet Decision of 13 May 2016). The only general plan regarding global warming in Japan, it seeks to guide national and local governments, businesses and citizens to promote global warming countermeasures in a comprehensive and strategic manner. It covers targets for reducing GHG emissions and removals as well as basic matters concerning measures that businesses, citizens, and national and local governments should implement to achieve the targets. The ministerial-level Global Warming Prevention Headquarters and the director-level Committee of Government Ministries take the initiative in maintaining close communication and coordination among relevant government ministries and agencies and work on tasks. Relevant government ministries and agencies use the Regional Energy and Global Warming Mitigation Councils installed in individual regional blocks to follow up on and support regional efforts with local governments.

90. **Sweden** reported on its **new climate policy framework**, which consists of a Climate Act, new national climate targets and a climate policy council. The climate policy framework is the most important climate reform in Sweden's history as it sets long-term conditions for the business sector and society. The Climate Act imposes responsibility on the current and future governments for pursuing a climate policy that is based on the national climate target of net-zero emissions by 2045 and negative emissions thereafter. Other targets include a 70 per cent emission reduction for domestic transport, excluding domestic aviation, by 2030; and emissions from non-ETS sectors being at least 63 per cent lower in 2030 and at least 75 per cent lower in 2040 than in 1990. The reform is a key component of Sweden's efforts in line with the Paris Agreement.

2. Targets and midterm and long-term strategies

91. All developed countries except Turkey have emission targets for 2020, pledged under the Cancun Agreements, and all have targets for 2030, pledged in their NDCs under the Paris Agreement. The PaMs reported in the BR3s are primarily aimed at meeting the 2020 targets, but, as the BR3s are the first reports fully reflecting Parties' commitments under the Paris Agreement, considerable attention was paid to strategies and relevant PaMs aimed at meeting goals in 2030 and beyond.

92. In its BR3 the **EU** reported on its **Clean Energy for All Europeans package**, which explains the energy-related targets and actions underlying its overall NDC target of a 40 per cent emission reduction by 2030 in comparison with the 1990 level. To support the delivery of the 2020 energy-related targets and lay the foundation for achieving the 2030 targets of a share of at least 27 per cent of EU energy consumption from renewable energy sources and a 30 per cent improvement in energy efficiency, the package aims to keep the EU competitive as the clean-energy transition changes global energy markets. In this way, the EU can lead the clean energy transition, not merely adapt to it. The eight legislative proposals in the package aim to put energy efficiency first, achieve global leadership in the field of renewable energy and provide a fair deal for consumers. They include amendments to extend the energy efficiency obligation of energy suppliers and distributors to 2030, to help achieve a decarbonized building stock by 2050 and to facilitate the uptake of a district heating and cooling strategy. In addition, the European Commission has adopted measures in relation to ecodesign and energy labelling, as well as an overarching strategy for accelerating clean-energy innovation.

93. Under the Paris Agreement, Parties are to formulate and communicate long-term low GHG emission development strategies. Among the Annex I Parties, Canada, Czechia, France, Germany, Ukraine, the United Kingdom and the United States have thus far submitted long-term strategies. Other Parties reported in their BR3s that work on their long-term strategies is under way.

94. In its BR3 the **United Kingdom** reported on its **Clean Growth Strategy**, which sets out policies and proposals for future carbon budgets and illustrative pathways towards its 2050 target. It includes a summary of performance against carbon budgets, with the initial estimates of a subset of new early-stage policies and proposals included. Updated projections for the fourth and fifth carbon budgets (including estimates of emission reductions from a subset of Clean Growth Strategy policies and proposals) suggest that the United Kingdom could deliver 97 and 95 per cent of the required performance against the 1990 level for carbon budgets that will end in 10 and 15 years, respectively.

95. The **Climate Protection Policy of Czechia** represents a long-term low-emission development strategy that will lead to cost-effective achievement of national targets. It proposes efficient and effective measures, including their contribution to reducing GHG emissions by 2030, and describes the pathways leading to a low-emission economy by 2050. It defines PaMs in relation to the gradual reduction of GHG emissions in the energy sector, final energy consumption, industry, transport, agriculture and forestry, waste management, science and research and voluntary instruments with respect to their economically exploitable potential. The Climate Protection Policy does not replace the various national sectoral policies and strategies but complements and elaborates on them.

3. Rigorous and comprehensive system for measurement, reporting and verification of emissions and the effectiveness of policies and measures

96. Institutional frameworks, such as a rigorous and comprehensive national or regional system of MRV of emissions and performance of PaMs, are necessary to maximize the relevance, effectiveness, efficiency and sustainability of the portfolio of PaMs. Parties reported several new and strengthened MRV systems in BR3s.

97. In its BR3 **Belgium** reported on a **new federal MRV** law, adopted in October 2016. It puts in place a framework for the reporting, monitoring and evaluation of federal PaMs in the field of climate change and ozone layer protection. Accordingly, the law ensures that all entities and departments of the federal authority in possession of relevant data and information communicate annually to guarantee the timeliness, transparency, accuracy, consistency, comparability and completeness of the information reported.

98. **Canada's 2016 Pan-Canadian Framework** and its supporting governance architecture is the overarching framework for the coordination and implementation of climate change policy across Canada. The Framework includes over 50 concrete measures and builds on the early leadership of provinces and territories in reducing GHG emissions. It also includes a governance and reporting mechanism to ensure ongoing collaboration across federal, provincial and territorial governments, to track progress in implementing measures and to identify opportunities for further action.

99. **Japan** reported in its BR3 on how its **Global Warming Prevention Headquarters** assesses the status of the achievement of targets by GHG and other categories, relevant indexes, and the progress of individual actions and measures every year on the basis of stringent rules and regular evaluations and examinations by relevant councils. Specifically, the Headquarters or its committee clarifies the amount of emission reductions achieved to evaluate the effects of measures. Furthermore, it presents budget proposals, tax reform proposals and bills that will be implemented in the next fiscal year or later. Data and information are used to evaluate individual PaMs. If PaMs showing slow progress are identified, their improvement and reinforcement will be considered. In such cases, new PaMs are explored, rather than being limited to strengthening those already included in Japan's Plan for Global Warming Countermeasures.

100. The **EU monitoring mechanism regulation** assesses the monitoring and evaluation of progress towards the EU's emission targets. Under the regulation, EU member States are required to report a GHG inventory for all sectors; GHG emission projections; information

on PaMs to reduce GHG emissions; information on national adaptation actions; information on low-carbon development strategies; information on financial and technology support provided to developing countries; and information on national governments' use of revenue from the auctioning of allowances in the EU ETS. An additional requirement under the regulation is for the European Commission to produce an annual report on the EU's progress towards its Kyoto Protocol and other targets, covering actual (historical) emissions and projected future emissions. Furthermore, under the regulation the EU introduced an annual compliance cycle requiring the review of member States' GHG inventories for the purpose of ensuring compliance with their obligations under the ESD in the period 2013–2020 and to enable the use of flexibilities and corrective action at the end of each year.

4. Comprehensive set of policies and measures

101. As described in paragraph 62 above, Parties' are seeking to mitigate emissions using a combination of instruments: economic and fiscal instruments that introduce carbon pricing; framework targets and burden-sharing commitments; sector-specific regulations; and voluntary actions, information and education programmes, and research and development. The extent to which Parties use instruments from these four categories depends on their national circumstances, but all the instruments are important for ensuring effective GHG emission mitigation.

102. Economic and fiscal instruments, such as emissions trading and carbon and energy taxes, deliver the most emission reductions. Box 3 highlights the engagement of the financial sector in Parties' meeting their 2020 targets. Sector-specific regulatory policies are continuing to be developed and strengthened. There is a trend in Parties adopting or expanding PaMs in these two categories to a wider range of sectors. While framework targets have been used most commonly by the EU, other Parties have also started using them to define long-term targets such as net-zero emissions by 2050 or high share of renewable sources in the energy mix. Multi-year carbon budgets setting GHG emission limits over specific time periods have also been reported.

Box 3

Greater engagement of the financial sector towards achieving 2020 emission targets under the Convention and nationally determined contributions under the Paris Agreement

Financing plays a large and increasing role in realizing emission mitigation action. Countries have sought to engage the financial services sector more actively in combating climate change through a number of PaMs.

The **United Kingdom** is targeting increased domestic green finance action to mobilize additional private investment in sustainable and environmental projects and infrastructure. The country has an established reputation in green finance innovation and leadership and considers itself to be a leader in green finance.

The City of London Corporation's Green Finance Initiative was established in 2016 at the request of the Government. The Initiative acts as a hub for private sector led innovation and promotes London and the United Kingdom as the global centre of green finance.

The United Kingdom has established a Green Finance Taskforce, consisting of senior leaders from across the financial sector and academia, which works with industry peers to provide the Government with recommendations on how to accelerate the growth of green finance; deliver the investment required to meet the United Kingdom's domestic carbon reduction targets; and consolidate the United Kingdom's leadership in financing international clean investment.

In **France**, the requirements of companies in relation to meeting environmental, social and governance responsibility criteria and financial risk disclosure have been increased by Article 173 of the Energy Transition for Green Growth Act of August 2015 regarding climate change reporting obligations. Since the financial year ending 31 December 2016, large companies (and municipalities with more than 50,000

inhabitants, State services and public institutions) must carry out regular GHG emission measurement and reporting and establish action plans to reduce emissions.

Large companies must also include information in their non-financial reports on significant direct or indirect GHG emissions due to their activities, particularly those resulting from their goods and services. They must disclose financial risks related to the effects of climate change and measures adopted by the company to reduce them.

In addition, institutional investors must disclose to beneficiaries how their investment decision-making process takes environmental, social and governance criteria into consideration (including climate risk) and how they are contributing to the financing of the ecological and energy transition

5. Carbon pricing

103. There are two main mechanisms, namely carbon taxes and emissions trading, used to put a price on GHG emissions, thus creating incentives for individuals and institutions to reduce their emissions in the least expensive way possible. Carbon taxes are typically applied to fuels and electricity, seeking to raise their prices in a manner consistent with their inherent emission factors. Emissions trading is used to create a price for carbon indirectly, by limiting emissions by establishing quotas of or caps on emissions, issuing certificates or allowances and requiring emitters to submit a tradable certificate (or allowance) for each tonne of their CO_2 emissions.

104. Since the early 2000s, emissions trading has grown, in terms of use and mitigation impact, more than carbon or energy taxes, which were introduced only in a few countries in the early 1990s after Finland introduced the first carbon tax in 1990. However, use of carbon and energy taxes has been on the rise in recent years, with Denmark, Finland, France, Ireland, Japan, Netherlands Norway Sweden Switzerland and the United Kingdom all making use of them. In practice, carbon and energy taxes are typically applied to a wider, more diverse range of sectors, including transport, residential, commercial, public and less energy-intensive industrial sectors, in addition to those commonly covered by emissions trading (electricity generation and more energy-intensive industries). In this sense, emissions trading and carbon taxes are mostly used in a complementary manner. Some Parties (Denmark, Ireland, Netherlands, Norway, Sweden and United Kingdom) use carbon taxes and emissions trading together. Emissions trading is primarily aimed at power generation and energy-intensive industry, and carbon taxes focus on the residential, commercial and transport sectors. Ireland, Sweden and Switzerland also have carbon or energy taxes focused on transport: Ireland's tax was introduced in 2009 on liquid-based fuels, Sweden has planned tax programmes to target more environmentally friendly transport and Switzerland has a heavy vehicle use tax.

105. A commonality among countries with carbon or energy taxes is that the revenue generally increases over time, by either expanding the coverage or increasing the rate of the carbon tax. While some countries have cancelled their carbon revenue systems, in countries where they are used there is a strong political commitment to continually improving the tax and providing a focus for revenue recycling.

106. Revenue recycling from carbon pricing is mostly used for broader economic support. However, if used for climate change purposes, it could reinforce the effect of carbon pricing by providing a revenue source for additional climate mitigation action. Canada's carbon pricing backstop system allows revenues from pricing systems to remain in the jurisdiction of origin and used, for example, to address impacts on vulnerable populations and sectors and to support climate change and clean growth goals. Up to one third of the revenue generated from Switzerland's CO_2 levy on heating and process fuels is used for a national buildings refurbishment programme and a small amount is allocated to a technology fund granting loan guarantees for the development of new low-emission technologies as part of its revenue recycling. In Japan, a special tax for climate change mitigation was introduced in 2012 as a levy on all fossil fuels. While the tax remains low, the revenue is used for mitigation actions addressing energy-related CO_2 emissions, such as promoting energy savings, diffusing renewable energy, and utilizing cleaner and more efficient fossil fuels.

107. A new type of carbon pricing, namely competitive tendering, was reported in the BR2s and BR3s. Competitive tendering involves Parties paying for emission reductions from accredited projects at a price determined by auction or another competitive mechanism. Australia allocated 2.5 billion Australian dollars to purchasing carbon credits through its Emissions Reduction Fund using a competitive process of reverse auctions. In Germany and the Netherlands, a tendering process for renewable energy sources will replace the feed-in tariff. In Denmark wind energy is expected to cover 50 per cent of Danish electricity consumption in 2020 through a tendering approach, and Denmark is also looking at tendering for electric trams. Finland will also introduce a tendering process to support renewable energy supply from 2018.

108. In its BR3 **Canada** reported on a **carbon pricing backstop system** under which provinces and territories have the flexibility to implement either an explicit price-based system (a carbon tax such as the one in British Columbia, or a hybrid approach composed of a carbon levy and an output-based pricing system, such as in Alberta) or a cap-and-trade system (such as those in Quebec and Ontario). A federal carbon pricing backstop system will be applied in jurisdictions that request it or that do not have a carbon pricing system in place in 2018 that meets the pan-Canadian carbon pricing benchmark. The federal system would take effect on 1 January 2019. The pricing system is based on GHG emissions and applied to a common and broad set of emissions sources to ensure effectiveness and minimize the impacts of interprovincial competitiveness.

109. In its BR3 **the United Kingdom** reported on its **carbon price floor**. The carbon price support, which came into effect on 1 April 2013, is a tax on fossil fuels used to generate electricity. When the carbon price support is added to the EU ETS price, it sums to the carbon price floor, a minimum carbon price for the power sector. A minimum carbon price sends an early and credible signal to incentivize billions of pounds of investment in low-carbon electricity generation now by providing certainty on the carbon price for electricity generation and helps to ensure the United Kingdom's long-term energy security. To give an indication of the likely rates required to meet the floor, every year the rate is announced with the budget and the Finance Bill legislates it two years ahead to provide certainty to the market and set out the provisional rates for the following two years.

110. In its BR3 **Switzerland** reported on its **CO_2 levy on heating and process fuels**, with rates contingent upon whether targets are met. In the context of the CO_2 Ordinance, the Swiss Federal Council defined intermediate reduction targets for the CO_2 emissions from heating and process fuels for 2012, 2014 and 2016. If targets are not met, the CO_2 levy on heating and process fuels is increased automatically to the levels laid down in the CO_2 Ordinance.

111. In its BR3 **the EU** reported on **proposals for the fourth phase of the EU ETS**. The EU ETS is based on the cap-and-trade principle and has been operational since 2005. It limits emissions from nearly 11,000 energy-intensive installations (power stations and industrial plants) and slightly over 500 aircraft operators operating between European Economic Area countries and covers around 45 per cent of the EU's GHG emissions. A political agreement was reached at the beginning of November 2017 on the fourth phase of the EU ETS to help achieve a 43 per cent reduction (from the 2005 level) in emissions from energy production and industry by 2030. The creation of several low-carbon funding mechanisms, specifically an innovation fund (to support demonstration of innovative renewable energy and low-carbon innovation in industry, as well as carbon capture, use and storage) and a modernization fund (to contribute to modernizing the energy systems of 10 EU member States with lower GDP).

112. The **Swedish system of energy taxation** is based on a combination of a CO_2 tax, an energy tax on fuels and an energy tax on electricity. The CO_2 tax is based on the fossil carbon content of the fuel, was introduced in 1991 and aims at reducing CO_2 emissions from non-ETS sectors. The tax has been raised in several steps since it was first implemented: in total, from 0.25 Swedish krona per kg CO_2 (1991) to 1.13 Swedish krona per kg CO_2 (2017). In addition to specific tax increases stipulated in government bills, a yearly indexation of the tax level is applied. Taxes on energy have been used in Sweden for a long time. Initially used for fiscal reasons, in more recent years the aim has been to steer energy use towards achieving Sweden's energy efficiency and renewability targets. An energy tax on motor fuels also aims at internalizing external costs resulting from the traffic, such as road wear and noise.

113. **Australia** reported on its competitive tendering **Emissions Reduction Fund** in its BR3. The Australian Government has allocated 2.5 billion Australian dollars to purchasing carbon credits through the Fund using a competitive process of reverse auctions or other processes that represent value for money and comply with legislated purchasing principles. The Fund is made up of three interrelated elements: crediting measured, reported and verified emission reductions; purchasing emission reductions; and safeguarding emission reductions. This measure has changed since the BR2, with a safeguard mechanism coming into effect on 1 July 2016. The mechanism is designed to ensure emission reductions are not offset by significant increases in emissions above 'business as usual' level elsewhere in the economy by placing emission limits (or baselines) on Australia's largest emitters. It covers around 140 businesses that have facilities with annual direct emissions of more than 100,000 t CO_2 eq (including the manufacturing, mining, oil and gas, transport and electricity sectors). Facilities covered by the safeguard mechanism are required to reduce emissions or purchase carbon credits to ensure net emissions remain below the baseline.

114. **Germany** reported on its competitive tendering **STEP up! electricity programme**. It is a multisectoral instrument of competitive tendering, launched on 1 June 2016 as a measure within the National Action Plan on Energy Efficiency. It is a mechanism designed to ensure market-based distribution of funding. The basic idea is to use a tendering mechanism to make the provided capital as cost-effective as possible. A total of EUR 300 million is available for the programme up to the end of 2018. The plan calls for two tendering rounds to be held each year. A constant funding volume of EUR 50 million is assumed for the period after 2018. As a matter of principle, the competitive tendering model is addressed to all players and sectors. The instrument will initially be directed solely at the electricity sector. Only the effects on electricity consumption are therefore considered for quantification. The programme includes background conditions and criteria that allow stakeholders to submit proposals on specific measures. Specific areas that are known to offer a great deal of potential and to be subject to certain barriers will also be addressed using the closed tendering model. Applications may be submitted for individual projects (measures that the applicant will carry out on its own) and collective projects (third-party implementation of a group of similar measures) by a single organization known as a project aggregator. The contract is awarded to measures offering the best cost–benefit ratios (euros of funding per kWh saved).

6. Framework targets

115. Framework targets (or burden-sharing commitments) establish either legally binding (i.e. mandatory) or indicative (i.e. voluntary) goals or strategies for reducing GHG emissions. This type of target can include carbon budgets or overall emission reduction targets (net-zero emissions by 2050), technology shares such as 50 or 100 per cent renewable energy by a certain time, transport fuel supply targets such as for ethanol or biodiesel, and efficiency targets. Often framework targets include MRV procedures to ensure compliance. Framework targets are used by Parties to focus the direction and stringency of their operational PaMs or, in the context of multilevel governance, to devolve partial responsibility for mitigation to different levels of government (e.g. EU member States, states, provinces and municipalities).

116. Framework targets are becoming increasingly specific in terms of their overall emission reduction, renewable energy or energy efficiency mandates, but do not specify the mechanisms by which the targets should be accomplished. Lower levels of government must implement their own operational PaMs to achieve the targets. The associated mitigation projects are often administered by local authorities, which are closer to the actual mitigation opportunities. They have been used mostly by the EU, for example in the EU climate and energy package outlining specific targets for 2020.

117. In its BR3 **the EU** reported on its proposed **effort-sharing regulation**, which relates to 2030 targets. It would succeed the ESD, which provided targets for each member State individually to reduce or limit growth in its GHG emissions from non-ETS sectors between 2005 and 2020. The EU claims that the ESD has been effective in stimulating new national PaMs and has resulted in member States considering new measures and in improved coordination between national, regional and local governments. This positive progress informed a new legislative proposal for the effort-sharing regulation, which was presented by the European Commission in July 2016. The regulation sets out binding annual GHG

emission targets for EU member States for the period 2021–2030 and maintains binding annual GHG emission limits for each member State after 2020 for non-ETS sectors. Emission limits will be set for each year in the 10-year period until 2030 according to a decreasing linear trajectory.

118. **The United Kingdom's Climate Change Act** includes a number of carbon budgets. The Climate Change Act was passed in November 2008, introducing the world's first long-term legally binding framework to reduce GHG emissions. The Act, which is the central piece of legislation governing the country's approach to tackling climate change, specifies that the United Kingdom must reduce its emissions by at least 80 per cent by 2050 relative to the 1990 level and by at least 34 per cent by 2020. Carbon budgets set a framework for meeting the statutory targets by setting an emission limit over each five-year period. The Act established the Committee on Climate Change, an independent body that advises the Government on emission targets and reports to Parliament on progress in reducing GHG emissions, which the Government is required to respond to. In October 2017, the Government published a Clean Growth Strategy, setting out policies and proposals for future carbon budgets and illustrative pathways towards the country's 2050 targets.

119. In its BR3 **France** reported on its **National Low-Carbon Strategy**, introduced in 2015, which for the first time relies on carbon budgets, namely GHG emission caps that must not be exceeded at the national level over five-year periods: 2015–2018, 2019–2023, 2024–2028 and 2029–2033. The Strategy orchestrates the implementation of the transition towards a low-carbon economy and will be updated every four to five years. For the purpose of overall consistency, it includes long-term guidelines and sector-specific recommendations (for energy and non-energy sectors). It defines the emission reduction trajectory, broken down by sector on an indicative basis, leading to the achievement of a 75 per cent reduction of GHG emissions compared with the 1990 level.

7. Sector-specific policies and measures

(a) Energy

120. Policies covering the energy sector target energy industries, fugitive emissions and the residential, commercial and public sectors. For Parties with an emissions trading system, emissions from the power sector are reduced through actions that comply with the trading system. Emission control regulations are used by other Parties to reduce power sector emissions. Other common PaMs in the energy sector include:

(a) Power sector planning and permitting provisions that increase power generation from energy sources that are less carbon intensive than coal (i.e. renewable energy sources, natural gas, nuclear energy);

(b) Incentives for increased power generation from renewable energy supplies (e.g. feed-in tariffs, competitive tendering, utility renewable portfolio standards);

(c) Incentives for utility-based energy efficiency programmes and obligations;

(d) Incentives for increased power generation, transmission and distribution efficiency through combined heat and power, grid upgrades, distributed (i.e. small scale) generation and other means;

(e) Energy efficiency standards for equipment and incentives for energy management systems in industrial facilities;

(f) Energy efficiency provisions in building codes, energy rating and labelling, and renovation incentives for residential, commercial and public buildings, including space heating, cooling and ventilation, water heating and lighting;

(g) Energy efficiency standards and labels for household appliances, home entertainment, office equipment and lighting.

121. **Canada** is aiming to **phase out traditional coal units** across the country by 2030. Amendments to the 2015 regulations to reduce CO_2 emissions from coal-fired electricity will require the phase-out of existing coal-fired units without carbon capture and storage once the units reach a defined period of operating life. Building on this domestic action, in 2017 the

Governments of Canada and the United Kingdom launched the global Powering Past Coal Alliance, which aims to encourage the phase-out of unabated coal-fired electricity. Furthermore, in 2014, Ontario, a Canadian province, became the first jurisdiction in North America to fully eliminate coal as a source of electricity generation, thus avoiding more than 30 Mt annual GHG emissions. In 2015, Ontario passed the Ending Coal for Cleaner Air Act, permanently banning coal-fired electricity generation in the province.

122. The Government's long-term goal is for **Denmark to be independent of fossil fuels by 2050**. Renewable energy sources are promoted via economic measures, including energy and CO_2 taxes on fossil fuels and through public service obligation schemes, which supplemented the price of electricity paid by consumers until 2017. From 2018–2019 Denmark is undertaking a 1 billion Danish kroner tender process that allows photovoltaic panels and wind turbines to compete to deliver the greenest power to consumers. The expected new annual renewable energy capacity is equivalent to about 140,000 Danish households' annual electricity consumption. If the tendered bids are lower than expected, the amount of new renewable energy capacity will increase accordingly. In addition, 150 million Danish kroner were allocated for new test wind turbines to be established both inside and outside the two national test centres for large wind turbines in 2018 and 2019. Furthermore, in 2018, additional initiatives for the post-2020 period will be discussed, including how to achieve more than 40 per cent renewable energy in final energy consumption, approximately 50 per cent electricity to be supplied by wind power, an approximate 8 per cent reduction in gross energy consumption in relation to 2010, and a 34 per cent reduction in GHG emissions in relation to 1990.

123. In the industrial sector, such as manufacturing, **Japan** promotes **energy management and the introduction of energy-efficient equipment and devices** on the basis of the Act on the Rational Use of Energy (1979). Specifically, business operators are classified into four classes and evaluated periodically. Well-performing operators are publicized by business type and praised, while those stagnating are intensively investigated. In addition, a benchmark system that sets energy efficiency targets at a level that 10–20 per cent of business operators among the same business types can achieve has been extended from the manufacturing industry to the retail and service industries. The goal is to expand it to cover 70 per cent of the energy consumed by all industries by 2018.

124. In its BR3 **Belgium** reported on its **mechanism for increasing awareness of climate responsibility among its regions for the building sector**. The mechanism consists of a multiannual trajectory for the reduction of GHG emissions in the residential and tertiary building sectors (excluding industrial buildings) for each Belgian region. A financial bonus is awarded to the region if it exceeds its assigned objective. The bonus is calculated on the basis of the reference trajectory and is to be invested in emission reduction policies. If the region fails to meet its assigned objective, a financial penalty is inflicted, calculated on the basis of the difference between the reference trajectory and actual emissions, and to be invested in emission reduction policies by the Federal State. The mechanism will be funded by revenues from the auctioning of emission quotas assigned to Belgium that are yet to be distributed between the regions and the Federal State through the domestic burden-sharing arrangement.

125. In its BR3 **the Russian Federation** reported on its **energy strategy**. RES 2035 envisages the reduction of emissions of environmental pollutants and GHGs and decreased waste formation. It calls for the development of renewable energy sources that are not based on fossil fuels, such as hydro and nuclear power production, as well as the use of best available technologies. The main strategic guidelines are safety, energy and economic efficiency and sustainable development of the energy sector.

(b) Industry and industrial processes

126. Parties commonly use regulations, but also economic instruments, fiscal incentives and education, to limit the use or improve the manufacturing, handling, use and end-of-life recovery of F-gases used as substitutes for ozone-depleting substances. Some Parties also use voluntary agreements to reduce process emissions from the manufacture of nitric acid, aluminium, cement and other materials.

127. In 1990, HFC emissions were insignificant; however, since phasing out ozone-depleting substances such as chlorofluorocarbons under the Montreal Protocol and replacing them with HFCs, HFC emissions have increased substantially. Since the BR2s were submitted, Parties to the Montreal Protocol have agreed, under the Kigali Amendment, to take effect in January 2019, to globally phase down the use of HFCs as alternatives to ozone-depleting substances. While not ozone-depleting substances themselves, HFCs can have high or very high GWPs, ranging from about 121 to 14,800. Parties did not report extensively on the implications of the Kigali Amendment for their PaMs in industry and industrial processes.

128. The **EU** has adopted a directive on mobile air conditioning systems used in small motor vehicles, and the F-gas regulation to control F-gas emissions, including HFCs. The action taken by the EU and its member States under the F-gas regulation will enable the EU to comply with the Kigali Amendment to the Montreal Protocol.

129. In June 2017, the **Australian Government** passed legislation to **phase down HFC imports** from 1 January 2018. The import phase-down will reduce HFC emissions by reducing the amount of HFCs in the economy. This will be complemented by other measures to reduce HFC emissions, including improving equipment maintenance to reduce HFC leaks and improving energy performance.

(c) Transport

130. The transport sector, in which reducing GHG emissions has been a challenge in the past, is experiencing some innovation, which is having a positive impact. Road vehicle fuel economy and, increasingly, CO_2 emission standards and framework targets are the centrepiece of most Parties' efforts to mitigate transport sector emissions. Parties are also using a variety of instruments to increase the efficiency and effectiveness of passenger and freight transport services, to promote public transport and non-motorized modes of transport and to improve the CO_2 emission intensity of domestic and international aviation. In addition, recently many Parties are providing incentives to reduce the carbon intensity of transport fuel supply by increasing the use of biofuels and electricity and to support the development of relevant technologies, such as hybrid and electric vehicles.

131. **Norway** provides strong **incentives for using zero-emission vehicles**. Electric cars (battery and fuel cells) are exempt from Norway's motor vehicle registration tax and road usage tax. Electric cars also have a reduced rate of annual tax on motor vehicles and are exempt from value added tax at purchase. Additional benefits for electric cars include access to bus lanes, toll-free passage, a rebate on car ferry crossings and free access to public parking. At the same time, relevant infrastructure has been supported, with more than 10,000 charging points established and a support programme for fast-charging in municipalities with fewer than two fast-charging points. This has had a major effect on the sale of electric vehicles: the share of new zero-emission cars in the sale of new cars in 2017 was about 20 per cent and currently Norway has around 130,000 electric cars. About 4 per cent of the Norwegian passenger car fleet is battery electric, which is the largest share of electric cars as a percentage of a country's passenger car fleet in the world.

132. In its BR3 **the EU** reported on its **low-emission mobility strategy**, which seeks to optimize the transport system and improve its efficiency. The 2011 EU White Paper on transport put forward a goal of reducing EU transport GHG emissions by at least 60 per cent by 2050 relative to 1990. This target was reiterated in the EU low-emission mobility strategy, adopted in 2016, which additionally set the ambition of drastically reducing, without delay, emissions of air pollutants from transport. The analytical work underpinning the strategy showed that cost-effective CO_2 emission reductions of 18–19 per cent are needed by 2030 for transport relative to 2005. In addition, the European Commission has adopted an agenda for a socially fair transition towards clean, competitive and connected mobility for all and a European strategy on cooperative intelligent transport systems, a milestone on the pathway towards cooperative, connected and automated mobility.

133. **Canada** set **emission standards for light-duty vehicles** through a government regulation. Building on the success of the passenger automobile and light truck GHG emission regulations covering model years 2011–2016, the regulation was developed in collaboration with the United States to ensure alignment. The amended regulations apply to

companies that manufacture or import new light-duty vehicles into Canada for sale and establish progressively more stringent GHG emission standards for new passenger automobiles and light trucks for model years 2017 and beyond, while providing companies with flexibility to comply in a cost-effective manner.

134. **Sweden** will introduce a **tax on air travel** in 2018 with the aim of reducing the climate impact of aviation. The proposed tax has been designed as a tax on commercial flights and will be paid by the airline carrying out the flight for passengers travelling from a Swedish airport. Various levels of tax (60, 250 or 400 Swedish kroner) will be levied depending on the flight's final destination.

135. As a global car manufacturer, **Japan sets stringent fuel efficiency standards** that affect not only its domestic car fleet but also the exported fleet. These standards have evolved from 13.6 km/litre fuel set in 2010 to 20.3 km/litre fuel to be achieved by 2020. Japan is also among the world leaders in promoting hybrid and hydrogen-powered vehicles. The Government provides subsidies and infrastructure support and has established an ambitious vision of a hydrogen-powered society.

(d) Waste and waste management

136. Parties commonly use regulations and public facilities and infrastructure to reduce CH_4 emissions from waste: waste is minimized through reduced packaging and increased product and packaging reusability and recycling; waste is reused through the implementation of waste separation and recycling; while landfilled waste is minimized through processing and incineration with CH_4 capture or flaring.

137. In its BR3 **the EU** reported on its **Circular Economy Package**, which it claims provides a clear, systematic and holistic approach that focuses on several priority issues, including plastics, food waste, critical raw materials and construction and demolition, and clearly delineates actions, commitments and timetables. The Package encompasses a collection of legislative proposals published by the European Commission under various directives (on waste, packaging waste, landfill, end-of-life of vehicles, batteries and accumulators and waste batteries and accumulators, and waste electrical and electronic equipment), sets targets (recycling 65 per cent of municipal waste and 75 per cent of packaging waste by 2030, and reducing landfill to 10 per cent of municipal waste by 2030), establishes commitments (ban on landfilling separately collected waste) and clarifies methods, as well as introducing incentives for producers to make greener products and offering measures to facilitate industrial material reuse.

138. Key developments in the implementation of the Circular Economy Package include the development of legislative proposals on the online sale of goods and fertilizers, the launch of innovation deals for a circular economy, the development of an ecodesign working plan as part of the Clean Energy for All Europeans package, the establishment of the EU Platform on Food Losses and Food Waste, the publication of a communication on waste-to-energy processes and their role in the circular economy, the development of a proposal to amend the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment, and the launch of a platform to support the financing of circular economy.

(e) Agriculture

139. PaMs directed at the agriculture sector seek to reduce N_2O emissions through manure management and optimized nitrogen fertilizer use. They also aim to reduce CH_4 emissions through changes in livestock management.

140. In its BR3 **New Zealand** reported on its **research into reducing emissions from agricultural production**. Agriculture contributes almost half of New Zealand's total GHG emissions; therefore, the Party has an enduring commitment to providing leadership in research, innovation and technical solutions to reduce emissions and sharing this knowledge internationally. New Zealand is conducting research to identify methane inhibitors, develop low methane emitting sheep through genetics, progress towards a methane vaccine, and identify naturally occurring compounds that can lower N_2O emissions from pasture. It has also established the Biological Emissions Reference Group, a joint government and industry

reference group set up to build a robust and agreed basis of evidence of what the agriculture sector can do to reduce emissions at the farm level, now and in the future, and to assess costs and opportunities. Furthermore, New Zealand contributes funding and expertise to the international research activities of the Global Research Alliance on Agricultural Greenhouse Gases and co-chairs its Livestock Research Group.

(f) Forestry and land use, land-use change and forestry

141. PaMs directed at forestry and LULUCF seek to reduce emissions from sources and enhance removals from sinks through programmes promoting afforestation, reforestation and sustainable management of forests, grassland, wetlands and cropland. There are also programmes to prevent forest fires and increase green urban areas.

142. In its BR3 **Australia** highlighted its provision of **support to savannah burning projects** through its Emissions Reduction Fund. These projects reduce emissions from savannah fires in Northern Australia by undertaking early dry season burns that reduce the incidence and extent of larger, higher intensity fires in the late dry season. The projects have created 1.8 million Australian carbon credit units to date, but they also emphasize the high value of co-benefits generated through indigenous fire management, including indigenous employment, supporting Aboriginal people to return to and remain in their country, biodiversity protection, transfer of knowledge to younger generations, maintaining Aboriginal languages, and higher standards of mental and physical health. Following the ongoing success of Australia's domestic savannah fire management methods, Australia supported the International Savanna Fire Management Initiative, which involved assessing and promoting the feasibility of establishing emission projects in developing countries; sharing Australia's lessons learned with fire management practitioners and indigenous representatives in other countries; and identifying regions in developing countries for piloting savannah fire management.

D. Assessment of the economic and social consequences of response measures

143. In accordance with the UNFCCC reporting guidelines on BRs, each Annex I Party is encouraged to provide, to the extent possible, detailed information on the assessment of the economic and social consequences of its response measures.

144. Of the BR3s submitted, 23 Parties provided specific sections on this topic, of which 7 referred to their reporting, in their national inventory reports or national communications, on ways to minimize the adverse effects of the implementation of PaMs.

145. From 43 Parties, 13 BRs specifically refer to the cross-border impacts of mitigation action and 11 refer to the economic and social impact of policies on developing countries specifically. Eleven Parties specifically referred to actions or processes in place to address the cross-border impacts of response measures.

146. The EU and several member States (Belgium, Czechia, France, Germany, Greece, Malta, Portugal and Sweden) referred to the impact assessment process introduced by the EU (detailed in the BR1, BR2 and national inventory report of the EU) in their BR3s.

147. International trade (Slovakia, Switzerland), economic diversification (Australia, Switzerland), transition and labour (Australia, Belgium, Germany), impacts on vulnerable groups of society and indigenous peoples (Canada, Germany) and emissions trading (Canada, Slovakia) were covered in the context of impacts of response measures.

148. The reports indicate the assessment of both positive and negative economic and social impacts of response measures. For example, the National Action Plan on Energy Efficiency in Germany is promoting the development of new technologies and job creation in new sectors; while the development of biofuels in Belgium was identified to potentially affect food prices and land and forest management, especially in developing countries. Belgium, the Netherlands and Slovakia mentioned steps taken together with the EU, under EU sustainability criteria, to safeguard against the negative impacts associated with use of biofuels.

149. Norway and Switzerland mentioned that they are assisting oil-dependent developing countries in diversifying their economies. Norway detailed its Oil for Development initiative, aimed at responding to requests for assistance from developing countries in their efforts to manage petroleum resources in an environmentally sound way that generates economic growth and promotes the welfare of the whole population. Norway also indicated initiatives fostering technology development and transfer, as well as capacity-building efforts in developing countries, to increase access to renewable energy and reduce dependence of fossil fuels.

IV. Greenhouse gas emission projections

A. Overview

150. This chapter presents GHG emission projections for 2020 and 2030 for all Annex I Parties. Information is taken from the BR3s, except for Belarus, Ukraine and the United States, which had not submitted their BR3s at the time of the preparation of this report. Information for Belarus and the United States is from their BR2s, while information for Ukraine is from its BR1. The EU provided projections in its BR3 but those values are not included in the totals in this report; in accordance with the approach used for previous compilation and synthesis reports, to avoid double counting, the projections data reported by the individual EU member States were used instead.

151. Projected emissions for 2020 and 2030 are presented, along with historical data for 1990 and 2016, for the purpose of assessing potential future progress in reducing emissions. Note that the 1990 emission levels as reported have changed since the previous compilation and synthesis report, so comparisons of absolute emission projections between that report and this one should be viewed in that context.

152. In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications",[20] Parties are required at a minimum to report projections under the WEM scenario, but may also report projections under the WAM and WOM scenario. The WEM scenario takes into account the effects of PaMs that have either been implemented or adopted, whereas the WAM scenario includes the effects of PaMs planned at the time that the projections were prepared. The WAM scenario is usually reported by Parties that have recognized the need to introduce additional measures or strengthen existing measures to attain their 2020 or NDC targets. Under the WOM scenario PaMs implemented, adopted or planned after the year chosen as the starting point for the projections are not considered.

153. Projections under the WEM scenario were reported by all 43 Annex I Parties; 23 Parties reported projections under the WAM scenario; and 12 Parties reported projections under the WOM scenario.

154. Table 5 in annex I provides information on the sources of the projections presented in this report and an overview of the scenarios reported by Annex I Parties.

155. Total aggregate GHG emissions without LULUCF, including the effect of implemented and adopted PaMs, are projected to be 11.4 per cent lower in 2020 than in 1990. This results largely from the steep decline in the emissions of EIT Parties (by 34.3 per cent), with most of the reductions observed in the early 1990s, combined with the slight decrease in the emissions of non-EIT Parties (by 0.5 per cent), which can be partly attributed to their PaMs, with their effect manifested mostly after 2010. Total emissions are projected to further decline by 2.0 per cent between 2020 and 2030, reflecting the effects of increasing the scope of and strengthening existing PaMs.

[20] FCCC/CP/1999/7, chapter II, paragraphs 27–48.

B. Approaches and assumptions used to prepare the projections

156. The models and approaches used by Parties to estimate their projections can be classified into two broad categories: economy-wide macroeconomic models; and models used to project emissions for specific sectors and gases, such as energy-related GHG emissions, non-energy-related GHG emissions, and GHG emissions and removals from LULUCF. Most Parties provided a detailed explanation of the models and approaches used, although less detailed explanations were provided of how emissions and removals were projected for non-energy sectors.

157. Most Parties used an integrated approach to projecting energy-related emissions, whereby macroeconomic top-down models were coupled with sector- and technology-specific bottom-up models. The type and characteristics of such models differed among Parties and in most cases such models are used also for other purposes, such as in energy planning.

158. Many Parties used spreadsheet models consistent with methodologies used for the GHG emissions inventories to project emissions from non-energy sources other than LULUCF. The projections were based on activity data, emission factors and sector-specific growth assumptions. For the projections of GHG emissions and removals from LULUCF, Parties used models that are broadly consistent with those used for their GHG inventories combined with sector-specific assumptions.

159. All Parties reported on the key drivers and assumptions behind their emission projections, which are for most Parties GDP, population growth and international oil prices (see table 6 in annex I). Other assumptions included the expected development of GDP components, the prices of coal and natural gas, the extent of electrification of heating and transport, heating and cooling degree days, and activity data for some emission drivers, such as industrial production, number of livestock and number of households.

160. The projected emission trends should be compared across Parties with caution owing to the diversity of the models and approaches used in estimating the projections, and the differences in the key drivers and assumptions underlying the projections, to which they are highly sensitive.

C. Projected total aggregate greenhouse gas emissions

161. While all Parties reported information under the WEM scenario for both 2020 and 2030, only a subset of Parties reported a WAM scenario and only a few Parties reported a WOM scenario. In order to have a set of data that allows for a rough comparison of total GHG emissions across scenarios, where projection estimates were not reported for the WAM scenario, values from the WEM scenario were utilized for both 2020 and 2030. Because the methodologies and assumptions used for producing the WOM scenario varied significantly and relatively few Parties produced one, aggregate analysis of those scenarios was not undertaken.

1. Projections without emissions or removals from land use, land-use change and forestry

(a) Projections under the 'with measures' scenario

162. All 43 Annex I Parties reported projections data under the WEM scenario for 2020 and 2030. Figure 20 shows the total projected GHG emissions without LULUCF in 2020 and 2030.

163. GHG emissions for all Annex I Parties in 2020 are projected to equal 17,454 Mt CO_2 eq, 11.4 per cent lower than the 1990 level of 19,694 Mt CO_2 eq. This is consistent with the projected emission trend reported in the BR2s,[21] albeit a somewhat lower rate of decrease due to the slightly higher projected emissions for 2020 reported in the BR3s.

[21] See document FCCC/SBI/2016/INF.10/Add.1, chapter IV.

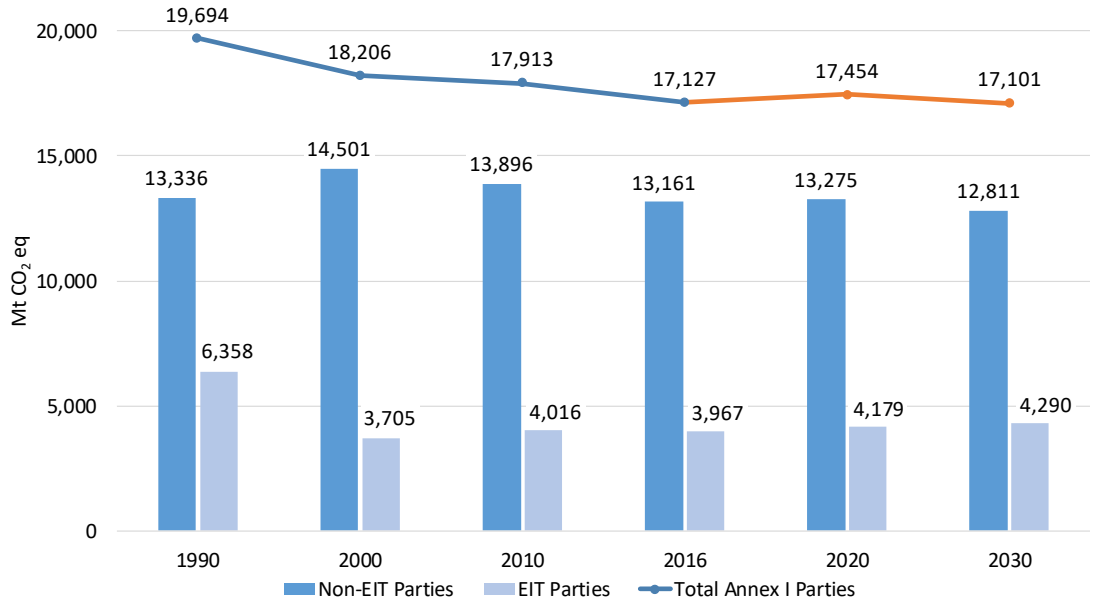
Emissions in 2030 are projected to be 13.2 per cent lower than in 1990, owing to a further 2.1 per cent drop in emissions after 2020. The projected trend from 2016 (the latest reported year) to 2020 shows emissions increasing by 1.9 per cent. It should be noted that this increase could be attributed in part to the fact that the projections reported in the BR3s were modelled using emission data for 2015 or earlier. The projected downward trend in emissions between 2020 and 2030 presented in this report is similar to that in the previous report, mostly reflecting the impact of PaMs as the underlying drivers remain broadly the same.

164. For EIT Parties, emissions in 2020 and 2030 are projected to be 34.3 and 32.5 per cent, respectively, lower than in 1990, owing mainly to significant emission decreases in the 1990s. However, their emissions are projected to be above the 2016 level by 5.3 per cent in 2020 and by 8.1 per cent in 2030 as the effects of PaMs are not expected to offset the impact on emissions of underlying drivers. Between 2020 and 2030, their emissions are projected to increase by 2.7 per cent. These projected changes are consistent with the historical trends for this group of Parties: deep emission reductions occurred at the beginning of the 1990s, but, as their economies subsequently grew, emissions also began to increase; this growth is projected to extend at least until 2030, unless further PaMs are implemented.

165. For non-EIT Parties, emissions in 2020 are projected to be 0.5 per cent below the 1990 level. From 2020 to 2030, their emissions are projected to decrease by 3.5 per cent, resulting in projected emissions in 2030 at 3.9 per cent below the 1990 level, reflecting at least in part the expected effects of PaMs, such as the EU ETS. In 2020, their emissions are projected to be 0.9 per cent above the 2016 level, while their emissions in 2030 are projected to be 2.7 per cent below it. Emissions of non-EIT Parties will continue to account for the largest share of the total aggregate GHG emissions of Annex I Parties in 2020 (76.1 per cent); however, owing to the projected increase in emissions of EIT Parties, that share is expected to become slightly smaller by 2030 (74.9 per cent).

Figure 19

Historical and projected greenhouse gas emissions without land use, land-use change and forestry in 2020 and 2030 under the 'with measures' scenario



(b) Projections under the 'with additional measures' scenario

166. A total of 23 Parties (Belarus, Bulgaria, Canada, Croatia, Cyprus, Czechia, Estonia, EU, Finland, Germany, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Monaco, Netherlands, Portugal, Romania, Russian Federation, Slovakia, Switzerland and Ukraine), which account for 28.2 per cent of the total emissions without LULUCF in 1990, reported projections under the WAM scenario for 2020 and 2030.

167. When considering only the Parties that reported a WAM scenario, emissions under that scenario are projected to be 3.2 and 9.3 per cent lower than under the WEM scenario in 2020 and 2030, respectively.

(c) Projections under the 'without measures' scenario

168. A total of 12 Parties (Croatia, Cyprus, Denmark, Malta, Monaco, New Zealand, Romania, Russian Federation, Slovakia, Switzerland, Turkey and Ukraine) reported projections under the WOM scenario for 2020 and 2030.

169. For that group of Parties, GHG emissions without LULUCF are projected to be 12.8 per cent higher in 2020 under the WOM scenario than under the WEM scenario. That projected difference in emissions between the two scenarios grows to 27.1 per cent for 2030.

2. Projections with emissions and removals from land use, land-use change and forestry

170. A total of 40 Parties reported projections of total GHG emissions with LULUCF under the WEM scenario for 2020 and 2030.

171. For those Parties taken together, emissions in 2020 are projected to equal 14,840 Mt CO_2 eq, which is 17.9 per cent below the 1990 level of 18,073 Mt CO_2 eq. Between 2020 and 2030, emissions are projected to decrease by 1.3 per cent, resulting in emissions being 18.9 per cent lower in 2030 than in 1990, but 1.3 per cent higher than in 2016. Continued progress on actual emission reduction by 2016 compared with in 2014 means that the trend from 2016 (the latest reporting year) to 2020 is now projected to be increasing (by 2.6 per cent), as seen in figure 22, instead of decreasing as previously reported.

172. For comparison, the total GHG emissions without LULUCF for the same group of 40 Parties are projected to equal 16,650 Mt CO_2 eq in 2020, 12.4 per cent below the 1990 level of 19,012 Mt CO_2 eq. Emissions without LULUCF in 2030 are projected to be 14.2 per cent lower than in 1990. Between 2020 and 2030, emissions for this group are projected to decrease by 2.0 per cent.

173. Net removals in 2020 from the LULUCF sector are projected to be 51.8 per cent higher than in 1990, but an 18.9 per cent decrease in removals is projected for between 2016 and 2020.

174. Since the projections for GHG emissions without LULUCF cover 43 Parties and the projections for GHG emissions with LULUCF cover only 40 Parties, interpretation of the difference in the projected emission trends should be undertaken with caution: while the data available indicate that the inclusion of LULUCF results in deeper emission reductions, the future impacts of LULUCF could offset some of the gains expected to result from PaMs.

D. Greenhouse gas emission projections by sector

1. Projected changes in sectoral greenhouse gas emissions under the 'with measures' scenario

175. All Annex I Parties reported sectoral projections for 2020 and 2030, but not all Parties reported projections for all sectors. Therefore, the comparison of percentage changes in the projected emissions for 2020 and 2030 from the 1990 and 2016 level should be interpreted with caution.

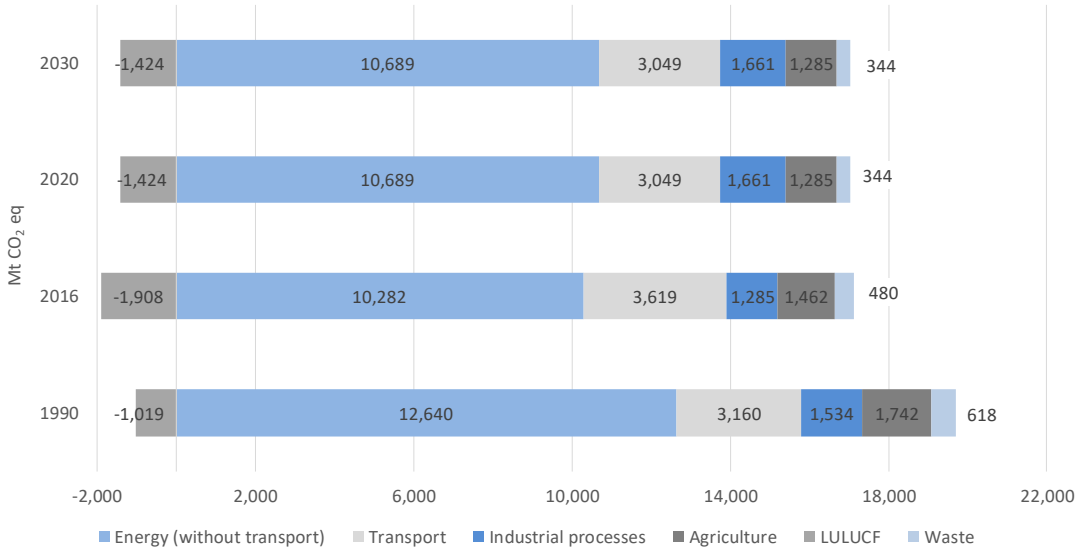
176. Total emissions from all sectors are projected to decrease by 2020 compared with the 1990 level, but emissions from the energy sector (excluding transport) are projected to increase by 6.8 per cent compared with the 2016 level (see figure 20).

177. It is expected that the energy sector (including transport) will remain the dominant source of GHG emissions in 2020, contributing 82.7 per cent of the total emissions.

178. Considering the sectoral data provided by Parties for 2030, emissions from all sectors except industrial processes are projected to be lower than in 1990. Notably, emissions from transport are also projected to be lower by 2020 and 2030, a break from the past near-continuous emission growth in this sector. Net removals from the LULUCF sector in 2030

are projected to be below the projected 2020 level, but still well above the 1990 level. Figure 21 shows the sectoral emission projections for 2030 under the WEM scenario.

Figure 20
Historical and projected greenhouse gas emissions and removals under the 'with measures' scenario, by sector, in 2020 and 2030



2. Projected changes in greenhouse gas emissions from international bunker fuels

179. A total of 25 Parties (Australia, Austria, Belgium, Canada, Czechia, Denmark, Estonia, EU, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Liechtenstein, Lithuania, Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Switzerland and United States) reported projections of GHG emissions from international bunker fuels for aviation and maritime transport.

180. According to the data provided by the reporting Parties, GHG emissions from international bunker fuel use are projected to increase by 2.6 per cent from 2016 to 2020, from 448 to 460 Mt CO_2 eq, which is significantly above (by 50 per cent) the 1990 level. By 2030 such emissions are expected to continue to rise to 512 Mt CO_2 eq, an increase in emissions between 2020 and 2030 of 11.4 per cent. While these values provide insight into the general growth trend in this sector, they cover a limited number of Parties and might not be fully representative. Not all Parties reported international bunker emission projections separately for the aviation and maritime sectors, making sector-level analysis difficult.

E. Projections data for individual Annex I Parties

181. Figure 22 shows the projected percentage changes in GHG emissions for individual Annex I Parties by 2020 compared with the 1990 and 2016 level under the WEM scenario. This information, together with the data reported under the WAM scenario, is also presented in tabular format in tables 7 and 8 in annex I.

182. The projected total GHG emissions of Annex I Parties in 2020 are influenced most by the emissions of the United States, the Russian Federation, Japan, Germany and Canada, which account for about 70 per cent of the total emissions of Annex I Parties under the WEM scenario. Some key aspects of their projected GHG emission profiles without LULUCF are as follows:

(a) The United States alone accounts for more than 33 per cent of the total GHG emissions of Annex I Parties. Compared with the 2016 level, its emissions are projected to rise by 1.6 per cent by 2020 and then decrease by 2.3 per cent by 2030;

(b) The Russian Federation's emissions are projected to be 26.5 per cent lower in 2020 than in 1990, but between 2016 and 2030 its emissions are expected to increase by 5.6 per cent;

(c) Japan's GHG emissions are projected to rise by 7.3 per cent between 2016 and 2020, to 10.5 per cent above the 1990 level, and subsequently decrease by 22.9 per cent between 2020 and 2030;

(d) Germany's GHG emissions in 2020 are projected to be 34.8 per cent below the 1990 level and decline further between 2020 and 2030 to reach 41.3 per cent below the 1990 level;

(e) Canada's GHG emissions are projected to rise by 3.4 per cent between 2016 and 2020, to 20.8 per cent above the 1990 level. Between 2020 and 2030, its emissions are projected to decrease by 1.0 per cent to 19.6 per cent above the 1990 level.

183. The projected changes in individual Parties' total aggregate GHG emissions without LULUCF under the WEM scenario varied:

(a) For 2016–2020 there was a significant range of projected increases and decreases in emissions across Parties. The largest relative change was an increase of 35.6 per cent in Ukraine, followed by Turkey (34.9 per cent) and Iceland (23.6 per cent). The projected changes for Turkey and Ukraine are driven primarily by growth in the energy and industrial sectors, but it should be noted that the projections for the two Parties are based on older inventory data and may not therefore be directly comparable with those of the other Parties. The primary driver for the emission increase in Iceland is the forecast substantial growth in its industrial sector;

(b) The largest absolute increases in emissions from 2016 to 2030 were projected for Ukraine, followed by Turkey and the United States;

(c) Denmark projected the largest relative emission decrease from 2016 to 2020 (20.0 per cent), followed by France, Malta and Monaco, all with decreases of more than 15 per cent. Denmark's projected decline in emissions is driven primarily by emission reductions in the non-transport energy sectors; France's by emission reductions in transport and residential and other energy use; Malta's by emission reductions in electricity generation and transport; and Monaco's by emission reductions in non-transport energy;

(d) The largest absolute decreases in emissions from 2016 to 2030 were projected for Germany, followed by France and the United Kingdom.

Figure 21

Projected changes in the total greenhouse gas emissions without land use, land-use change and forestry of individual Annex I Parties under the 'with measures' scenario by 2020 compared with the 2016 level

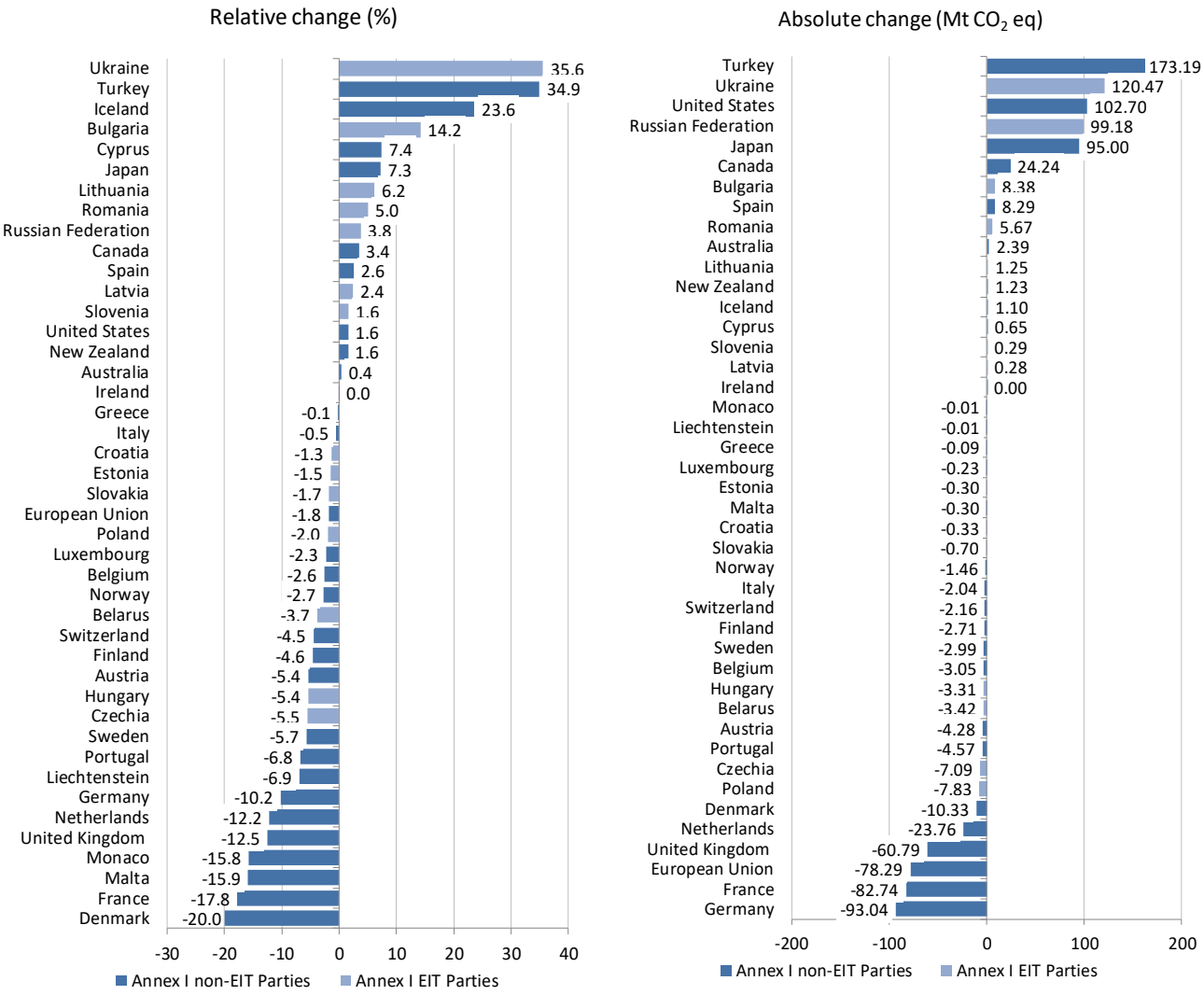
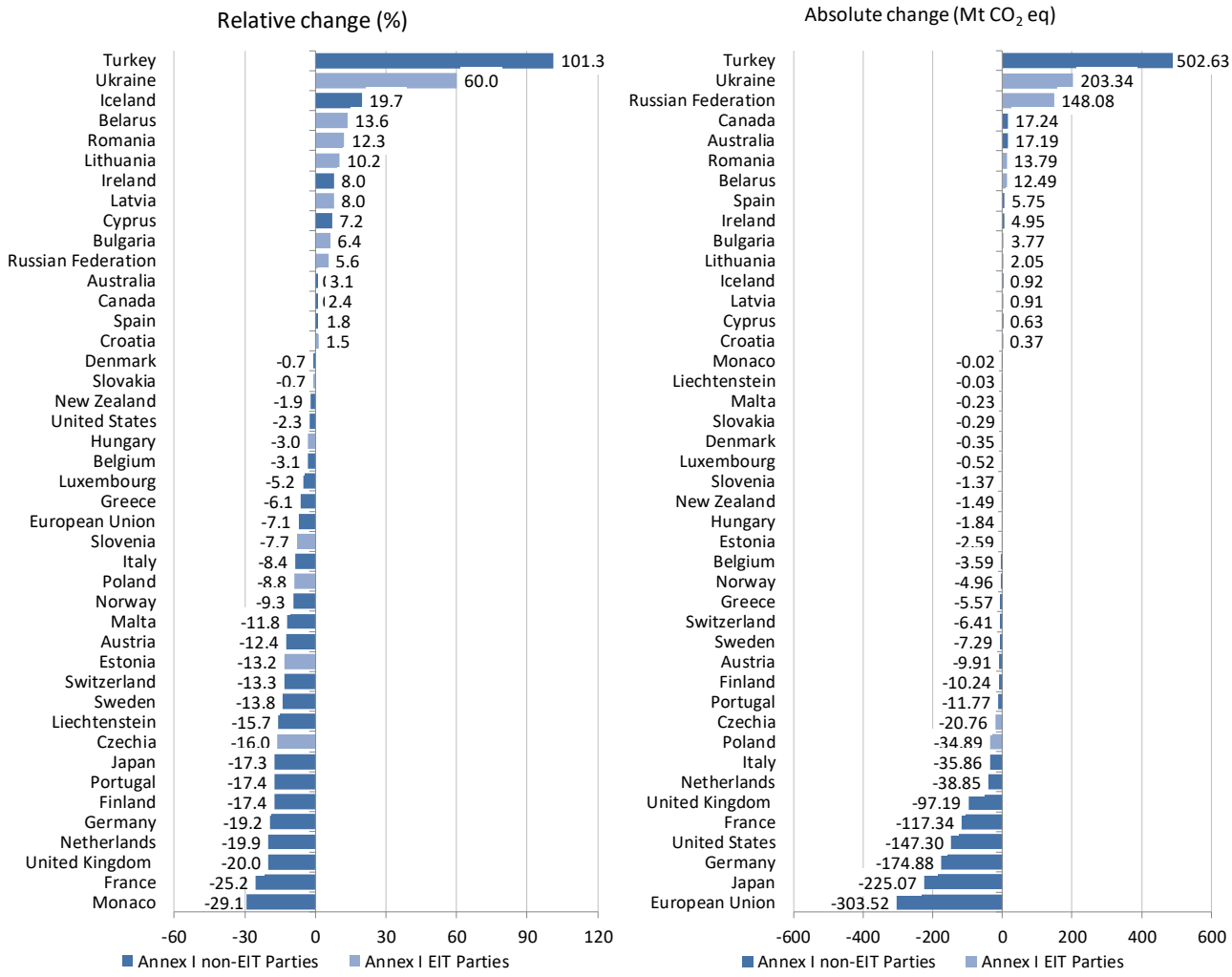


Figure 22

Projected changes in the total greenhouse gas emissions without land use, land-use change and forestry of individual Annex I Parties under the 'with measures' scenario by 2030 compared with the 2016 level



184. For the 40 Parties that reported projections of total GHG emissions with LULUCF under the WEM scenario, the range of the projected changes is wider than for emissions without LULUCF. Comparing the with and without LULUCF projections demonstrates the significant impact of the sector for some Parties.

Figure 23

Projected changes in the total greenhouse gas emissions with land use, land-use change and forestry of individual Annex I Parties under the 'with measures' scenario by 2020 compared with the 2016 level

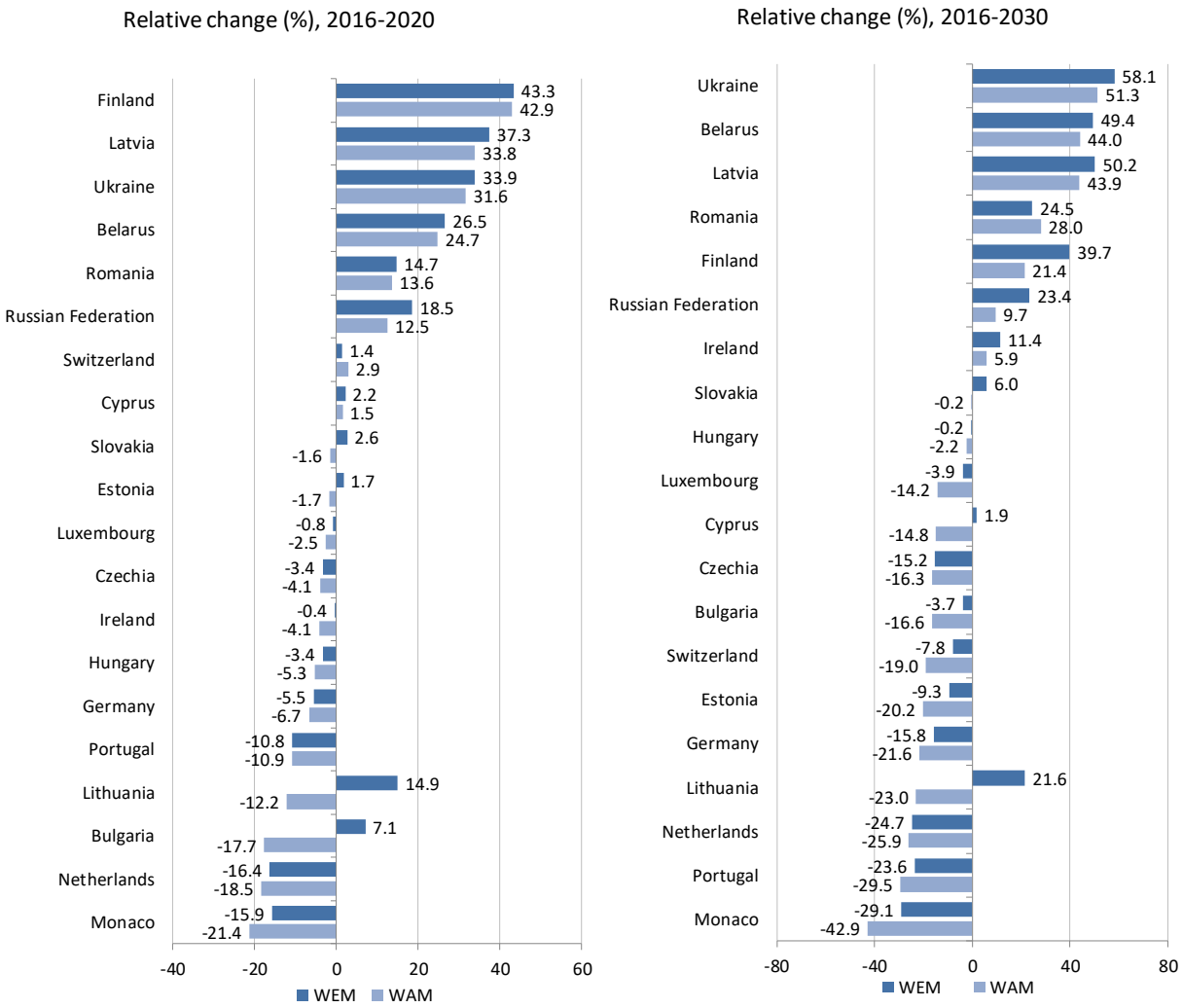
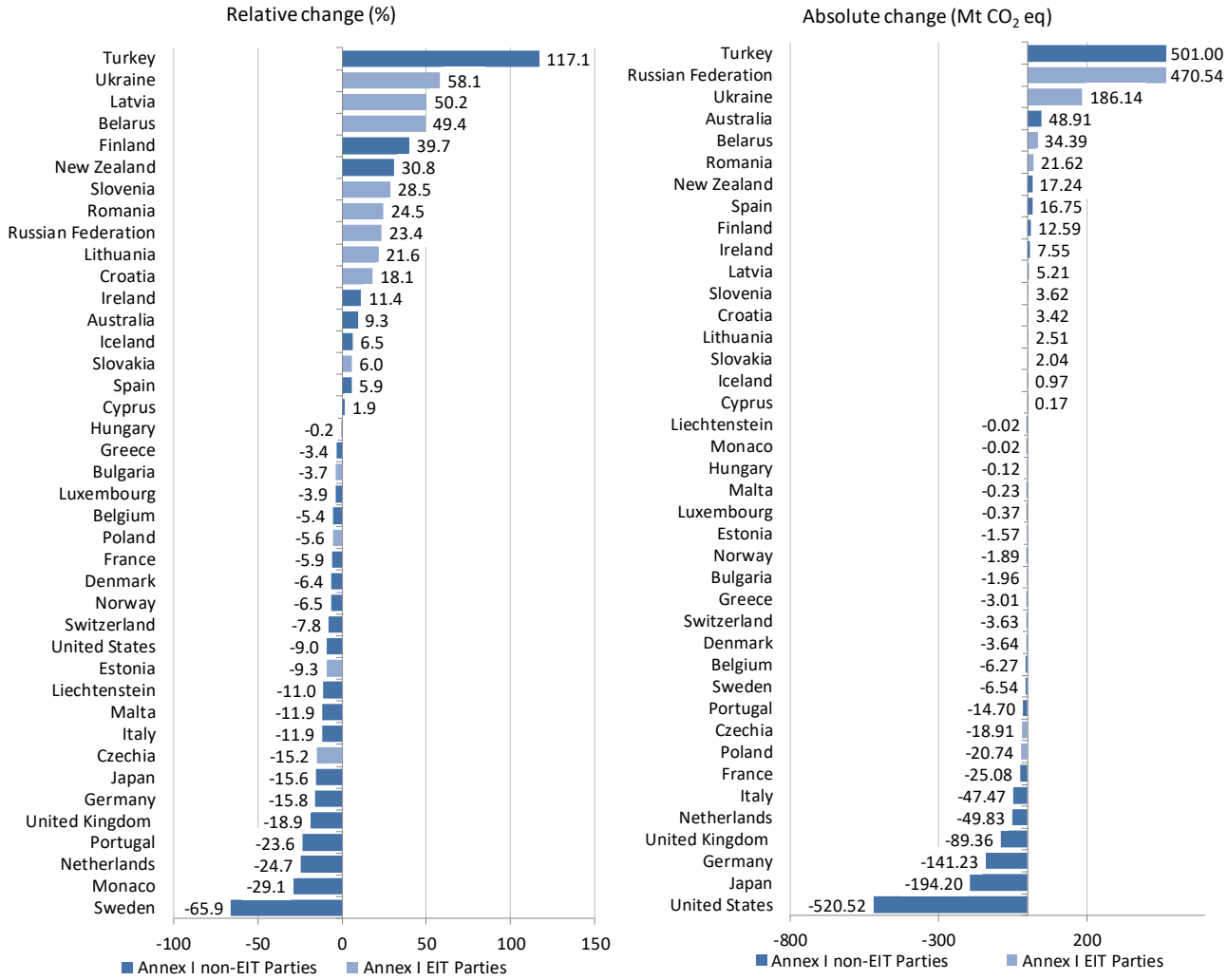


Figure 24

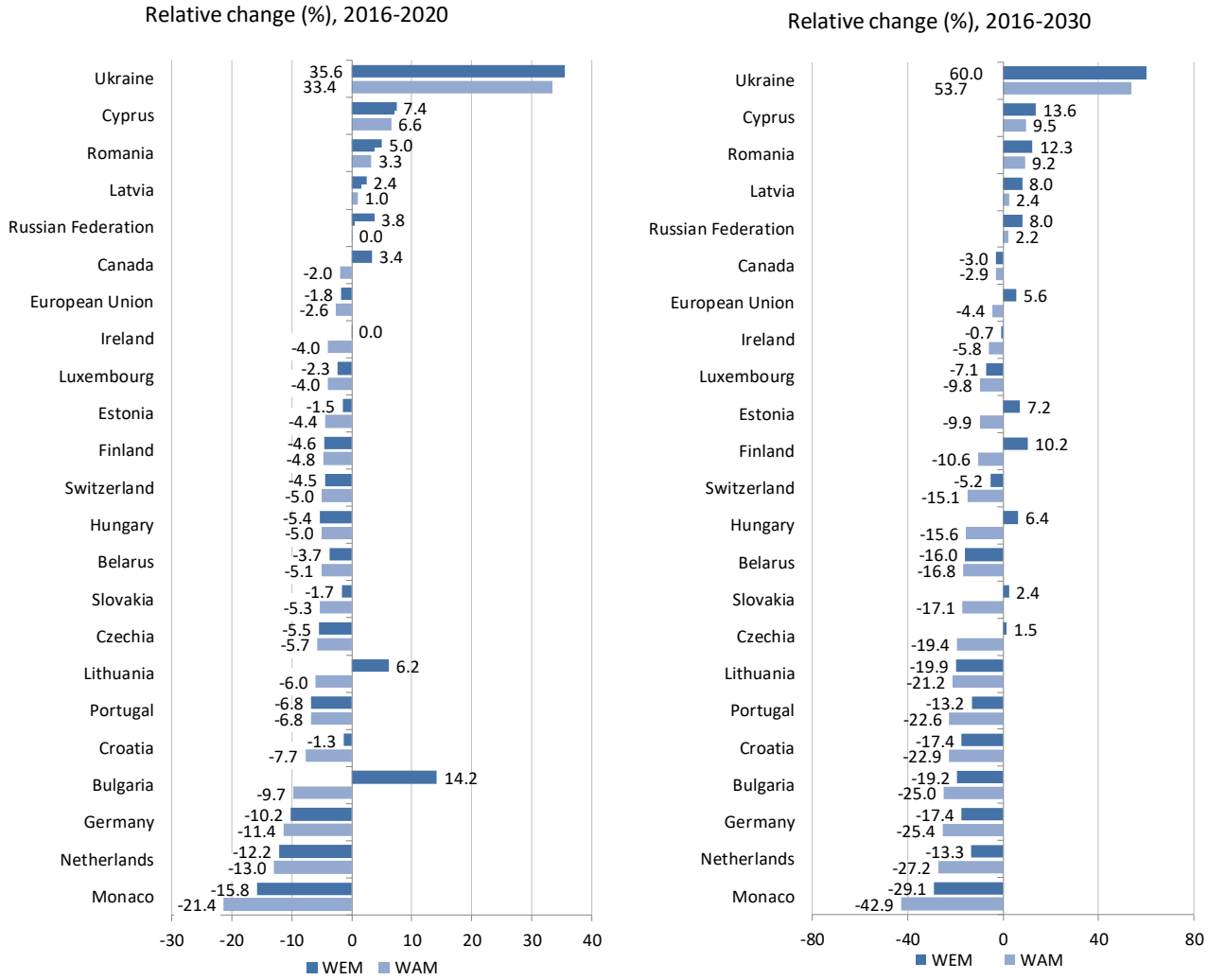
Projected changes in the total greenhouse gas emissions with land use, land-use change and forestry of individual Annex I Parties under the 'with measures' scenario by 2030 compared with the 2016 level



185. A total of 23 Parties provided projections of total GHG emissions without LULUCF under the WAM scenario. For both 2016–2020 and 2016–2030 the largest emission decrease is projected for Monaco (21.4 and 42.9 per cent, respectively) and the highest emission increase is projected for Ukraine (33.4 and 53.7 per cent, respectively).

Figure 25

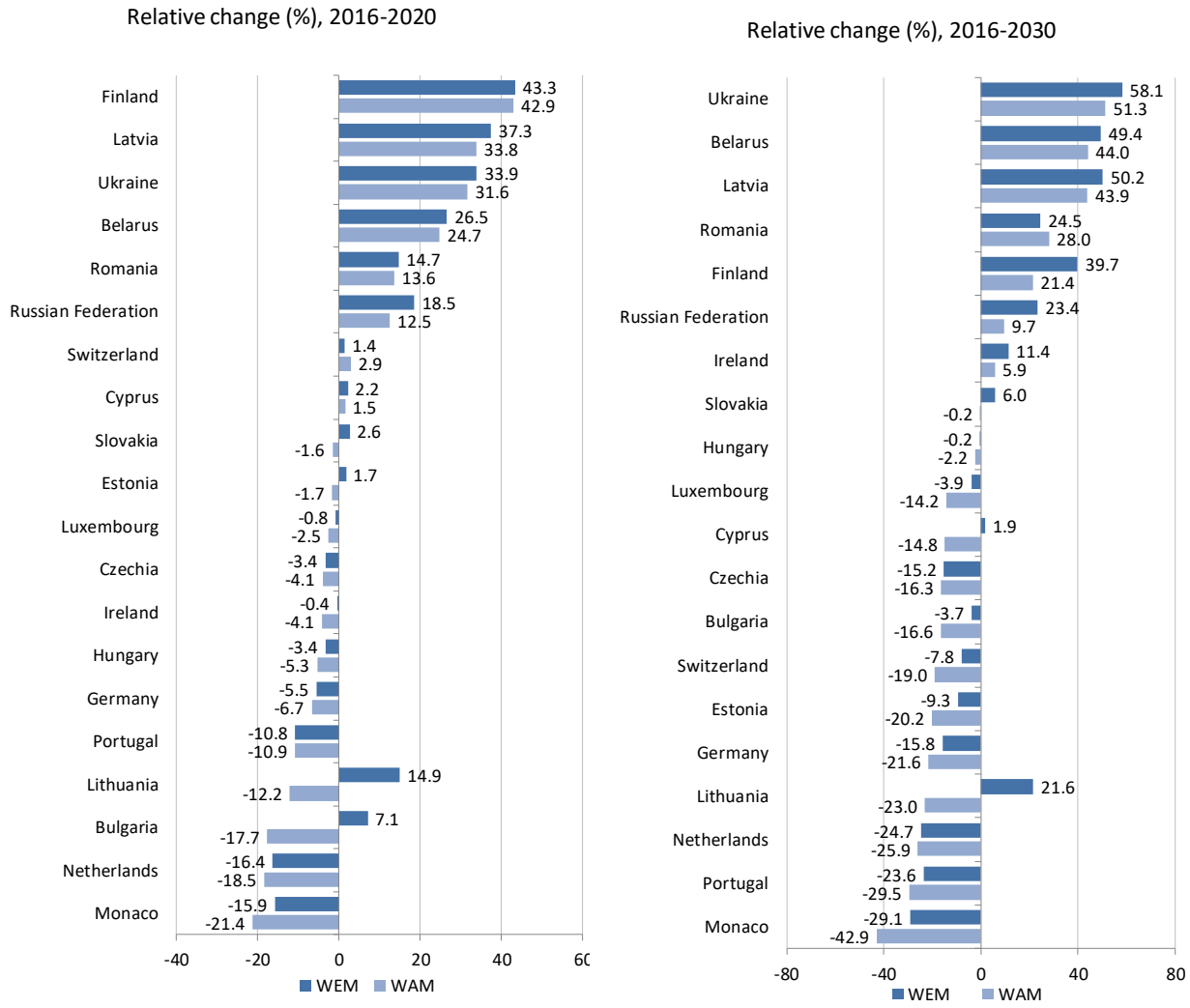
Projected changes in the total greenhouse gas emissions without land use, land-use change and forestry of individual Annex I Parties under the 'with additional measures' and 'with measures' scenario by 2020 and 2030 compared with the 2016 level



186. A total of 20 Parties reported projections of total GHG emissions with LULUCF under the WAM scenario. The changes ranged from a projected emission decrease of 21.4 per cent (Monaco) to a projected emission increase of 42.9 per cent (Finland) for the period 2016–2020, and from a projected emission decrease of 42.9 per cent (Monaco) to a projected emission increase of 51.3 per cent (Ukraine) for the period 2016–2030.

Figure 26

Projected changes in the greenhouse gas emissions with land use, land-use change and forestry of individual Annex I Parties under the 'with additional measures' and 'with measures' scenario by 2020 and 2030



V. Provision of financial, technological and capacity-building support to developing country Parties

A. Overview

187. The BR3s provide quantitative and qualitative information on the provision of financial, technological and capacity-building support to non-Annex I Parties. The UNFCCC reporting guidelines on BRs require Annex II Parties to report such information. Three CTF tables are of relevance: CTF table 7 for summary information on public support provided in a given year; CTF table 7(a) for information on public financial support contributed through multilateral channels in a given year; and CTF table 7(b) for information on public financial support contributed through bilateral, regional and other channels in a given year. Information on support provided for technology development and transfer is reported in CTF table 8, while CTF table 9 covers the provision of capacity-building support.

188. With regard to financial resources, in their BR3s Annex II Parties provided extensive quantitative and qualitative information in response to the reporting requirements. Most of the trends identified in the BR2s continued to manifest themselves in the BR3s. The information provided shows an increase in the provision of financial support from 2013–2014 to 2015–2016, with a particularly significant increase in climate-specific funding

channelled through bilateral, regional and other channels. This indicates the beginning of an urgently required shift away from carbon-intensive infrastructure investments towards low-emission and climate-resilient development. The share of public financial support provided through bilateral, regional and other channels in the total financial contributions has increased significantly. The largest share of the total climate-specific finance provided was dedicated to mitigation, followed by adaptation and cross-cutting activities. Annex I Parties provided incomplete information on the recipients of their climate finance, and fewer than half of the Annex II Parties provided information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties.

189. On technological support, almost all Annex II Parties, including a number of EIT Parties, provided information on steps taken to promote, facilitate and finance the transfer of, or access to, climate technologies for non-Annex I Parties. Parties continued to provide technology support to assist developing country Parties in reducing their GHG emissions; in particular for activities related to renewable energy technology and energy efficiency, such as smart-grid projects, solar home systems and hybrid biomass systems. Support was also provided for innovative technologies, such as low-carbon cement projects. Transfer of adaptation technology remains mostly targeted at adaptation planning and supporting disaster risk reduction. Soft technology transfer through cooperation programmes, low-emission programmes, regional gateways, innovation centres or feasibility studies constituted around 20 per cent of the reported technology transfer, with the projects often including significant training and capacity-building elements of technology transfer.

190. While there was a slight decrease in the number of capacity-building activities reported in the BR3s compared with in the BR2s, most Parties noted that capacity-building is an integral part of most cooperation projects undertaken with developing countries, in particular around technology transfer and financial support. Furthermore, there was an increase in the number of partnerships reported. While capacity-building activities focused on adaptation were more often reported than those for mitigation, new and emerging areas of capacity-building were also reported in the BR3s, including for REDD-plus,[22] readiness for and access to climate finance, NDCs and transparency. The institutional and systemic level of support for capacity-building is of particular importance in the pre-2020 period, when the capacity of developing countries to establish the institutional frameworks and policies needed to implement their NDCs and to develop an effective MRV system for the post-2020 period is being built.

191. Increasing finance, technology transfer and capacity-building support is being reported by EIT Parties not included in Annex II to the Convention. The nature of the reported support varies among EIT Parties, but includes financial support provided to developing countries and technology transfer and capacity-building support provided to other EIT Parties, by means of either partnerships or multilateral forums. It is encouraging to see such enhanced reporting by EIT Parties.

B. Climate finance

1. Introduction

192. The information provided by Annex II Parties on climate finance, including descriptions of the programmes, projects and initiatives supported and actions taken in the area of climate change, is summarized below. It addresses adaptation and mitigation activities supported by Annex II Parties through multilateral and bilateral channels, including support for clean energy, energy efficiency, forestry, sustainable agriculture, land use, transport, capacity-building, and biodiversity or REDD-plus. Of particular note is that 10 EIT Parties not included in Annex II to the Convention voluntarily provided information on climate finance in their BR3s.

[22] In decision 1/CP.16, paragraph 70, the COP encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks.

193. In general, Annex II Parties reported more qualitative information in their BR3s than in their BR2s or BR1s, particularly on methodological issues, definitions and climate-related private finance mobilized. Although fewer reporting issues than previously were identified in the BR3s, some persist, such as Annex II Parties continuing to use different methodological approaches to providing financial data. An overview of the information on climate finance reported in the BR3s can be found in annex III.

2. Overall trends in the provision of climate finance

194. Annex II Parties continued to report on their provision via multilateral and bilateral channels of financial resources for the implementation of the Convention, with increased funds provided in 2015–2016 in comparison with in the previous reporting period of 2013–2014. Most of the trends identified in the BR2s continued to manifest themselves in the BR3s:

(a) Most of the finance provided was reported as climate-specific support;

(b) Most of the climate-specific contributions were directed at mitigation activities;

(c) There was a significant increase in funding channelled through bilateral, regional and other channels;

(d) The predominant funding source was ODA;

(e) Grants were the main financial instrument used, followed by concessional and non-concessional loans, with equity being the least-used instrument.

195. The majority of the reported contributions through multilateral channels were identified as being core or general support. Overall, increased climate-specific financial support through multilateral channels was reported in the BR3s in comparison with in the BR2s. Of the contributions through multilateral channels, by far the largest portion of funding was provided, as previously, through multilateral financial institutions, including regional development banks. The previous compilation and synthesis report highlighted that the majority of contributions via multilateral channels were marked as provided. Most of the contributions via multilateral channels were reported as disbursed in the BR3s (see annex III for more information).

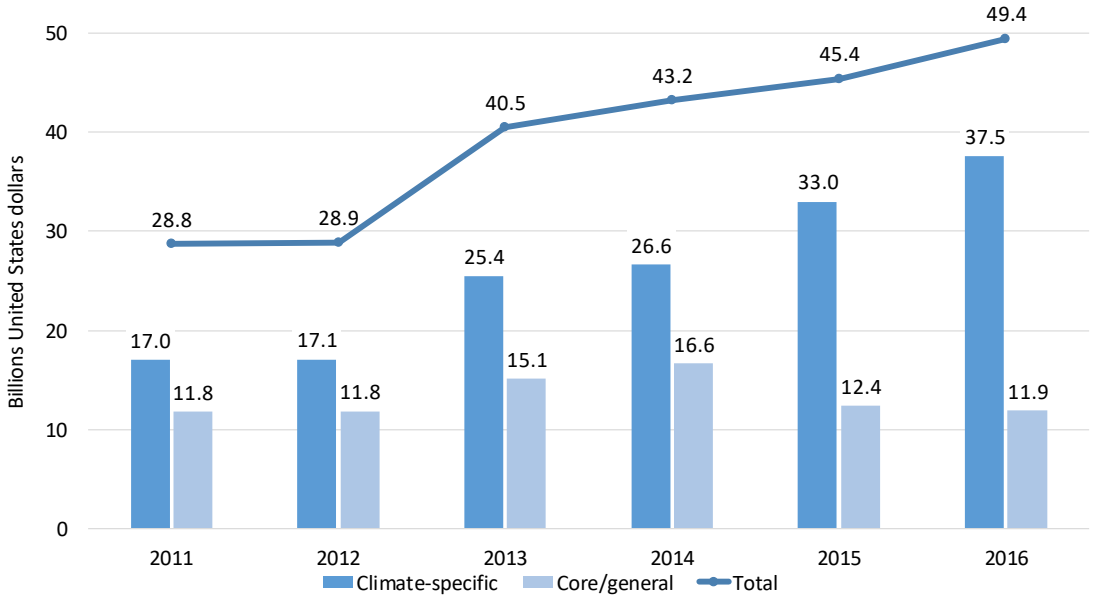
196. Annex II Parties continued to provide qualitative and quantitative information on their provision of financial support through bilateral, regional and other channels. Overall, the findings from the BR3s support the findings from the BR2s in terms of the significant increase in funding provided through bilateral, regional and other channels. The largest funding source was ODA, following the trend identified in the BR2s, with most of the contributions identified as being committed. With respect to the financial instruments used, grants were the main instrument used, closely followed by concessional loans and other instruments.

3. Scale of funding and trends by type of financial support

(a) Public financial support provided

197. Total financial support provided by Annex II Parties saw an increase of 13.3 per cent from 2013–2014 to 2015–2016, amounting to USD 49.4 billion in 2016. The BR3s show an overall increase in financial contributions since the BR2s, as shown in figure 27.

Figure 27
Financial contributions and their thematic distribution reported in biennial reports for 2011–2016



198. The total financial contributions reported in the CTF tables consist of climate-specific contributions (for mitigation or adaptation, cross-cutting or other) and core or general contributions. The largest share (around 74 per cent on average) of the total support provided by Parties in 2015–2016 was identified as climate-specific support, with the rest being core or general contributions.

199. Of the total climate-specific support reported in the BR3s, by far the largest amount of funding was dedicated to mitigation (65 per cent), followed by adaptation (14 per cent), cross-cutting (14 per cent) and other contributions (7 per cent).

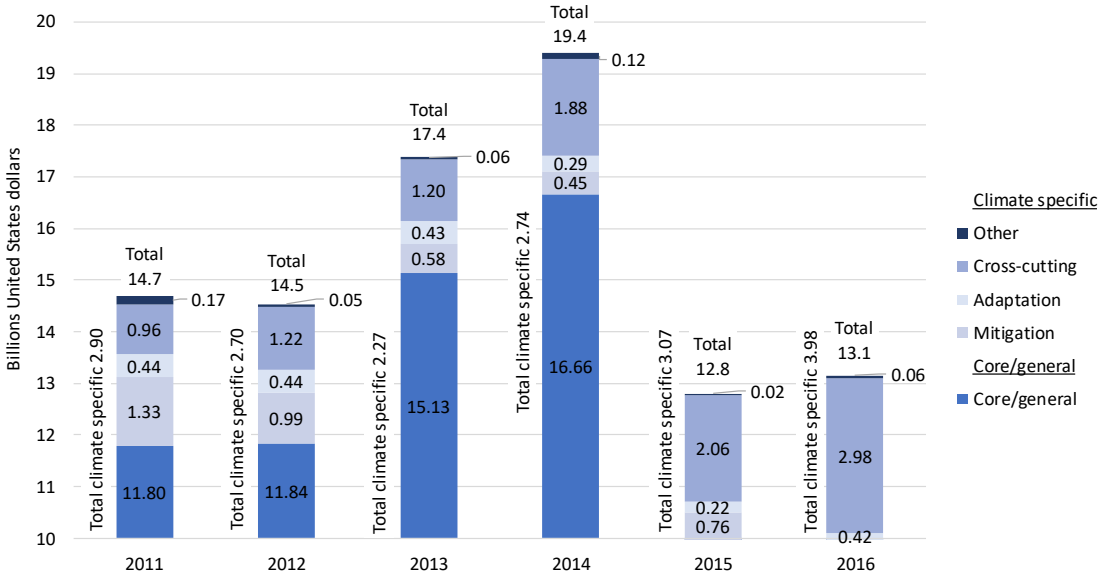
(b) Climate finance through multilateral channels

200. The total public financial contributions provided through multilateral channels slightly increased (by around 3 per cent) in 2015–2016. The total financial support provided through multilateral channels reported in the BR3s showed a significant decrease of more than 15 per cent in comparison with that reported in the BR2s. With regard to the distribution between core or general and climate-specific support, Parties reported that the climate-specific portion accounted for around 27 per cent of the total support provided through multilateral channels in 2015–2016. Slightly more climate-specific contributions were reported in the BR3s than in the BR2s; however, the core or general contributions had decreased by around 27 per cent for the first time since 2011–2012. The largest decrease (around 30 per cent) in core or general funding was recorded for 2014–2015, as shown in figure 28.

201. The largest portion of the climate-specific contributions reported in the BR3s was labelled as cross-cutting. In 2011–2015, this was followed by mitigation, adaptation and other activities; however, in 2016 the second largest contribution was for adaptation, followed by mitigation and other, as shown in figure 28.

Figure 28

Climate finance contributions through multilateral channels, by type of support, reported in the third biennial reports for 2011–2016



Note: The totals include climate-specific and core or general contributions through multilateral channels.

202. The largest portion of finance was provided to multilateral financial institutions in 2015–2016, notably through multilateral development banks, as previously. Among the financial institutions, the largest portion of funding was provided through the World Bank, although a decrease in core or general contributions was recorded. Funding provided to multilateral development banks slightly decreased in 2015–2016, with the African Development Bank receiving the largest amount of funding, followed by the Asian Development Bank and the Inter-American Development Bank. Funding for the International Finance Corporation also slightly decreased, as shown in table 6.

203. The financing of the operating entities of the Financial Mechanism followed previous trends, with the Global Environment Facility receiving the largest portion of funding, as shown in table 6. There was a significant increase in climate-specific funding provided to the Least Developed Countries Fund in 2015–2016, with Ireland in particular highlighting its consistent and long-term support for the Fund. The BR3s showed a slight increase in funding for the Adaptation Fund, but a decrease for the Special Climate Change Fund. Funding for the Green Climate Fund significantly increased in 2015–2016, contributing to the year-on-year increase in the amount of climate finance provided through multilateral climate change funds (see table 6).

204. The contributions to multilateral climate change funds increased on average by almost 50 per cent in 2015–2016. On the other hand, the contributions to multilateral financial institutions, including regional development banks, significantly decreased, by around 30 per cent on average. the BR3s showed a slight decrease, of around 4 per cent on average, in the contributions to specialized United Nations bodies.

Table 6

Financial contributions provided through multilateral channels as reported in the third biennial reports

(Millions of United States dollars)

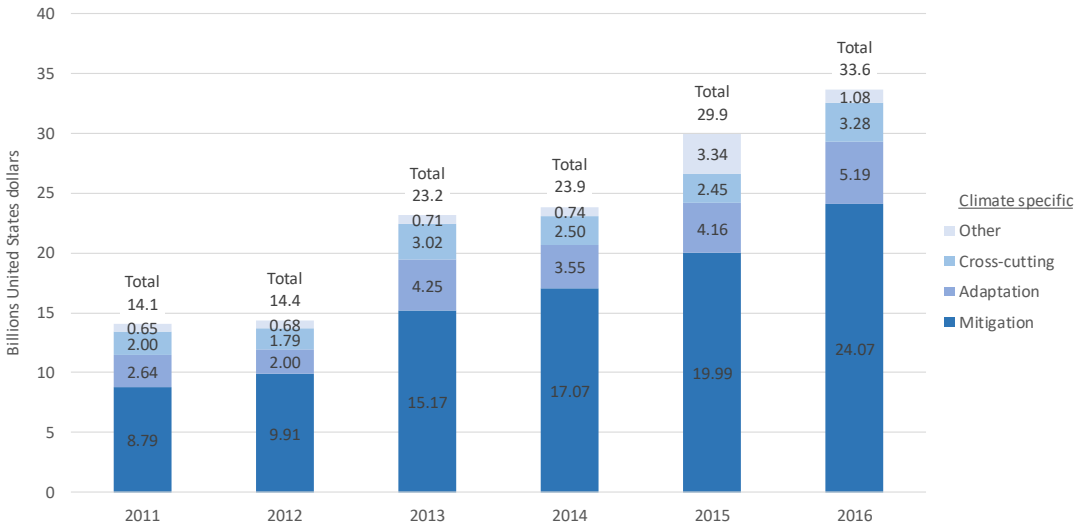
	2015		*2016*	
	Core/general	*Climate specific*	*Core/general*	*Climate specific*
Total contributions through multilateral channels	**9 732.58**	**3 065.25**	**9 171.11**	**3 985.21**
Multilateral climate change funds	**657.48**	**2 159.25**	**567.01**	**2 866.68**
1. Global Environment Facility	439.10	207.75	424.13	260.86
2. Least Developed Countries Fund	2.81	62.33	1.78	135.74

	2015		2016	
	Core/general	*Climate specific*	*Core/general*	*Climate specific*
3. Special Climate Change Fund	2.30	68.84	0.51	60.13
4. Adaptation Fund	0.00	67.36	0.00	89.45
5. Green Climate Fund	173.69	898.52	120.88	1 874.97
6. UNFCCC Trust Fund for Supplementary Activities	0.59	3.07	0.25	2.74
7. Other multilateral climate change funds	38.99	851.38	19.46	442.79
Multilateral financial institutions, including regional development banks	**7 571.26**	**680.06**	**7 199.44**	**830.06**
1. World Bank	3 764.82	331.84	3 318.75	374.42
2. International Finance Corporation	8.47	16.01	32.33	3.95
3. African Development Bank	829.69	53.96	804.92	54.79
4. Asian Development Bank	404.01	45.03	338.75	38.99
5. European Bank for Reconstruction and Development	5.16	1.49	9.95	3.64
6. Inter-American Development Bank	20.17	11.26	24.26	5.23
7. Other	2 538.93	220.47	2 670.47	349.03
Specialized United Nations bodies	**1 503.84**	**225.94**	**1 404.68**	**288.47**
1. United Nations Development Programme	551.42	39.09	484.48	54.77
2. United Nations Environment Programme	33.52	17.05	24.80	16.46
3. Other	918.90	169.80	895.40	217.24

(c) Climate finance through bilateral, regional and other channels

205. Contributions through bilateral, regional and other channels increased by around 12 per cent in 2015–2016. On average, the climate-specific support through those channels reported in the BR3s showed an almost 35 per cent increase compared with that reported in the BR2s, as shown in figure 29.

Figure 29
Climate finance contributions through bilateral, regional and other channels, by type of support, reported in the third biennial reports for 2011–2016



Note: The totals comprise climate-specific contributions through bilateral, regional and other channels and a small portion reported as core or general, but this figure only presents the climate-specific portions.

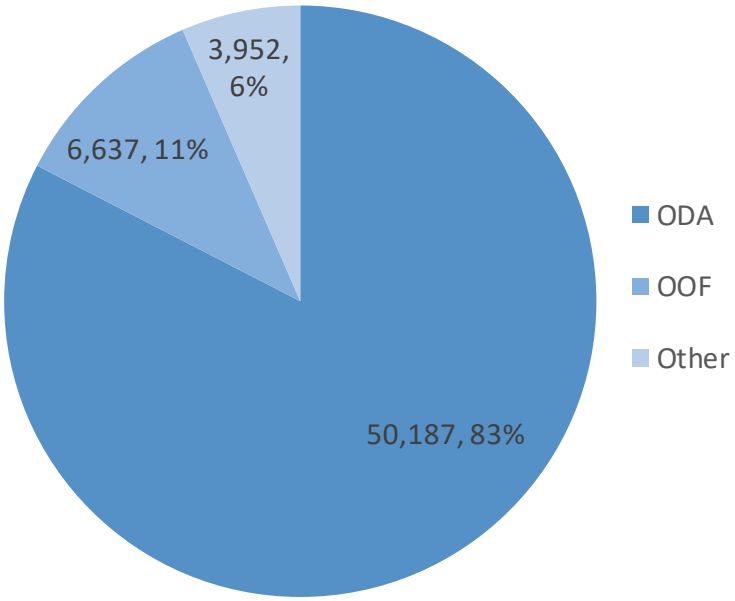
206. A significantly larger amount of funding was reported as committed in the BR3s than in the BR2s: on average, roughly 87 per cent was reported as committed and 13 per cent as disbursed[23] of the total funding provided through bilateral, regional and other channels.[24] Parties reported USD 23.9 billion (87 per cent) as committed and USD 3.52 billion (13 per cent) as disbursed in 2015.[25] For 2016, Parties reported USD 27.6 billion as committed and USD 4.1 billion as disbursed, representing the same shares as in 2015.[26]

207. The largest funding source via the same channels was ODA, which accounted for roughly 83 per cent of the total on average, following the trends identified in the BR1s and BR2s. The remaining 17 per cent was divided between OOF at 11 per cent and other funding sources at 6 per cent, as shown in figure 30. For 2015, Parties reported USD 23.5 billion (81 per cent) as ODA, USD 3.66 billion (12.5 per cent) as OOF and USD 1.9 billion (6.5 per cent) as from other funding sources. For 2016, Parties reported USD 26.7 billion (84 per cent) as ODA, USD 2.98 billion (9.5 per cent) as OOF and USD 2.05 billion (6.5 per cent) as other.

Figure 30

Climate finance contributions through bilateral, regional and other channels, by funding source, reported in the third biennial reports

(Millions of United States dollars and share of total contributions)



208. In terms of financial instruments, Parties reported the largest amount of funding as grants in the BR3s, accounting on average for almost 44 per cent of the total bilateral contributions, closely followed by concessional loans (40 per cent). The third largest (albeit significantly lower) amount of funding was provided via a financial instrument not listed in CTF table 7(b), accounting for around 9 per cent, followed by non-concessional loans at 6 per cent and equity at 1 per cent, as shown in figure 31. Grant contributions experienced the largest increase, of almost 41 per cent, in 2015–2016.

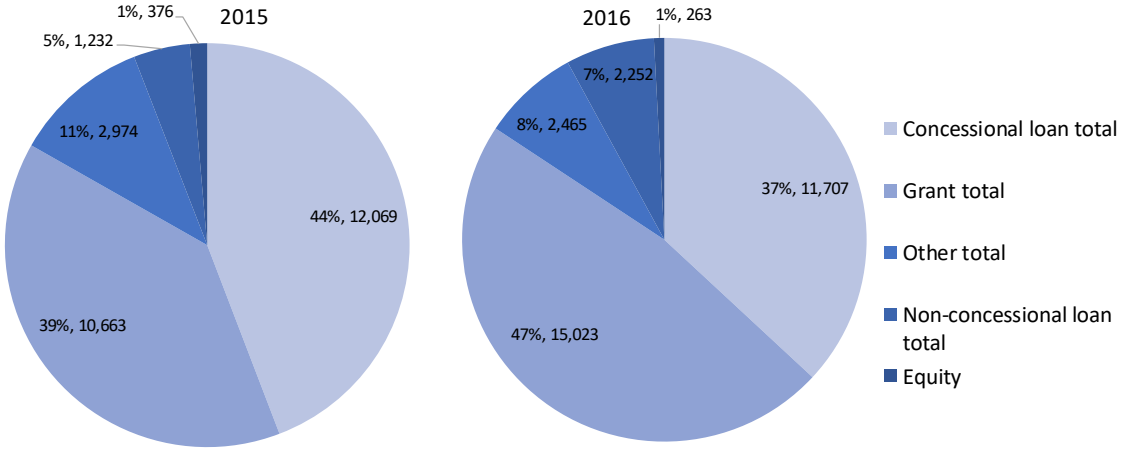
[23] Three Parties reported a total of USD 2.32 billion (around a 4 per cent share of the total bilateral contributions) as provided, which has been classified here as disbursed.

[24] One Party reported USD 11.23 billion (19 per cent of the total) as both committed and disbursed, which has been classified here as committed.

[25] One Party reported USD 465,000 of funding but did not specify its status, which accounts for the remaining 0.05 per cent.

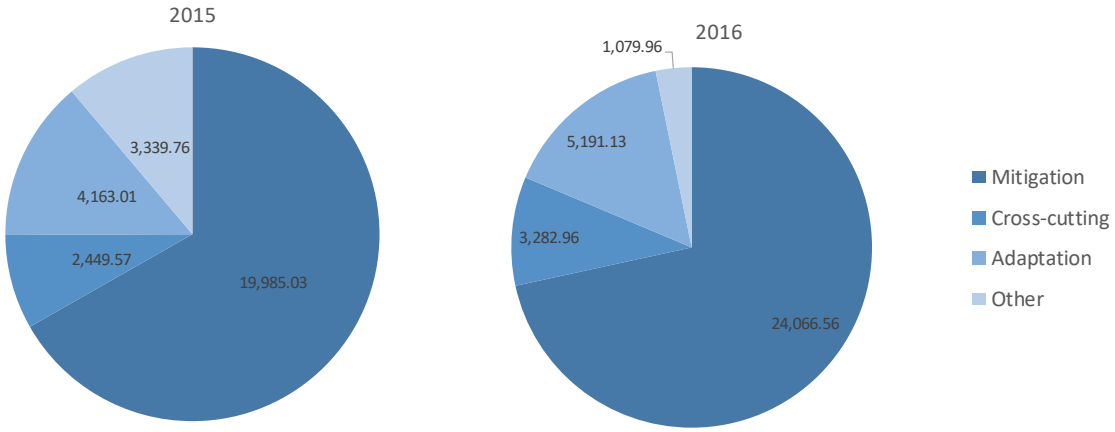
[26] One Party reported USD 1.3 million of funding but did not specify its status, which accounts for the remaining 0.5 per cent.

Figure 31
Climate finance contributions through bilateral, regional and other channels, by financial instrument, reported in the third biennial reports for 2015 and 2016
(Millions of United States dollars and share of total contributions)



209. The types of support provided via bilateral, regional and other channels in 2015 and 2016 followed the trend identified in the BR2s, as indicated in figure 32. The majority of funding was provided for mitigation, with an increase of 20 per cent in 2015–2016, followed by adaptation, with an increase of 25 per cent, and cross-cutting, with a clear increase of around 34 per cent.

Figure 32
Climate finance contributions through bilateral, regional and other channels, by type of support, reported in the third biennial reports for 2015 and 2016
(Millions of United States dollars)



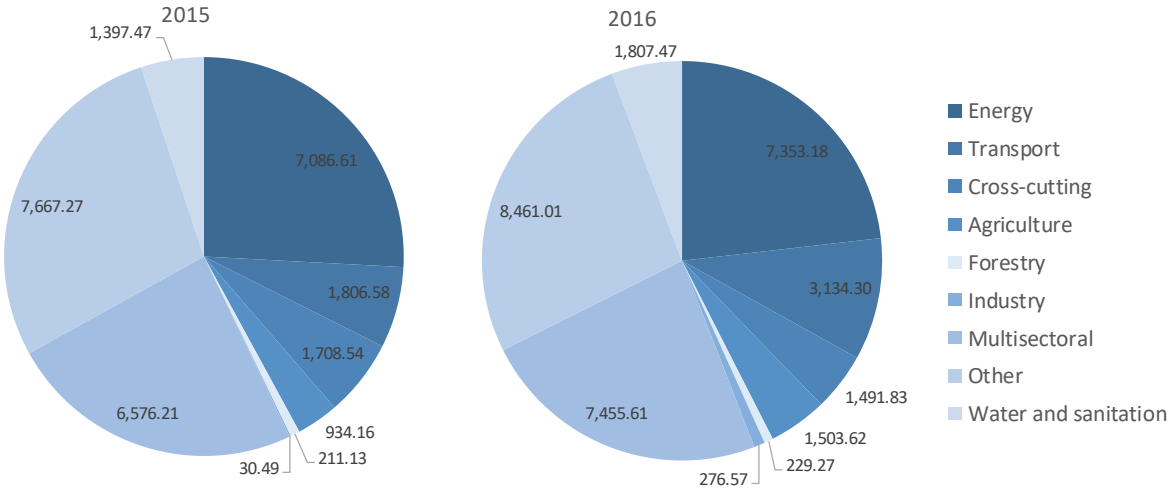
(d) Sectors

210. The presentation of the sectoral distribution of the climate finance provided is limited by reporting issues, such as differences in multisectoral data entries in the CTF tables. Nevertheless, some preliminary insights can be established. The information provided suggests that the largest amount of funding in 2015–2016 was provided to the energy sector, even though there has been a decreasing trend in the share of the energy sector of the total bilateral contributions since 2011. The second largest amount was dedicated to transport, which experienced a significant increase in funding in 2015–2016, followed by water and sanitation and cross-cutting, agriculture, forestry and industry, as shown in figure 33. However, the largest portion of funding was reported under other,[27] and, where more than

[27] Where data were not correctly submitted, the funding has been classified here as other.

one sector was allocated, the funding was classified as multisectoral as a single categorization was not possible.[28] Those two categories represent over 50 per cent of the total funding and so a large amount of the funding reported could not be categorized and included in the sectoral analysis.

Figure 33
Contributions through bilateral, regional and other channels in 2015 and 2016 by sector reported in third biennial reports
(Millions of United States dollars)



(e) Mitigation and adaptation needs of non-Annex I Parties

211. Many Parties highlighted the need to follow a country-driven approach (implying programming based on country needs) and to promote national ownership in providing climate finance to developing country Parties. Other needs highlighted related to the provision of capacity-building support and the strengthening of national planning capacities, processes and institutions, the development and dissemination of climate adaptation planning and strategies, and increased access to clean technologies and innovation in the field of adaptation. A few Parties specifically mentioned their focus on responding to developing country Parties' needs as reflected in their NDCs, NAPs and other development plans. Box 4 presents examples of activities for financing mitigation and adaptation drawn from the BR3s.

212. A few Parties mentioned that all activities of multilateral institutions are endorsed by the recipient countries, for instance via board-level decision-making processes, to ensure that the resources provided effectively address the needs and priorities of non-Annex I Parties. It was indicated that some multilateral institutions have initiated a better integration and alignment of their portfolios with the NDCs of developing country Parties. In this context, the more detailed and precise the NDC is, the better and more easily it can be aligned with the finance portfolio.

213. Many Parties highlighted the need to integrate climate change policies and considerations into external and bilateral relations, and the development of cooperation strategies and programmes, particularly with regard to engaging in new areas of work, such as combined adaptation and disaster risk reduction efforts, as well as the need to integrate gender considerations into climate finance.

[28] Three Parties for 2015 and two Parties for 2016 did not provide a sectoral classification of the smaller part of their contributions.

Box 4
Examples of activities for financing mitigation or adaptation reported in the third biennial reports

The Swiss State Secretariat for Economic Affairs has implemented a **Pilot Auction Facility for Methane and Climate Change Mitigation** to demonstrate a new pay-for-performance mechanism that delivers financing, in the form of a price guarantee, to projects that combat climate change. The mechanism takes advantage of existing tools and experience developed at the multilateral level under the clean development mechanism and related carbon markets.

The **International Partnership for Blue Carbon** was announced by Australia at the United Nations Climate Change Conference in Paris in 2015. The Partnership brings together governments, non-governmental organizations and research institutes working to enhance the protection and restoration of coastal blue carbon ecosystems – mangroves, tidal marshes and seagrasses. Protecting and restoring these ecosystems contributes to mitigation, increases coastal resilience and protection against storm surges, and delivers a range of co-benefits related to food security, fisheries and sustainable livelihoods. In November 2017, the Australian Government announced a 6 million Australian dollar initiative to support efforts to protect and manage coastal blue carbon ecosystems in the Pacific. The initiative aims to strengthen expertise and data on blue carbon in the Pacific, support its integration into national GHG emission accounting and climate policy, and encourage relevant public and private sector investment.

The **New Seed Initiative for Maize in Southern Africa**, funded by the Swiss Agency for Development Cooperation, was launched to conduct research into drought-tolerant maize varieties that can yield greater harvests than conventional varieties, even in less fertile soil. The ultimate aim is to achieve greater food security. At the same time, its activities involve cooperation with government and private sector stakeholders in the maize sector to encourage seed production and trade (also for small-scale producers). Maize is one of the main staple foods in Southern Africa, used by 70 per cent of the population to cover its food requirements. However, drought and poor soil often result in crop loss or even crop failure. The initiative is designed to give poor farmers access to drought-tolerant seeds that are resistant to certain diseases and have a certain tolerance to nutrient depletion.

The **United Kingdom's** 26 million pounds sterling **Climate High-Level Investment Programme in Ethiopia** has so far supported more than 1.4 million people in coping with the effects of climate change, while building the institutional capacity to ensure that the Ethiopian Government is capable of assessing and addressing climate risks.

The **Canada–Honduras Value-Added Agroforestry Project**, which is promoting sustainable agricultural practices in Honduras, is particularly associated with coffee production, a market important to the Honduran economy. Canada is supporting Honduras by implementing diversified agroforestry systems and taking measures to improve soil stability so that crops will be more resistant to extreme climatic conditions, such as drought. Focusing on vulnerable regions and low-income farmers, the project is expected to directly improve the standard of living of 9,000 beneficiaries, of which 4,000 are women.

(f) Climate-related private finance mobilized

214. Fewer than half of Annex II Parties provided quantitative information, to varying degrees, on private climate finance mobilized.[29] Since there are no specific parameters for reporting such information, Parties provided information for different timelines, in different currencies (local and/or United States dollars) and using different definitions and methodologies. Many Annex II Parties recognized the voluntary nature of the reporting. Of the 13 Annex II Parties that reported on private finance, 4 provided biennial information and 4 provided annual information only for 2015 or 2016. One Party provided aggregated

[29] For Parties that did not provide information in United States dollars, the financial data provided in national currency were converted using exchange rates from the data set of financial indicators of the OECD for the relevant years.

information for 2015–2016, accounting for USD 3.8 billion. Another Party restated the information included in its BR2, indicating rough yearly estimates in the range of USD 0.5–1.8 billion. Two Parties stated that the reported amount had been mobilized "to date". Lastly, one Party reported having mobilized around USD 2.5 billion in private finance in the period 2014–2017.

215. The amounts of climate-related private finance reported in the BR3s are presented in table 7. Since the amounts were derived using different definitions and methodologies, it is not possible to aggregate them. Box 5 presents examples of private finance mobilized through public interventions drawn from the BR3s.

Box 5
Examples of private finance mobilized through public interventions reported in the third biennial reports

In 2016, **Export Credit Norway** provided a loan guaranteed by the Norwegian Export Credit Guarantee Agency of USD 51.3 million to support **a solar power plant project in Honduras**. The total project investment amounted to USD 124.5 million. Scatec Solar, Norfund and the local partner PEMSA, an energy company, provided equity to the project. Loans were also provided by the Inter-American Investment Corporation. Scatec Solar, PEMSA and partly the Inter-American Investment Corporation were private contributors.

In 2016, **KLP Norfund Investments** and other contributors provided funds for **d.light**, the leading provider of off-grid solar solutions, which has a commanding market share in emerging markets, with a focus on Africa and Asia. In 2016, d.light secured USD 13 million to expand its operations: USD 5 million in equity from new investor KLP Norfund, USD 5.5 million in grant funding from Beyond the Grid and Shell Foundation, and USD 2.5 million in debt from SunFunder. KLP Norfund, SunFunder and partly Beyond the Grid and Shell Foundation were private contributors.

The United Kingdom has invested 20 million pounds sterling in **the eco.business Fund**, a public–private partnership currently operating in Costa Rica, Ecuador, El Salvador and Nicaragua. The Fund promotes business and consumption practices that contribute to biodiversity conservation and the sustainable use of natural resources. By leveraging and de-risking investment from private sector donors, the Fund will protect around 32,500 ha biodiverse forest and save 280,000 t CO_2. Within five years, public sector finance in the eco.business Fund is projected to reach USD 147 million, bringing in private sector funding of USD 314 million.

In 2016, through the International Finance Corporation–Canada Climate Change Program, **Canada** invested USD 7.5 million in the installation of rooftop solar photovoltaic panels and the implementation of green building measures at a chain of 18 supermarkets in **Sri Lanka**. This is the first solar photovoltaic and green building project in the retail sector. Canada's loan provided the long-term financing needed for this type of investment to be successful, mobilizing over USD 12 million from other public and private sources. The panels will produce 30–50 per cent of the energy consumed by the supermarkets, avoiding an estimated 2,300 t GHG emissions per year. The project is also demonstrating the financial success of rooftop solar photovoltaics for commercial initiatives in Sri Lanka, helping to encourage similar investments in the future.

Table 7
Climate-related private finance mobilized as reported in third biennial reports

Party	*Amount (USD million)*	*Year or period*	*Provider*
Belgium	156	2014–2017	Direct and indirect investments through renewable energy funds
Canada	1 700	To date	Co-financed by multilateral development banks and other public sources
Denmark	0.193/0.220	2015/2016	Provided through equity capital and investment vehicles

Party	*Amount (USD million)*	*Year or period*	*Provider*
Finland	500–1 800	Yearly since 2013	Not specified
France	767/1 130	2015/2016	Bilateral public funding provided by the French Development Agency
Germany	396	2015	KfW Development Bank
Japan	3 800	2015 and 2016	Private finance leveraged
Netherlands	81/189	2015/2016	Mobilized through co-financing
Norway	97	2016	Norfund, through equity and loans
Spain	458/580	2015/2016	Private finance leveraged through bilateral channels
Sweden	804	2016	Sida, through guarantees
Switzerland	8.5	2016	Private finance leveraged through bilateral channels
United Kingdom	644	2016	United Kingdom International Climate Finance direct investment

C. Technology transfer

216. Developing and transferring technologies to support national action on climate change has been an essential element of the UNFCCC process since the beginning. There are climate technologies that contribute to both reducing GHG emissions as well as adapting to the adverse effects of climate change. There are also soft technologies that support training and capacity-building in using climate technologies.

217. All Annex II Parties provided information in their BR3s on steps taken to promote, facilitate and finance the transfer of, or access to, climate technologies and know-how for developing countries. This reporting contributed to communicating their efforts to meet their commitments under Article 4, paragraph 5, of the Convention. Most Annex II Parties completed CTF table 8, included a section on technology in their BR3s and provided descriptions of the technology activities that they have supported in developing countries.

218. More than half of Annex II Parties noted challenges in reporting on technology activities. They highlighted an overlap with the reporting of climate finance and capacity-building activities and described the absence of indicators for identifying and measuring technology activities within climate-relevant projects. Owing to those challenges, Parties did not report on all their technology transfer activities and there may be gaps in the reported total support provided to developing countries.

1. New trends in support for technology transfer

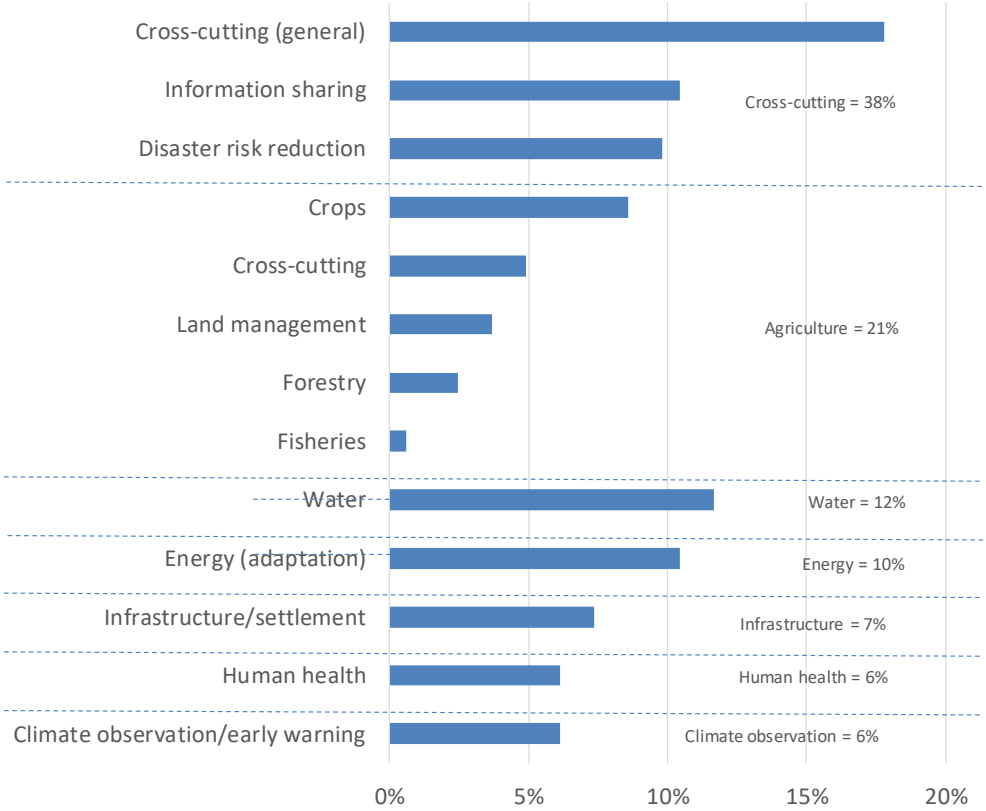
219. In the BR3s, 22 Annex II Parties completed CTF table 8, informing on support provided to developing countries for more than 300 technology transfer activities, a similar number of activities to that reported in the BR2s. Many Annex II Parties stated that the reported activities were examples of their efforts and did not represent their total support provided to developing countries. Most of the reported technology activities had been implemented, with about 25 per cent planned or under implementation.

220. Furthermore, while the requirement is for Annex II Parties to provide details on their provision of technological support, a number of EIT Parties also provided information on technology transfer to non-Annex I Parties and other Eastern and Central European countries. Lithuania provided financial support in 2016 for installing solar power plants with 141 kW capacity at six schools and kindergartens in remote areas of Georgia. Czechia outlined in CTF table 7(b) its financial support for both adaptation and mitigation projects that involve technology transfer. Hungary and Poland are both involved in water management,

Kazakhstan has focused on the international Green Bridge Partnership Programme and Latvia participates in the Eastern Europe Energy Efficiency and Environment Partnership Fund. Furthermore, a number of EIT Parties, such as Croatia, highlighted that they are planning to provide financial, technological and capacity-building support to non-Annex I Parties in the future. It is often through partnerships with and programmes in other EIT countries that EIT Parties provide support for technology transfer, such as the Poland–Ukraine and Lithuania–Georgia partnerships.

221. The number of adaptation technology activities supported as a percentage of all reported activities remained similar to that reported in the BR2s (approximately 35 per cent) (see figure 34). More than 33 per cent of activities related to technologies that cut across adaptation sectors, such as those for sharing information on adaptation planning and disaster risk reduction. For example, Japan is providing adaptation support through a project that aims to strengthen local capacity for disaster risk reduction in the Mekong Delta region of Viet Nam. Technology activities for adaptation in the agriculture sector continued to be commonly reported: the Netherlands supported Ethiopia in developing its seed sector; Portugal supported Guinea-Bissau in developing more resilient rice crops; and New Zealand provided support to Papua New Guinea's farmers to increase their understanding and use of farming methods and alternative climate-resistant crop varieties.

Figure 34
Adaptation technology transfer activities reported by Annex II Parties in their third biennial reports

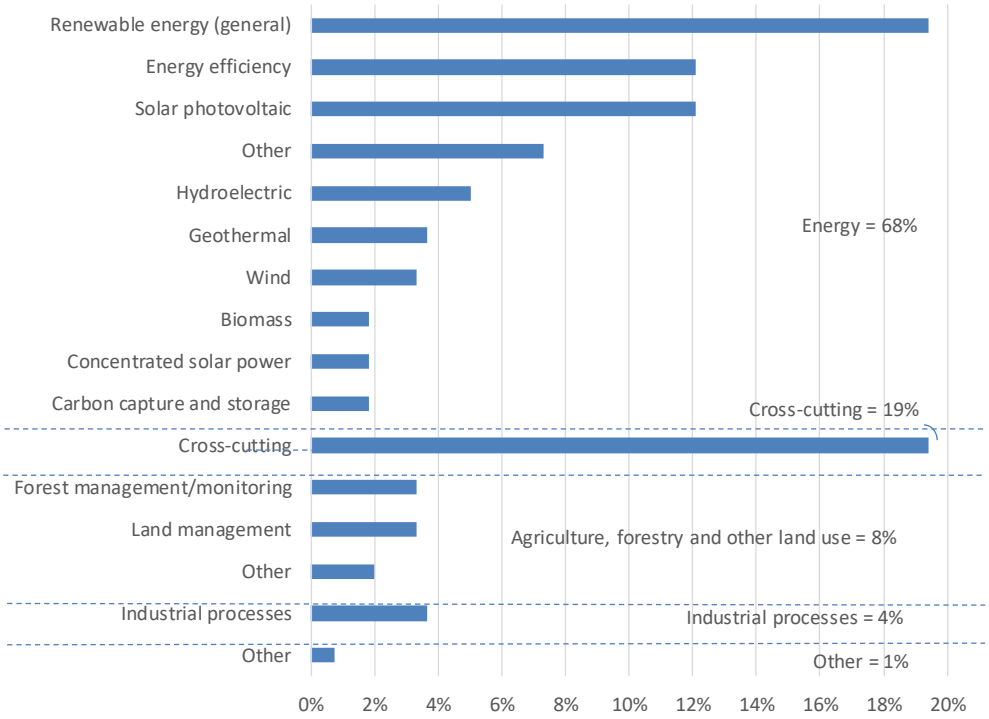


222. Similar to in the BR2s, the technology support reported in the BR3s focused mainly on helping non-Annex I Parties to mitigate GHG emissions (see figure 36). Approximately 65 per cent of the activities were focused on the energy sector, many for renewable energy and energy efficiency technologies. The technology activities covered the full spectrum of mitigation technologies, ranging from global smart-grid projects, to solar home systems in Vanuatu, to hybrid biomass systems in Cuba and low-carbon cement projects.

223. The next largest category of projects addressed cross-cutting issues (almost 20 per cent of the projects). Cross-cutting projects targeted soft technology transfer through cooperation programmes, low-emission programmes, regional gateways for technology transfer, support for innovation centres and feasibility studies. The EU Horizon 2020

programme is an example, where the focus is on research and innovation through cooperation between countries, often in the form of public–private partnerships. Only a small number of projects were reported to relate to transport, industrial processes, forestry, or water and sanitation.

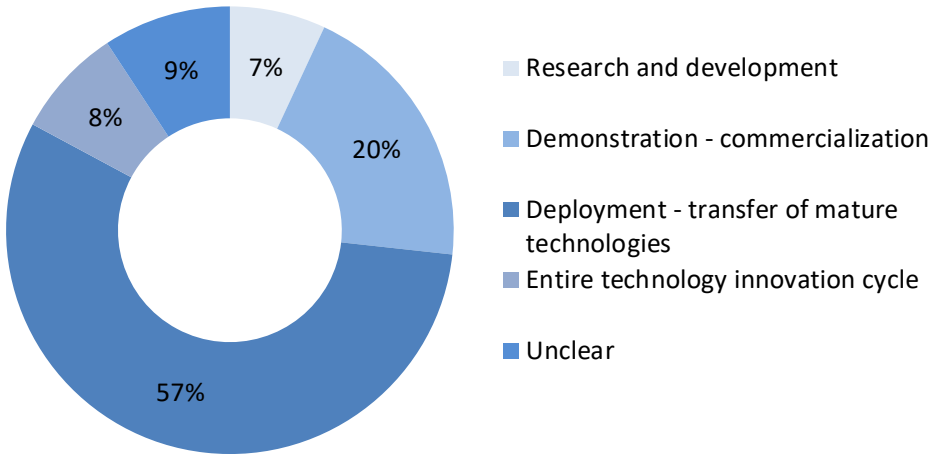
Figure 35
Mitigation technology transfer activities reported by Annex II Parties in their third biennial reports



224. The technology cycle is often defined as the research and development, demonstration, deployment, diffusion and transfer of technology. The technology activities reported in the BR3s predominantly related to the later stages of the technology cycle, reflecting a similar pattern to that observed in the BR1s and BR2s. As shown in figure 36, more than half of all reported technology activities were for transferring mature climate technologies.

225. Most of the reported projects focused on soft technologies, such as supporting energy-efficient labelling in the Pacific Islands. Almost 40 per cent of the projects focused on transferring hard technologies, but they often included soft technologies such as training or capacity-building as part of the technology transfer. Examples of such projects include Italy's transfer of small hydroelectric plants to the Plurinational State of Bolivia, and Belgium's support for the installation of a solar photovoltaic system in the Democratic Republic of the Congo. Norway's Clean Energy for Development initiative supports the development of low-carbon and energy-sector strategies and is frequently supplemented by institutional and human resource development measures that improve the technological expertise of the recipient country (e.g. support for Hydro Lab in Nepal).

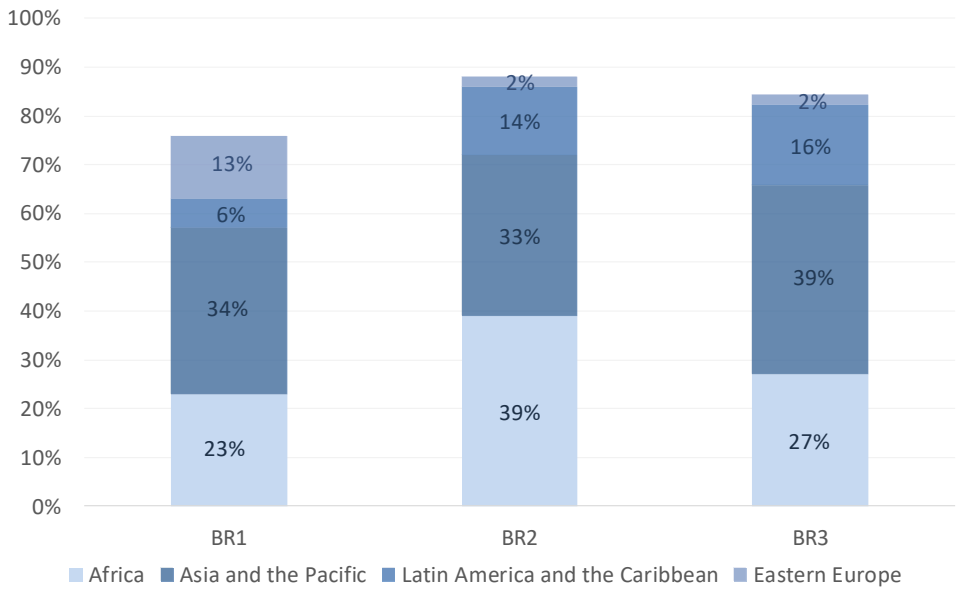
Figure 36
Distribution by stage of the technology cycle of technology transfer activities reported by Annex II Parties in their third biennial reports



2. Recipients of reported technology transfer

226. The Asia-Pacific region benefited from the most reported technology transfer, which reflects a new trend since the BR2s, when it was the case for Africa (see figure 37). Almost 40 per cent of projects covered the Asia-Pacific region, representing the highest quantity of technology transfer that it has received as reported in the BRs. As reported in the BR3s, more than 45 per cent of projects covered the least developed countries and more than 45 per cent the small island developing States. There has been a decrease in reported technology transfer to Eastern European countries and an increase in reported technology transfer to Latin American countries, but this comes with the caveat that many Parties only provided a sample list of supported technology transfer activities in their BR3s.

Figure 37
Distribution by region of technology transfer activities reported by Annex II Parties in their biennial reports



3. Implementation channels

227. Annex II Parties reported on three different levels of cooperation in supporting technology activities. About half of the activities were undertaken through bilateral cooperation, often as part of ODA. Of the remaining reported projects, almost 25 per cent were regional and 25 per cent multilateral. Most of the multilateral activities focused on soft

technologies, such as support provided to the International Renewable Energy Agency for developing policies that incentivize the use of renewable energy technologies, and to the Private Financing Advisory Network, which helps to mobilize private finance for renewable energy and energy efficiency projects in sub-Saharan Africa. The Energy Efficiency Promotion Programme in Latin America and the Caribbean is another example of supporting soft technology transfer. Box 6 presents examples of bilateral, regional and multilateral technology transfer projects drawn from the BR3s.

228. While most projects continued to be funded by public sources, the reporting showed an increase since the BR2s in projects funded by a combination of public and private funding. Regarding the actors implementing the activities, public entities implemented over half of the projects; joint public–private initiatives implemented more than 30 per cent of the reported activities; and a few projects implemented by the private sector were reported.

Box 6
Examples of bilateral, regional and multilateral technology transfer projects reported in the third biennial reports

New Zealand supported Kiribati in increasing its resilience to drought events resulting from climate change. The Kiribati Water and Sanitation 2015–2020 project provided community rainwater harvesting systems, improved South Tarawa's reticulated water supply and sewerage systems, and scoped possible investment in desalination. Key factors for success included country ownership, alignment with Kiribati's national strategies and priorities, a results-based approach, and transparency of support and action.

Iceland, in cooperation with the World Bank and the Nordic Development Fund, is assisting 13 **East African countries** (Burundi, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Uganda, United Republic of Tanzania and Zambia) **in conducting geothermal exploration** and building the capacity to utilize geothermal energy. The project aims to help the countries to develop a realistic assessment of potential geothermal sites; possible plans for further action, where applicable; and the capacity to move forward on the plans and to submit exploration drilling projects for funding.

Canada, Denmark, France, Hungary, Norway and Switzerland reported on providing **support to the Climate Technology Centre and Network** in their BR3s. The Climate Technology Centre and Network is the implementation arm of the Technology Mechanism, helping developing countries to scale up and speed up the development and transfer of climate technologies. It has three core services: providing technical assistance at the request of developing countries; fostering collaboration and access to information on climate technologies; and strengthening networks, partnerships and capacity-building. The United Nations Environment Programme, in collaboration with the United Nations Industrial Development Organization, hosts the Climate Technology Centre and Network, with the support of 11 partner institutions. As at mid-2018, the Climate Technology Centre and Network was responding to over 130 requests from developing countries on climate technology issues (further information is available at www.ctc-n.org).

D. Capacity-building

1. Overview

229. The importance of building the capacity of countries to effectively address climate change has long been recognized by Parties through the Convention, the Kyoto Protocol and most recently the Paris Agreement. There are capacity-building frameworks to support developing country and EIT Parties in implementing the provisions of the Convention.

230. Annex II Parties are required to provide information in their BRs on capacity-building activities and the associated support provided to non-Annex I Parties. Parties report on capacity-building support both qualitatively in the BRs and quantitatively in CTF table 9. While the reporting requirement applies to Annex II Parties, a number of EIT Parties also report on providing support to other EIT Parties or developing countries for capacity-building activities.

231. The Paris Agreement has led to a stronger international focus on capacity-building, including providing the institutional and systemic level of support needed for developing countries to establish the frameworks and policies needed to implement their NDCs and develop an effective MRV system. The BR3s show that the pre-2020 period is essential for building capacity for transparency-related activities by providing support for international programmes and partnerships such as the Initiative for Climate Action Transparency, the NDC Partnership and the Capacity-building Initiative for Transparency.

232. Parties noted in their BR3s that capacity-building is an integral component of most cooperation projects and can therefore not be categorized or reported separately. In this context, the lack of an internationally agreed approach to tracking capacity-building through ODA quantitatively was noted.

233. In general, the information contained in the BR3s suggests that most activities implemented through ODA include capacity-building elements, components or approaches. Accordingly, many Parties pointed out that the activities reported in CTF table 9 or in the dedicated section on capacity-building in the BR3 represented only a selection of capacity-building activities supported by them. Thus, identifying clear trends and patterns in capacity-building activities from the previous reporting period to the current one is not straightforward.

2. Overview of and trends in capacity-building projects reported in third biennial reports

234. A total of 387 capacity-building activities were reported in the BR3s (in CTF table 9 only), which represents a slight decrease compared with the 400 activities reported in the BR2s. Figure 38 illustrates the distribution of the capacity-building activities reported in support of adaptation, mitigation, technology transfer and development, and multiple areas in the BR1s, BR2s and BR3s. An increased proportion of capacity-building activities for technology transfer was reported in the BR3s, owing probably to the decrease in the reporting of capacity-building activities for mitigation and adaptation.

235. Some EIT Parties, namely Kazakhstan, Latvia, Poland, the Russian Federation and Slovakia, reported on providing support for capacity-building activities in CTF table 9, and a number of EIT Parties provided qualitative information on their provision of capacity-building support (see box 7).

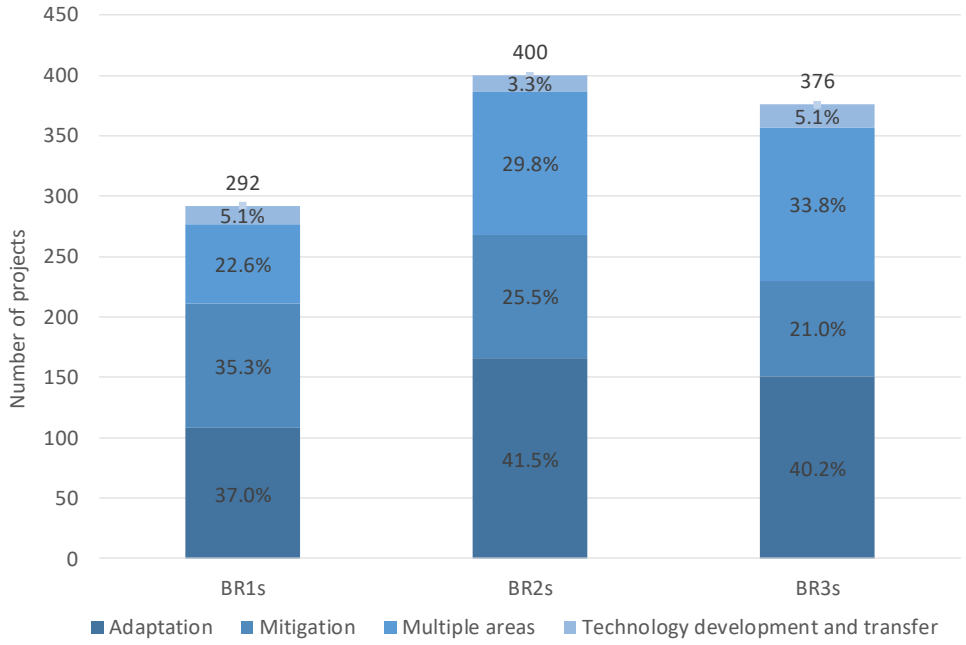
Box 7

Examples of capacity-building support provided by Parties with economies in transition

While the requirement is for Annex II Parties to report on their provision of capacity-building support, EIT Parties are also regularly reporting thereon. Almost all EIT Parties provided examples in their BR3s of their capacity-building support projects either in developing countries or in Eastern and Central European countries.

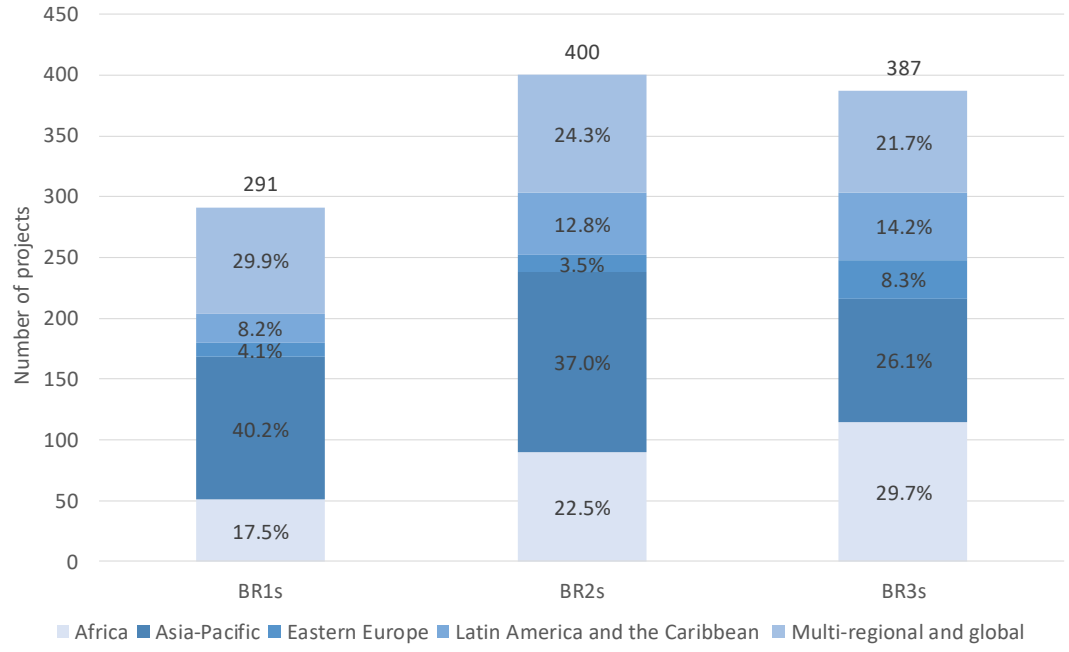
Bulgaria supported a capacity-building project in the former Yugoslav Republic of Macedonia on MRV systems for GHG inventories and emissions trading. Croatia is involved in a programme for transferring knowledge and experience in the field of environment and climate between countries in the region. Czechia provides financial assistance to bilateral projects that have capacity-building elements. Kazakhstan, with support from the United Nations Development Programme, has launched training to transfer knowledge on resource-saving for agriculture in African countries. The EU twinning project Strengthening Sustainable Management of Forests in Georgia will be implemented by a Lithuanian and Hungarian consortium. Latvia has a cooperation project with Urgench State University in Uzbekistan to educate and train staff and students in sustainable environmental engineering, particularly on alternative energy resources, waste-free production, energy efficiency and climate change. Poland reported on providing capacity-building support for adaptation for search and rescue groups in Armenia for disaster prevention and preparedness. The Slovak Agency for International Development Cooperation has implemented more than 35 capacity-building projects through ODA and Slovakia provides scholarships to students from developing countries. Slovenia provides financial support for both mitigation and adaptation projects that include the transfer of knowledge, technology or good practices from Slovenia.

Figure 38
Capacity-building projects by focus area reported in first, second and third biennial reports



236. As shown in figure 39, in terms of the regional distribution of capacity-building activities, for Africa, Eastern Europe[30] and, to a lesser degree, Latin America and the Caribbean there was an increase in the proportion of activities reported in CTF table 9 from the BR2s to the BR3s, while the proportion of multiregional or global activities and activities in Asia-Pacific decreased. However, this comes with the caveat that many Parties only provided a sample list of their supported capacity-building activities in the BR3s.

Figure 39
Regional distribution of capacity-building projects reported in first, second and third biennial reports



[30] Projects in Eastern Europe include the EU Eastern Partnership countries (Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Ukraine) and the Russian Federation.

237. According to the qualitative descriptions in the BR3s, overall the capacity-building activities reported address all 15 priority areas outlined in the framework for capacity-building in developing countries established under decision 2/CP.7.[31] Parties reported focusing mostly on education, training and public awareness; capacity-building for the implementation of adaptation measures; and capacity-building for the implementation of mitigation options. Only a few projects specifically supported the clean development mechanism or NCs. It is not possible to determine the exact number of projects addressing each priority area, as Parties are not required to classify their reported activities accordingly in CTF table 9.

238. The Paris Agreement has brought about new and emerging areas for capacity-building, including REDD-plus, readiness for and access to climate finance, NDCs and transparency, which were reported in the BR3s. The BR3s show that the pre-2020 period is essential for building capacity for transparency-related activities by providing support for international programmes and partnerships such as the Initiative for Climate Action Transparency, the NDC Partnership and the Capacity-building Initiative for Transparency.

239. The volume of financial support provided for capacity-building projects cannot be assessed from the information reported by Parties in CTF table 9 as the funding allocation to individual projects was not been systematically reported.

3. Capacity-building for adaptation and mitigation reported in third biennial reports

240. As previously, more capacity-building activities were reported for adaptation (151 activities) than for mitigation (79 activities), as shown in figure 39. Parties reported a high number of activities addressing capacity-building across multiple areas (127 projects), and 19 activities were reported to support capacity-building for technology development and transfer.

241. According to the qualitative project descriptions in the BR3s, Parties provided capacity-building support in key mitigation sectors, including energy, LULUCF and waste management. Support was also provided for preparing GHG inventories, which is key to managing emissions; for carbon budgets; and for low-carbon resilience. Key adaptation capacity-building activities addressed agriculture and land use, water management and disaster risk reduction. Impact assessment, adaptive management and partnerships for resilience and education were also supported. It is not possible to undertake a quantitative assessment of the sectoral distribution of the reported mitigation and adaptation capacity-building activities as there is no clear sectoral reporting field in CTF table 9.

242. A major caveat with regard to this reporting is that it varies considerably by Party. While many Parties listed only a number of representative activities in CTF table 9, other Parties included all their supported activities with a capacity-building component. Furthermore, one Party listed individual scholarships, which resulted in a relatively high number of capacity-building activities reported. In relation to capacity-building for technology development and transfer, one Party listed a large number of activities under technology development and transfer, while many other Parties saw this aspect as a component of capacity-building activities supporting multiple areas and classified their activities accordingly.

4. Capacity-building at the individual, institutional and systemic level reported in third biennial reports

243. Parties reported on capacity-building activities targeting the individual, institutional and systemic level. Capacity-building targeting the individual level refers to developing educational, training and awareness-raising activities. Institutional-level capacity-building refers to fostering the development of organizations and institutions, including their missions, mandates, cultures, structures, competencies, and human and financial resources, as well as promoting cooperation between organizations, institutions and sectors. Finally, systemic-level capacity-building refers to creating enabling environments through economic and

[31] See document FCCC/SBI/2018/5 for further information.

regulatory policies and the accountability frameworks within which institutions and individuals operate.

244. Since Parties are not required to report on the level of capacity targeted by the reported activities in CTF table 9, an exact quantitative assessment is not possible. However, on the basis of the qualitative project descriptions in the BR3s, it appears that roughly 50 per cent of the reported activities either contained a component focused on building individual capacity or focused entirely thereon. The distinction between activities that support institutional or systemic capacity-building is less clear-cut based on the project descriptions, but they suggest that at least 30 per cent of the reported activities targeted two or three levels of capacity. Boxes 8 and 9 illustrate activities that target multiple levels of capacity, including essential capacity-building resulting from the Paris Agreement.

Box 8
Landscape and Forest Management Multi-Donor Trust Fund

Sweden reported in its BR3 on the Landscape and Forest Management Multi-Donor Trust Fund in Mozambique, which addresses deforestation and forest degradation in the country that directly affect the rural population's resilience and have severe economic, social and environmental consequences. The intervention is implemented at two levels: the national level, with the aim of strengthening overall national forest management (including institutional capacity-building, law enforcement and review of the policy framework), and at the local level, focusing on climate-smart agriculture, sustainable use of wood fuels and sustainable forestry. The initiative is considered to have climate change adaptation and mitigation as its primary objectives.

Box 9
Capacity-building Initiative for Transparency

As part of the Paris Agreement, Parties agreed to establish a Capacity-building Initiative for Transparency to strengthen the institutional and technical capacities of developing countries to meet the enhanced transparency requirements defined in Article 13 of the Paris Agreement.

As at June 14, 2018, 41 projects, amounting to $53.2 million, were approved under the CBIT Trust Fund, including 39 national projects in Africa, Asia, Eastern and Central Europe and Latin America and the Caribbean, and 2 global projects. The national projects respond to priority needs of countries related to the enhanced transparency requirements under the Paris Agreement.

In addition, a global, cross-cutting coordination platform has been established to enable coordination of transparency actions, maximize learning opportunities, and enable knowledge sharing among CBIT countries so as to facilitate transparency enhancements.

Source: GEF Report to COP 24 (see document FCCC/CP/2018/6 and https://www.thegef.org/topics/capacity-building-initiative-transparency-cbit).

5. Role of partnerships in enhancing the provision of capacity-building

245. Bilateral cooperation was the primary channel used to implement capacity-building activities. In addition to bilateral channels, support through multilateral channels and projects implemented in cooperation with international organizations were reported. Most Parties reported projects engaging a wide range of stakeholders at the regional, subregional, national or local level, including government, private sector, civil society and academia. Boxes 10 and 11 provide examples of reported partnership initiatives aimed at enhancing climate-related capacity.

A number of Parties reported providing support for partnerships for enhancing implementation of the Paris Agreement, including the NDC Partnership, the Initiative for Climate Action Transparency and the Capacity-building Initiative for Transparency. Developing countries must start building the institutional and policy frameworks necessary

to meet the requirements of the Paris Agreement in the pre-2020 period to ensure that they can maximize effectiveness and efficiency in achieving their NDCs under the Paris Agreement.

Box 10
Pacific Catastrophe Risk Assessment and Financing Initiative

The Pacific Catastrophe Risk Assessment and Financing Initiative is a joint initiative of the Geoscience Division of the Pacific Community, the World Bank and the Asian Development Bank, with financial support from the Government of Japan, the Global Facility for Disaster Reduction and Recovery, and the Africa Caribbean Pacific and EU Natural Disaster Risk Reduction Programme, and technical support from AIR Worldwide, New Zealand GNS Science, Geoscience Australia, the Pacific Disaster Center, OpenGeo and the Global Facility for Disaster Reduction and Recovery Labs. The Initiative aims to provide Pacific Island countries with disaster risk modelling and assessment tools. It also aims to engage in a dialogue with those countries on integrated financial solutions for reducing their financial vulnerability to natural disasters and climate change. The Initiative is part of the broader agenda for disaster risk management and climate change adaptation in the Pacific region. The Pacific Disaster Risk Assessment project provides 15 countries with disaster risk assessment tools to help them better understand, model and assess their exposure to natural disasters (see http://pcrafi.spc.int/).

Box 11
Partnership initiatives aimed at enhancing climate-related capacity

The **NDC Partnership** is a coalition of countries and institutions working to mobilize support and achieve ambitious climate goals while enhancing sustainable development. Launched at the twenty-second session of the Conference of the Parties, the NDC Partnership aims to enhance cooperation so that countries have access to the technical knowledge and financial support they need to achieve large-scale climate and sustainable development targets as quickly and effectively as possible. The NDC Partnership builds in-country capacity and increases knowledge-sharing so that climate policies have meaningful and enduring impacts and drive an increase in global ambition over time (see http://ndcpartnership.org).

The **Initiative for Climate Action Transparency** was founded in 2016 to respond to the critical need to support improved transparency and capacity-building under the Paris Agreement. It is working with developing countries to strengthen their capacity to assess climate actions (in the context of their NDCs) and report their progress in line with the Paris Agreement, on the basis of individual country needs. It works closely with governments, along with public agencies, higher-education institutions and civil society bodies, to strengthen institutional arrangements, processes and procedures. The Initiative supports in-country capacity development through training modules on MRV of policies and actions, and sharing good practices and lessons learned (see climateactiontransparency.org).

Annex I

Supplementary data

Table 1
Description of Annex I Parties' quantified economy-wide emission reduction targets for 2020 reported in their third biennial reports in the common tabular format

Party	*Emission reduction target (change from base-year level) (%)*	*Base year (CO_2, CH_4 and N_2O)*	*Base year (HFCs, PFCs and SF_6)*	*Base year (NF_3)*	*Gases (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6)*	*Gases (other)*	*Source of global warming potential values*	*Sectors (energy, transport, industrial processes, agriculture and waste)*	*LULUCF included*	*LULUCF accounting approach*	*Market-based mechanisms under the Convention used*
Australia	5	2000	2000	2000	All	NF_3	AR4	All	Yes	Other[a]	Yes
Belarus	5–10	1990	1990		All		AR2	All	No		No
Canada	17	2005	2005	2005	All	NF_3	AR4	All	Yes	Other[a]	To be determined
European Union	20	1990	1990		All		AR4	All[b]	No		Yes
Iceland	20	1990	1990	1990	All	NF_3	AR4	All	Yes	Activity	Yes
Japan	At least 3.8	Fiscal year 2005	2005	2005	All	NF_3	AR4	All	Yes	Activity	Yes
Kazakhstan	15	1990	1995	2000	All	NF_3	AR4	All	No		No
Liechtenstein	20	1990	1990		All		AR4	All	Yes	Land	Yes
Monaco	30	1990	1995	1990	All	NF_3	AR4	All	Yes	Land	Yes
New Zealand	5	1990	1990	1990	All	NF_3	AR4	All	Yes	Activity	Yes
Norway	30	1990	1990	2000	All	NF_3	AR4	All	Yes	Activity	Yes
Russian Federation	15–25	1990	1990	1990	All	NF_3	AR4	All	No		No
Switzerland	20	1990	1990	1990	All	NF_3[c]	AR4	All	Yes	Activity	Yes
Turkey	–	–	–	–	–	–	–	–	–	–	–
Ukraine	20	1990	1990	To be determined	All	NF_3	AR2	All	No		Yes

Party	*Emission reduction target (change from base-year level) (%)*	*Base year (CO_2, CH_4 and N_2O)*	*Base year (HFCs, PFCs and SF_6)*	*Base year (NF_3)*	*Gases (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6)*	*Gases (other)*	*Source of global warming potential values*	*Sectors (energy, transport, industrial processes, agriculture and waste)*	*LULUCF included*	*LULUCF accounting approach*	*Market-based mechanisms under the Convention used*
United States	Approximately 17 in 2020	2005	2005	2005	All	NF_3	AR4	All	Yes	Land	No

[a] Based on the Kyoto Protocol LULUCF classification system: deforestation, afforestation, reforestation, forest management, cropland management, grazing land management and revegetation.
[b] Target includes aviation under the EU ETS and other (CTF table 7).
[c] Also includes indirect CO_2.

Table 2
Greenhouse gas emission limits of the European Union's 28 member States for the sectors not covered by the European Union Emissions Trading System

Party	*Greenhouse gas emission limit by 2020 compared with the 2005 level (%)*	*Party*	*Greenhouse gas emission limit by 2020 compared with the 2005 level (%)*	*Party*	*Greenhouse gas emission limit by 2020 compared with the 2005 level (%)*
Austria	–16	Germany	–14	Netherlands	–16
Belgium	–15	Greece	–4	Poland	14
Bulgaria	20	Hungary	10	Portugal	1
Croatia	11	Ireland	–20	Romania	19
Cyprus	–5	Italy	–13	Slovakia	13
Czechia	9	Latvia	17	Slovenia	4
Denmark	–20	Lithuania	15	Spain	–10
Estonia	11	Luxembourg	–20	Sweden	–17
Finland	–16	Malta	5	United Kingdom	–16
France	–14				

Table 3

Annex I Parties' total aggregate anthropogenic greenhouse gas emissions without emissions and removals from land use, land–use change and forestry, 1990, 2000, 2010 and 2016

	kt CO_2 eq				*Change in emissions (%)*		
Party	*1990*	*2000*	*2010*	*2016*	*1990–2016*	*1990–2000*	*2000–2016*
Australia	420 100	485 325	539 172	549 158	30.7	15.5	13.2
Austria	78 690	80 432	84 931	79 673	1.2	2.2	–0.9
Belarus[a]	139 274	81 217	94 247	91 542	–34.3	–41.7	12.7
Belgium	146 654	149 784	132 712	117 727	–19.7	2.1	–21.4
Bulgaria[a, b]	116 753	59 569	60 548	59 060	–49.4	–49.0	–0.9
Canada	603 205	731 599	693 967	704 162	16.7	21.3	–3.8
Croatia[a]	31 894	25 831	27 986	24 304	–23.8	–19.0	–5.9
Cyprus	5 591	8 271	9 419	8 773	56.9	47.9	6.1
Czechia[a]	197 476	149 003	139 572	129 583	–34.4	–24.5	–13.0
Denmark	70 599	71 388	64 492	51 620	–26.9	1.1	–27.7
Estonia[a]	40 398	17 305	21 131	19 627	–51.4	–57.2	13.4
European Union	5 646 080	5 159 788	4 775 474	4 291 252	–24.0	–8.6	–16.8
Finland	71 143	70 044	75 462	58 737	–17.4	–1.5	–16.1
France	549 336	554 707	516 805	465 129	–15.3	1.0	–16.1
Germany	1 251 635	1 044 969	942 783	909 404	–27.3	–16.5	–13.0
Greece	103 101	126 346	118 364	91 607	–11.1	22.5	–27.5
Hungary[a, b]	109 438	73 395	65 344	61 464	–43.8	–32.9	–16.3
Iceland	3 634	4 067	4 879	4 669	28.5	11.9	14.8
Ireland	55 490	68 555	61 233	61 546	10.9	23.5	–10.2
Italy	518 363	554 464	503 989	427 862	–17.5	7.0	–22.8
Japan	1 266 694	1 372 245	1 300 302	1 304 568	3.0	8.3	–4.9
Latvia[a]	26 430	10 513	12 374	11 289	–57.3	–60.2	7.4
Liechtenstein	229	248	230	188	–18.0	8.3	–24.3
Lithuania[a]	48 108	19 470	20 709	20 083	–58.3	–59.5	3.1
Luxembourg	12 786	9 667	12 167	10 028	–21.6	–24.4	3.7
Malta	2 102	2 811	2 968	1 910	–9.1	33.7	–32.0
Monaco	100	108	86	79	–21.1	7.9	–26.9
Netherlands	220 604	219 056	213 172	195 029	–11.6	–0.7	–11.0
New Zealand	65 815	76 102	78 672	78 727	19.6	15.6	3.4
Norway	51 697	54 598	55 136	53 243	3.0	5.6	–2.5
Poland[a, b]	569 841	389 605	405 973	395 824	–30.5	–31.6	1.6
Portugal	59 825	83 142	69 943	67 621	13.0	39.0	–18.7
Romania[a, b]	302 631	140 734	122 182	112 542	–62.8	–53.5	–20.0
Russian	3 734 345	2 249 072	2 573 185	2 643 817	–29.2	–39.8	17.6
Slovakia[a]	73 980	49 571	46 260	41 037	–44.5	–33.0	–17.2
Slovenia[a, b]	20 397	19 075	19 665	17 718	–13.1	–6.5	–7.1
Spain	287 656	385 572	355 882	324 707	12.9	34.0	–15.8
Sweden	71 515	68 649	64 412	52 893	–26.0	–4.0	–23.0
Switzerland	53 196	52 195	54 137	48 199	–9.4	–1.9	–7.7
Turkey[c]	210 715	293 494	402 564	496 067	135.4	39.3	69.0
Ukraine[a]	947 253	420 515	407 263	338 636	–64.3	–55.6	–19.5
United Kingdom	799 915	716 797	615 517	486 269	–39.2	–10.4	–32.2
United States	6 355 634	7 216 645	6 922 946	6 511 302	2.4	13.5	–9.8
Number of Parties showing a decrease in emissions by more than 1%					30	21	29
Number of Parties showing a change in emissions within 1%					0	2	2
Number of Parties showing an increase in emissions by more than 1%					13	20	12

[a] Party undergoing the process of transition to a market economy.

[b] The base year under the Convention is 1990, except for Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986), in accordance with decisions 9/CP.2 and 11/CP.4.

[c] In decision 26/CP.7, Parties were invited to recognize the special circumstances of Turkey, which place Turkey in a situation different from that of other Annex I Parties.

Table 4

Annex I Parties' total aggregate anthropogenic greenhouse gas emissions with emissions and removals from land use, land–use change and forestry, 1990, 2000, 2010 and 2016

	kt CO_2 eq				*Change in emissions (%)*		
Party	*1990*	*2000*	*2010*	*2016*	*1990–2016*	*1990–2000*	*2000–2016*
Australia	576 801	546 999	561 902	525 037	–9.0	–5.2	–4.0
Austria	66 708	64 067	79 053	75 464	13.1	–4.0	17.8
Belarus[a]	118 169	47 974	54 121	69 639	–41.1	–59.4	45.2
Belgium	144 220	147 894	131 176	116 578	–19.2	2.5	–21.2
Bulgaria[a, b]	101 519	50 141	51 427	52 523	–48.3	–50.6	4.8
Canada	535 510	690 468	662 068	676 356	26.3	28.9	–2.0
Croatia[a]	25 281	18 427	20 975	18 882	–25.3	–27.1	2.5
Cyprus	5 323	8 333	8 937	8 856	66.4	56.5	6.3
Czechia[a]	190 913	140 254	133 570	124 246	–34.9	–26.5	–11.4
Denmark	75 387	74 914	63 693	57 034	–24.3	–0.6	–23.9
Estonia[a]	38 854	13 934	19 145	16 903	–56.5	–64.1	21.3
European Union	5 386 300	4 844 478	4 448 675	3 989 760	–25.9	–10.1	–17.6
Finland	57 124	47 628	47 930	31 680	–44.5	–16.6	–33.5
France	523 489	532 863	479 254	428 550	–18.1	1.8	–19.6
Germany	1 220 323	1 007 008	926 414	894 925	–26.7	–17.5	–11.1
Greece	100 982	124 410	115 325	88 299	–12.6	23.2	–29.0
Hungary[a, b]	107 682	72 986	61 331	57 197	–46.9	–32.2	–21.6
Iceland	13 727	14 156	15 162	14 891	8.5	3.1	5.2
Ireland	61 889	74 866	66 267	66 491	7.4	21.0	–11.2
Italy	515 321	538 809	473 349	397 935	–22.8	4.6	–26.1
Japan	1 204 248	1 284 423	1 230 488	1 247 797	3.6	6.7	–2.9
Latvia[a]	15 733	872	11 017	10 363	–34.1	–94.5	1 088.5
Liechtenstein	235	272	249	196	–16.5	15.7	–27.8
Lithuania[a]	43 046	10 912	11 727	11 638	–73.0	–74.6	6.7
Luxembourg	12 834	8 965	12 014	9 537	–25.7	–30.2	6.4
Malta	2 105	2 814	2 970	1 913	–9.1	33.7	–32.0
Monaco	100	108	86	79	–21.2	7.8	–26.9
Netherlands	226 658	225 122	219 302	201 710	–11.0	–0.7	–10.4
New Zealand	36 275	44 012	47 605	55 953	54.2	21.3	27.1
Norway	41 333	30 389	28 701	28 887	–30.1	–26.5	–4.9
Poland[a, b]	553 914	356 696	375 577	367 872	–33.6	–35.6	3.1
Portugal	60 980	77 463	59 032	62 227	2.0	27.0	–19.7
Romania[a, b]	283 995	117 875	99 170	88 250	–68.9	–58.5	–25.1
Russian	3 893 153	1 847 582	1 943 666	2 009 362	–48.4	–52.5	8.8
Slovakia[a]	64 434	39 617	39 921	34 176	–47.0	–38.5	–13.7
Slovenia[a, b]	15 862	14 329	14 347	12 728	–19.8	–9.7	–11.2
Spain	248 307	342 602	315 432	283 962	14.4	38.0	–17.1
Sweden	35 589	30 666	19 771	9 923	–72.1	–13.8	–67.6
Switzerland	52 466	56 954	52 592	46 328	–11.7	8.6	–18.7
Turkey[c]	181 792	258 754	356 607	427 989	135.4	42.3	65.4
Ukraine[a]	889 283	375 125	370 178	320 642	–63.9	–57.8	–14.5
United Kingdom	797 787	708 924	601 077	471 726	–40.9	–11.1	–33.5
United States	5 536 014	6 463 882	6 206 014	5 794 522	4.7	16.8	–10.4
Number of Parties showing a decrease in emissions by more than 1%					32	23	29
Number of Parties showing a change in emissions within 1%					0	2	0
Number of Parties showing an increase in emissions by more than 1%					11	18	14

[a] Party undergoing the process of transition to a market economy.

[b] The base year under the Convention is 1990, except for Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986), in accordance with decisions 9/CP.2 and 11/CP.4.

[c] In decision 26/CP.7, Parties were invited to recognize the special circumstances of Turkey, which place Turkey in a situation different from that of other Annex I Parties.

Heat chart of policies and measures reported in the third biennial reports by type of policy instrument and sector affected

Occurrence (number of reported policies and measures)

	Energy	Transport	Industry/ industrial processes	Agriculture	Forestry/ LULUCF	Waste management/ waste	Cross-cutting	**Total**
Regulatory	341	181	92	120	52	111	67	**832**
Economic	290	146	43	139	57	35	58	**641**
Fiscal	167	92	13	30	9	29	20	**281**
Information	151	66	22	73	23	11	16	**293**
Voluntary agreements	68	24	26	24	14	6	8	**121**
Education	37	23	12	39	9	2	6	**92**
Research	25	15	15	35	12	6	6	**73**
Total	**935**	**471**	**183**	**364**	**141**	**207**	**177**	**2 074**

0-20	20-50	50-100	100-200	> 200

Impact (estimated annual emission reduction in Mt CO2 eq by 2020)

	Energy	Transport	Industry/ industrial processes	Agriculture	Forestry/ LULUCF	Waste management/ waste	Cross-cutting	**Total**
Regulatory	1 714	44	870	23	1	700	46	**1 806**
Economic	975	88	726	43	55	715	39	**1 217**
Fiscal	849	27	706	21	47	702	19	**956**
Information	64	21	2	19	48		4	**149**
Voluntary agreements	11	9	4	4	47	1	4	**75**
Education	16	7	17	10	2		5	**39**
Research	8	2	3	7			4	**15**
Total	**2 117**	**161**	**954**	**88**	**80**	**752**	**81**	**2 548**

	>0.5	0.5-10	10-40	40-100	100-1000	> 1000

Note: The estimated impacts by 2020 are of all PaMs reported in the BR3s by Annex I Parties, including EU member States but excluding the EU as a whole. The values exclude the impacts of the EU ETS as reported by EU member States but include its EU–wide impacts, and also exclude the impacts of the Russian Federation's Order of the President of the Russian Federation on the reduction of GHG emissions (2013) and Action Plan on the Provision of Greenhouse Gas Emission Reduction by 2020.

Table 5

Overview of greenhouse gas emission projection scenarios reported by Annex I Parties in their third biennial reports

	Scenario				*GHG projections*	
Party	*WEM*	*WAM*	*WOM*	*Projection period*	*Gases*	*Sectors*
Australia	Yes	No	No	To 2030	All seven gases	All sectors
Austria	Yes	No	No	To 2030	All seven gases	LULUCF not available
Belarus	Yes	Yes	No	To 2030	NA	LULUCF not available
Belgium	Yes	No	No	To 2030	All seven gases	All sectors
Bulgaria	Yes	Yes	No	To 2030	All seven gases	All sectors
Canada	Yes	Yes	No	To 2030	All seven gases	LULUCF not available
Croatia	Yes	Yes	Yes	To 2030	All seven gases	All sectors
Cyprus	Yes	Yes	Yes	To 2030	All seven gases	LULUCF not available
Czechia	Yes	Yes	No	To 2030	All seven gases	All sectors
Denmark	Yes	No	Yes	To 2030	All seven gases	All sectors
Estonia	Yes	Yes	No	To 2030	All seven gases	All sectors
European Union	Yes	Yes	No	To 2030	All seven gases	LULUCF not available
Finland	Yes	Yes	No	To 2030	All seven gases	All sectors
France	Yes	No	No	To 2030	All seven gases	All sectors

	Scenario				*GHG projections*	
Party	*WEM*	*WAM*	*WOM*	*Projection period*	*Gases*	*Sectors*
Germany	Yes	Yes	No	To 2030	All seven gases	All sectors
Greece	Yes	No	No	To 2030	All seven gases	All sectors
Hungary	Yes	Yes	No	To 2030	All seven gases	All sectors
Iceland	Yes	No	No	To 2030	All seven gases	All sectors
Ireland	Yes	Yes	No	To 2030	All seven gases	All sectors
Italy	Yes	No	No	To 2030	All seven gases	All sectors
Japan	Yes	No	No	To 2030	All seven gases	All sectors
Latvia	Yes	Yes	No	To 2030	All seven gases	All sectors
Liechtenstein	Yes	No	No	To 2030	All seven gases	All sectors
Lithuania	Yes	Yes	No	To 2030	All seven gases	All sectors
Luxembourg	Yes	Yes	No	To 2030	All seven gases	All sectors
Malta	Yes	No	Yes	To 2030	All seven gases	All sectors
Monaco	Yes	Yes	Yes	To 2030	All seven gases	All sectors
Netherlands	Yes	Yes	No	To 2030	All seven gases	All sectors
New Zealand	Yes	No	Yes	To 2030	All seven gases	All sectors
Norway	Yes	No	No	To 2030	All seven gases	All sectors
Poland	Yes	No	No	To 2030	All seven gases	All sectors
Portugal	Yes	Yes	No	To 2030	All seven gases	All sectors
Romania	Yes	Yes	Yes	To 2030	All seven gases	Transport included in energy
Russian Federation	Yes	Yes	Yes	To 2030	All seven gases	Energy and IPPU
Slovakia	Yes	Yes	Yes	To 2030	All seven gases	Transport included in energy
Slovenia	Yes	No	No	To 2030	All seven gases	All sectors
Spain	Yes	No	No	To 2030	All seven gases	Transport included in energy
Sweden	Yes	No	No	To 2030	All seven gases	All sectors
Switzerland	Yes	Yes	Yes	To 2030	All seven gases	All sectors
Turkey	Yes	No	Yes	To 2030	All seven gases	Transport included in energy
Ukraine	Yes	Yes	Yes	To 2030	All seven gases	All sectors
United Kingdom	Yes	No	No	To 2030	All seven gases	All sectors
United States	Yes	No	No	To 2030	All seven gases	All sectors

Note: The information for Ukraine is from its BR1 as the Party had not submitted any subsequent BR. The information for Belarus and the United States is from their BR2s as neither had submitted its BR3.

Table 6

Summary of key assumptions underlying the greenhouse gas emission projections reported in the third biennial reports

	Projections for 2011–2030	*Projections for 2020–2030*
Average GDP growth rate (per year)		
Below 2%	**EIT Parties:** Belarus, Croatia, Russian Federation and Slovenia	**EIT Parties:** Croatia and Russian Federation
	Non–EIT Parties: Austria, Canada, Finland, France, Germany, Italy, Japan, Netherlands, Portugal, Spain, Switzerland and United Kingdom	**Non–EIT Parties:** Austria, Canada, France, Germany, Italy, Japan, Malta, Netherlands, Norway, Spain and Switzerland
2–4%	**EIT Parties:** Bulgaria, Czechia, Estonia, Hungary, Latvia, Lithuania and Romania	**EIT Parties:** Bulgaria, Czechia, Estonia, Hungary, Lithuania, Poland, Romania, Slovakia and Slovenia

	Projections for 2011–2030	*Projections for 2020–2030*
	Non–EIT Parties: Australia, Denmark, Iceland, Ireland, Malta, Turkey and United States	**Non–EIT Parties:** Australia, Cyprus, Denmark, Finland, Iceland, Ireland, New Zealand, Portugal, Sweden, United Kingdom and United States
Above 4%	**EIT Parties:** NA	**EIT Parties:** Belarus and Latvia
	Non–EIT Parties: New Zealand	**Non–EIT Parties:** Turkey
Not available	**EIT Parties:** Poland and Slovakia	**EIT Parties:** NA
	Non–EIT Parties: Belgium, Cyprus, Greece, Liechtenstein, Luxembourg, Norway and Sweden	**Non–EIT Parties:** Belgium, Greece, Liechtenstein and Luxembourg
Average population growth rate (per year)		
Below 0 (negative)	**EIT Parties:** Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Romania and Slovenia	**EIT Parties:** Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovenia
	Non–EIT Parties: Germany, Portugal and Spain	**Non–EIT Parties:** Germany, Greece and Spain
0–3%	**EIT Parties:** NA	**EIT Parties:** Slovakia
	Non–EIT Parties: Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Iceland, Ireland, Italy, Japan, Liechtenstein, Malta, Netherlands, New Zealand, Switzerland, Turkey, United Kingdom and United States	**Non–EIT Parties:** Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Iceland, Ireland, Italy, Japan, Liechtenstein, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Sweden, Switzerland, Turkey, United Kingdom and United States
Not available	**EIT Parties:** Belarus, Poland, Russian Federation and Slovakia	**EIT Parties:** Belarus and Russian Federation
	Non–EIT Parties: Canada, Greece, Luxembourg, Norway and Sweden	**Non–EIT Parties:** NA
International oil price (per barrel)		
Below USD 75	**EIT Parties:** Bulgaria and Slovenia	**EIT Parties:** Bulgaria and Slovenia
	Non–EIT Parties: Canada, Denmark, Ireland, Italy, Netherlands, New Zealand and Portugal	**Non–EIT Parties:** Australia, Canada, Ireland and Norway
Above USD 75	**EIT Parties:** Romania	**EIT Parties:** Bulgaria, Czechia, Romania and Slovakia
	Non–EIT Parties: Australia, Austria and Iceland	**Non–EIT Parties:** Austria, Austria, Denmark, Iceland, Italy, Netherlands, New Zealand and Portugal
Not available	**EIT Parties:** Belarus, Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Russian Federation and Slovakia	**EIT Parties:** Belarus, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland and Russian Federation
	Non–EIT Parties: Belgium, Canada, Cyprus, Finland, France, Germany, Greece, Japan, Liechtenstein, Luxembourg, Malta, Norway, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States	**Non–EIT Parties:** Belgium, Cyprus, Finland, France, Germany, Greece, Japan, Liechtenstein, Luxembourg, Malta, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States

Table 7

Projected changes in total aggregate greenhouse gas emissions without emissions and removals from land use, land–use change and forestry of individual Annex I Parties

		WEM scenario				*WAM scenario*				*WOM scenario*			
	Actual emissions (kt CO_2 eq)	*Projected emissions (kt CO_2 eq)*		*Change compared with the 1990 level (%)*		*Projected emissions (kt CO_2 eq)*		*Change compared with the 1990 level (%)*		*Projected emissions (kt CO_2 eq)*		*Change compared with the 1990 level (%)*	
Party	*1990*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*
Australia	420 100	551 543	566 350	31.3	34.8	–	–	–	–	–	–	–	–
Austria	78 690	75 393	69 767	–4.2	–11.3	–	–	–	–	–	–	–	–
Belarus	139 274	88 120	104 028	–36.7	–25.3	86 870	100 278	–37.6	–28.0	–	–	–	–
Belgium	146 654	114 677	114 134	–21.8	–22.2	–	–	–	–	–	–	–	–
Bulgaria	116 753	67 439	62 827	–42.2	–46.2	53 326	49 827	–54.3	–57.3	–	–	–	–
Canada	603 205	728 400	721 400	20.8	19.6	690 400	583 400	14.5	–3.3	–	–	–	–
Croatia	31 894	23 977	24 677	–24.8	–22.6	22 430	19 583	–29.7	–38.6	25 636	29 707	–19.6	–6.9
Cyprus	5 591	9 425	9 402	68.6	68.2	9 351	7 906	67.2	41.4	9 684	10 213	73.2	82.7
Czechia	197 476	122 498	108 821	–38.0	–44.9	122 137	107 810	–38.2	–45.4	–	–	–	–
Denmark	70 599	41 289	51 269	–41.5	–27.4	–	–	–	– [–]	88 020	97 682	24.7	38.4
European Union	40 398	19 332	17 033	–52.1	–57.8	18 759	15 198	–53.6	–62.4	–	–	–	–
Estonia	5 646 080	4 212 961	3 987 737	–25.4	–29.4	4 179 457	3 871 984	–26.0	–31.4	–	–	–	–
Finland	71 143	56 031	48 493	–21.2	–31.8	55 920	43 810	–21.4	–38.4	–	–	–	–
France	549 336	382 391	347 785	–30.4	–36.7	–	–	–	–	–	–	–	–
Germany	1 251 635	816 368	734 524	–34.8	–41.3	805 623	682 048	–35.6	–45.5	–	–	–	–
Greece	103 101	91 515	86 036	–11.2	–16.6	–	–	–	–	–	–	–	–
Hungary	109 438	58 157	59 625	–46.9	–45.5	58 376	59 704	–46.7	–45.4	–	–	–	–
Iceland	3 634	5 770	5 590	58.8	53.8	–	–	–	–	–	–	–	–
Ireland	55 490	61 561	66 495	10.9	19.8	59 096	62 892	6.5	13.3	–	–	–	–
Italy	518 363	425 827	392 003	–17.9	–24.4	–	–	–	–	–	–	–	–
Japan	1 266 694	1 399 565	1 079 500	10.5	–14.8	–	–	–	–	–	–	–	–
Latvia	26 430	11 565	12 195	–56.2	–53.9	11 402	11 563	–56.9	–56.3	–	–	–	–
Liechtenstein	229	175	159	–23.6	–30.9	–	–	–	–	–	–	–	–
Lithuania	48 108	21 330	22 136	–55.7	–54.0	18 875	17 945	–60.8	–62.7	–	–	–	–

		WEM scenario				WAM scenario				WOM scenario			
	Actual emissions ($kt\ CO_2\ eq$)	Projected emissions ($kt\ CO_2\ eq$)		Change compared with the 1990 level (%)		Projected emissions ($kt\ CO_2\ eq$)		Change compared with the 1990 level (%)		Projected emissions ($kt\ CO_2\ eq$)		Change compared with the 1990 level (%)	
Party	*1990*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*
Luxembourg	12 786	9 797	9 504	–23.4	–25.7	9 628	8 517	–24.7	–33.4	–	–	–	–
Malta	2 102	1 606	1 683	–23.6	–19.9	–	–	–	–	1 833	2 098	–12.8	–0.2
Monaco	100	66	56	–33.6	–44.1	62	45	–38.0	–55.0	82	80	–17.7	–19.9
Netherlands	220 604	171 274	156 178	–22.4	–29.2	169 681	153 675	–23.1	–30.3	–	–	–	–
New Zealand	65 815	79 958	77 239	21.5	17.4	–	–	–	–	81 682	81 792	24.1	24.3
Norway	51 697	51 781	48 286	0.2	–6.6	–	–	–	–	–	–	–	–
Poland	569 841	387 993	360 933	–31.9	–36.7	–	–	–	–	–	–	–	–
Portugal	59 825	63 048	55 847	5.4	–6.6	63 011	52 163	5.3	–12.8	–	–	–	–
Romania	302 631	118 210	126 330	–60.9	–58.3	116 258	122 854	–61.6	–59.4	161 368	177 459	–46.7	–41.4
Russian Federation	3 734 345	2 743 000	2 791 900	–26.5	–25.2	2 645 000	2 528 200	–29.2	–32.3	3 084 700	3 470 900	–17.4	–7.1
Slovakia	73 980	40 336	40 744	–45.5	–44.9	38 880	38 647	–47.4	–47.8	41 819	42 790	–43.5	–42.2
Slovenia	20 397	18 009	16 351	–11.7	–19.8	–	–	–	–	–	–	–	–
Spain	287 656	332 994	330 453	15.8	14.9	–	–	–	–	–	–	–	–
Sweden	71 515	49 899	45 603	–30.2	–36.2	–	–	–	–	–	–	–	–
Switzerland	53 196	46 040	41 788	–13.5	–21.4	45 784	35 075	–13.9	–34.1	56 070	53 759	5.4	1.1
Turkey	210 715	669 253	998 698	217.6	374.0	–	–	–	–	713 094	1 213 479	238.4	475.9
Ukraine	947 253	459 104	541 981	–51.5	–42.8	451 777	520 462	–52.3	–45.1	509 641	800 097	–46.2	–15.5
United Kingdom	799 915	425 484	389 077	–46.8	–51.4	–	–	–	–	–	–	–	–
United States	6 355 634	6 614 000	6 364 000	4.1	0.1	–	–	–	–	–	–	–	–

Table 8

Projected changes in total aggregate greenhouse gas emissions with emissions and removals from land use, land–use change and forestry of individual Annex I Parties

		WEM scenario				*WAM scenario*				*WOM scenario*			
	Actual emissions (kt CO_2 eq)	*Projected emissions (kt CO_2 eq)*		*Change compared with the 1990 level (%)*		*Projected emissions (kt CO_2 eq)*		*Change compared with the 1990 level (%)*		*Projected emissions (kt CO_2 eq)*		*Change compared with the 1990 level (%)*	
Party	*1990*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*
Australia	576 801	554 133	573 947	–3.9	–0.5	–	–	–	–	–	–	–	–
Austria	66 708	–	–	–	–	–	–	–	–	–	–	–	–
Belarus	118 169	88 120	104 028	–25.4	–12.0	86 870	100 278	–26.49	–15.14	–	–	–	–
Belgium	144 220	110 947	110 305	–23.1	–23.5	–	–	–	–	–	–	–	–
Bulgaria	101 519	56 231	50 562	–44.6	–50.2	43 222	43 808	–57.43	–56.85	–	–	–	–
Canada	535 510	–	–	–	–	–	–	–	–	–	–	–	–
Croatia	25 281	20 878	22 302	–17.4	–11.8	–	–	–	–	–	–	–	–
Cyprus	5 324	9 047	9 021	69.9	69.5	8 990	7 545	68.9	41.7	9 304	9 811	74.8	84.3
Czechia	190 913	120 003	105 338	–37.1	–44.8	119 185	103 932	–37.57	–45.56	–	–	–	–
Denmark	75 387	41 289	53 392	–45.2	–29.2	–	–	–	–	–	–	–	–
European Union	38 854	17 192	15 330	–55.8	–60.5	16 619	13 494	–57.23	–65.27	–	–	–	–
Estonia	5 386 300	–	–	–	–	–	–	–	–	–	–	–	–
Finland	57 124	45 387	44 272	–20.5	–22.5	45 275	38 449	–20.74	–32.69	–	–	–	–
France	523 489	434 281	403 468	–17.0	–22.9	–	–	–	–	–	–	–	–
Germany	1 220 323	845 450	753 698	–30.7	–38.2	834 704	701 222	–31.60	–42.54	–	–	–	–
Greece	100 982	89 801	85 291	–11.1	–15.5	–	–	–	–	–	–	–	–
Hungary	107 682	55 276	57 077	–48.7	–47.0	54 137	55 932	–49.72	–48.06	–	–	–	–
Iceland	13 727	16 044	15 864	16.9	15.6	–	–	–	–	–	–	–	–
Ireland	61 889	66 199	74 045	7.0	19.6	63 734	70 442	2.98	13.82	–	–	–	–
Italy	515 321	401 446	350 467	–22.1	–32.0	–	–	–	–	–	–	–	–
Japan	1 204 248	1 363 161	1 053 600	13.2	–12.5	–	–	–	–	–	–	–	–
Latvia	15 733	14 232	15 569	–9.5	–1.0	13 867	14 913	–11.86	–5.21	–	–	–	–
Liechtenstein	235	191	174	–18.7	–25.7	–	–	–	–	–	–	–	–
Lithuania	43 046	13 376	14 147	–68.9	–67.1	10 222	8 956	–76.25	–79.19	–	–	–	–

		WEM scenario				WAM scenario				WOM scenario			
	Actual emissions ($kt CO_2 eq$)	*Projected emissions ($kt CO_2 eq$)*		*Change compared with the 1990 level (%)*		*Projected emissions ($kt CO_2 eq$)*		*Change compared with the 1990 level (%)*		*Projected emissions ($kt CO_2 eq$)*		*Change compared with the 1990 level (%)*	
Party	*1990*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*	*2020*	*2030*
Luxembourg	12 834	9 463	9 166	–26.3	–28.6	9 294	8 179	–27.58	–36.27	–	–	–	–
Malta	2 105	1 609	1 686	–23.6	–19.9	–	–	–	–	1 836	2 101	–12.8	–0.2
Monaco	100	66	56	–33.7	–44.1	62	45	–38.00	–54.98	82	80	–17.7	–19.9
Netherlands	226 658	168 667	151 878	–25.6	–33.0	164 465	149 375	–27.44	–34.10	–	–	–	–
New Zealand	36 275	64 264	73 196	77.2	101.8	–	–	–	–	70 954	83 142	95.6	129.2
Norway	41 333	28 298	26 999	–31.5	–34.7	–	–	–	–	–	–	–	–
Poland	553 914	366 173	347 137	–33.9	–37.3	–	–	–	–	–	–	–	–
Portugal	60 980	55 481	47 531	–9.0	–22.1	55 444	43 847	–9.08	–28.10	–	–	–	–
Romania	283 995	101 211	109 869	–64.4	–61.3	100 220	112 938	–64.71	–60.23	141 209	158 236	–50.3	–44.3
Russian Federation	3 893 153	2 381 600	2 479 900	–38.8	–36.3	2 259 800	2 204 800	–41.95	–43.37	2 687 500	3 169 200	–31.0	–18.6
Slovakia	64 434	35 070	36 214	–45.6	–43.8	33 615	34 117	–47.83	–47.05	36 554	38 260	–43.3	–40.6
Slovenia	15 862	18 009	16 351	13.5	3.1	–	–	–	–	–	–	–	–
Spain	248 307	299 945	300 714	20.8	21.1	–	–	–	–	–	–	–	–
Sweden	35 589	6 576	3 382	–81.5	–90.5	–	–	–	–	–	–	–	–
Switzerland	52 466	46 999	42 697	–10.4	–18.6	47 693	37 534	–9.10	–28.46	55 379	52 569	5.6	0.2
Turkey	181 792	599 217	928 987	229.6	411.0	–	–	–	–	672 901	1 174 781	270.1	546.2
Ukraine	889 283	429 331	506 781	–51.7	–43.0	422 004	485 260	–52.55	–45.43	509 641	800 097	–42.7	–10.0
United Kingdom	797 787	414 403	382 366	–48.1	–52.1	–	–	–	–	–	–	–	–
United States	5 536 014	5 451 000	5 274 000	–1.5	–4.7	–	–	–	–	–	–	–	–

Annex II

Methodology for estimating mitigation impacts of individual policies and measures for this report

1. There are often methodological difficulties in estimating the mitigation impacts of individual PaMs (as reported by Annex I Parties) and in assessing policy types and sectors affected across PaMs (as presented in this report).

2. In estimating the impact of individual PaMs, Parties might use different assumptions about baselines, counterfactual conditions, free ridership, rebound effects, interaction of PaMs, and macroeconomic and energy market conditions. Indeed, Parties assigned mitigation impacts among their various interrelated PaMs (e.g. emissions trading systems and renewable energy measures) using various methodologies.

3. For the purpose of this report, the total (and subtotal for categories) estimated impacts of reported PaMs for 2020 were calculated:

(a) On the basis of all Annex I Parties, including EU member States but excluding the EU as a whole to avoid double counting;

(b) Excluding the impacts of the EU ETS as reported by individual EU member States but including its EU–wide impacts, estimated at 494 Mt CO2 eq, of which 483 Mt CO_2 eq in the energy sector and 11 Mt CO_2 eq in the transport sector, classified as a regulatory and economic policy instrument;

(c) Excluding the impacts of the Order of the President of the Russian Federation on the reduction of GHG emissions (2013) and the Party's Action Plan on the Provision of Greenhouse Gas Emission Reduction by 2020, for which a total national GHG emission reduction target of at least 75 per cent of the 1990 level by 2020 was reported in the Russian Federation's BR3, with an estimated emission reduction impact by 2020 of 942 Mt CO_2 eq.

4. The EU did not report a mitigation impact for the EU ETS in its BR3. For the purpose of this report, the annual emission reduction impact of the EU ETS was estimated to be 494 Mt CO_2 eq (483 Mt CO_2 eq for fixed installations and 11 Mt CO_2 eq for aviation) below the 2005 level by 2020 and it was classified as an economic policy instrument. That value is the difference between the target 2020 emission caps (the 2013 cap minus subsequent annual decreases) for fixed installations (1,816 Mt CO_2 eq) and aviation (210 Mt CO_2 eq), which are 21 and 5 per cent lower than the 2005 emission levels for fixed installations (2,299 Mt CO_2 eq) and aviation (221 Mt CO_2 eq), respectively. This can be considered a low estimate of the impact of the EU ETS because it does not account for the sector's baseline emissions in 2020 (i.e. those that would occur in the absence of the EU ETS). For comparison, in an Ecofys study from 2009[1] the difference between the EU ETS 2020 cap and 2020 baseline was estimated to be 685 Mt CO_2 eq.

5. In addition, for the purpose of this report, the many PaMs reported (in all three BRs) under "other affected sectors" and "other policy instruments" were attributed to the most relevant predefined sector (energy, transport, industry or industrial processes, agriculture, forestry or LULUCF, waste management or waste, or cross–cutting) and policy instrument category (economic, fiscal, voluntary agreement, regulatory, information, education or research) on the basis of their description. As a result, there are far fewer PaMs classified as "other" presented in this report than in previous reports.

[1] Ecofys. 2009. EU climate policy impact in 2020: With a focus on the effectiveness of emissions trading policy in an economic recession scenario. Utrecht, the Netherlands: Ecofys. Available at https://www.ecofys.com/files/files/ecofys_euclimatepolicyimpactin2020_new.pdf.

Annex III

Overview of climate finance information reported in the third biennial reports

1. Annex II Parties provided for the first time in their BR3s quantitative information on climate finance using the revised CTF tables 7, 7(a) and 7(b), and qualitative information on definitions and methodologies used for the reporting in the documentation box.

2. Notwithstanding the improvement in the methodologies used for reporting climate finance in the BR3 CTF tables,[1] some reporting issues are still complicating the aggregation, comparison and analysis of the data compared with those in previous BRs, such as differences in the:

(a) Aggregate–level information provided in CTF table 7 (summary information), which is not consistent with the information provided in CTF tables 7(a) and 7(b);

(b) Approach to rounding and use of units (e.g. millions versus thousands);

(c) Currency used;[2]

(d) Reporting period (i.e. calendar year versus fiscal or financial year);

(e) Reporting of "NA" versus not providing any information in the CTF tables for certain categories;

(f) Approach to providing sector–related information. For example, some Parties did not provide any information, while others categorized a data entry as attributable to more than one sector. Therefore, a "multisectoral" category has been included in this report to capture data reported as such. One Party provided information on the percentage of contributions allocated to specific sectors;

(g) Approach to reporting on type of support. Values were incorrectly reported under "other" type of support in CRF table 7 for 2016.

3. **Allocation channels:** Annex II Parties provided quantitative information on public financial support provided through multilateral, bilateral, regional and other channels in CTF tables 7, 7(a) and 7(b). A few Parties provided additional qualitative information in the financial section of their BR3s.

4. **Year:** Several Parties provided information on whether they report by financial or fiscal, or calendar year, with most choosing the former. One Party changed from reporting by financial year to reporting by calendar year with a view to increasing the comparability of its climate finance data across providers of support.

5. **Currency:** Several Parties provided partial or no information on financial support in United States dollars or international currency. One Party provided only partial information in its domestic currency. Many Parties did not provide information on the methodology used for calculating the currency exchange rate. Most Parties that provided information on currency exchange rate used the OECD DAC exchange rate. Several Parties provided information on the exchange rate but did not specify the methodology behind it.

6. **Core or general support:** Almost half of the Parties that submitted BR3s provided information, in varied degrees of detail, on how they determine funds as being core or general in the documentation box. Some Parties stated that they reported their total contributions to multilateral institutions, funds and Development Finance Institutions that cannot be specified as being climate–specific support (e.g. when it is not possible to identify the climate–specific component of the contribution). Several Parties provided information only on imputed climate–related shares of multilateral contributions. Other Parties either categorized multilateral contributions as bilateral with multiple recipients or did not provide information

[1] See document FCCC/SBI/2014/INF.20/Add.1, paragraphs 269–271.

[2] For Parties that did not provide information in United States dollars, the financial data provided in national currency was converted to United States dollars using exchange rates from the data set of financial indicators of the OECD for the relevant years.

on how they determined the funds as being core or general at all. Parties largely indicated that they were not able to provide information on climate finance outflows via multilateral channels in their BR3s.

7. **Climate–specific support:** More than half of the Parties that submitted BR3s provided qualitative information, in varied degrees of detail, on how they determine climate–specific funds in the documentation box. They provided information on climate–specific support in the context of contributions provided through bilateral and other regional channels, mostly using the OECD Rio markers. Many Parties also provided qualitative information, in varied degrees of detail, on the definition and methodology used in identifying multilateral contributions as being climate–specific support.

8. **Status of support:** Most Parties that provided qualitative information on the status of their support only reported on their bilateral and multilateral disbursements, not on their commitments. Other Parties reported on disbursed multilateral contributions and committed bilateral contributions. Many Parties that provided such information used the OECD DAC definition and methodology.

9. **Funding source:** Fewer than half of the Parties that submitted BR3s provided information on funding sources, in varied degrees of detail, in the documentation box. Most Parties used the OECD DAC classification of ODA and OOF, or another compatible definition. Twenty–one Parties did not provide any information on funding sources in the documentation box, while others provided also quantitative information on funding sources. Some Parties reported the funding source as being both ODA and OOF, but information on distribution was not available. One Party provided information on the percentage of its contributions allocated to ODA and OOF.

10. **Financial instruments:** Many Parties used the OECD DAC definitions and reported providing support mainly in the form of grants. Two Parties provided information on climate–related private finance mobilized in the form of equity or guarantees. One Party provided information on the percentage of funds allocated through different financial instruments when several financial instruments were used.

11. **Type of support:** Regarding type of support, the main issue was reporting core contributions to multilateral funds. Only one reporting line could be entered in the CTF table per organization, which implied only one type of support per organization. However, many organizations are active in providing both mitigation and adaptation finance. Therefore, many core contributions had to be reported under cross–cutting, when most may have been able to be distributed between adaptation and mitigation. This resulted in an overrepresentation of cross–cutting among core multilateral funds. In addition to the existing categories of type of support (mitigation, adaptation, cross–cutting, other), one Party introduced a new category, "REDD–plus/biodiversity". A few Parties reported support for REDD–plus or forestry under other.

12. **Sectors:** More than half of the Parties that submitted BR3s provided information, in varied degrees of detail, on the categorization of sectors in the documentation box. Most used the OECD DAC sector and subsector classification (energy, transport, industry, agriculture, forestry, water and sanitation, cross–cutting, other, not applicable). In some cases Parties did not provide any information, while in other cases they marked a data entry as attributable to more than one sector. In these many cases the data were captured under a new category "multisectoral". One Party provided information on the percentage of its contributions allocated to specific sectors. The current reporting of sectoral information in the BR CTF tables does not allow precise sectoral statistics to be derived from it. One of the main limitations is the absence of a common sector classification or coding for Parties' reporting.

13. **New and additional:** Almost half of the Parties that submitted BR3s provided information on "new and additional" financial resources, in varied degrees of detail, in the documentation box. A number of Annex II Parties referred to the lack of an internationally agreed definition of what counts as "new and additional" financial resources. Most Parties indicated that the resources provided by them were new and additional compared with the financial resources reported for 2011–2014 in their previous NCs or BRs. A few Parties stated that the financial resources provided were new and additional pursuant to Article 4, paragraph 3, of the Convention. Many Annex II Parties indicated that the climate finance provided by them could be considered as new and additional because it was not diverted from funding other

development priorities. A number of Parties referred to the Copenhagen Accords and the fast–start finance pledges made therein using climate finance prior to 2009 as the baseline. Several Parties did not provide their criteria for determining new and additional financial resources.

14. **OECD DAC Rio markers:** Many Annex I Parties use the OECD DAC Rio markers for tracking their bilateral, regional and multilateral contributions, integrated into their own monitoring and reporting system. Some Annex I Parties provided specific information on their use of the Rio markers, including on matters related to double counting and definitions, as well as the Joint Report on Multilateral Development Banks' Climate Finance. More Annex II Parties provided information on imputed multilateral contributions than previously, reporting on the climate–related shares of core contributions to multilateral organizations, on the basis of the most recent data provided by multilateral development banks and published by OECD DAC.

15. Parties included information on some limitations and constraints of the Rio markers, such as the need to translate the data into estimated climate finance flows and the need for follow–up work to obtain quantitative results, as the Rio markers provide qualitative rather than quantitative information; and the need to avoid double counting in using the markers. New Zealand reported on efforts to address the constraints of the Rio markers, for instance by standardizing the quantification of climate–related finance on the basis of the markers.

16. **Disaggregated information on recipient country, region, project, programme and activity:** Although recipient country, region, project, programme and activity are reported in the BR CTF tables, the guidelines do not require further specific details on recipients to be reported. As such, information on the recipients of climate finance was relatively limited in the BR3s, with 34 Annex I Parties providing information to varied degrees of detail. This remains an area for further improvement in terms of data gaps and level of detail; the provision of further information could help to enhance understanding of where and what is being targeted by the support provided.

17. **Climate–related private finance:** In accordance with the UNFCCC reporting guidelines on BRs, Annex II Parties should report, to the extent possible, on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non–Annex I Parties and should report on PaMs that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties. Thirteen Annex II Parties provided information in their BR3s on private climate finance, to varied degrees of detail, which represents a significant increase compared with the BR2s. Many highlighted the increasing importance of scaling up climate finance to put countries on the pathway towards low GHG emission and climate–resilient economies, while underlining the continued importance of public climate finance:

(a) Some Annex II Parties provided more extensive qualitative information on the methodologies and definitions used in relation to the mobilization and tracking of private climate finance, such as the definition of public and private finance, direct and indirect mobilization, type of public intervention or instrument, point of measurement, attribution and causality;

(b) In addition, with regard to methodologies for reporting on climate–related private finance, several challenges or issues were acknowledged:

(i) The difficulty of distinguishing the origin of private finance;

(ii) The causality of the mobilization of private finance;

(iii) Confidentiality clauses related to some private sector data;

(iv) Lack of data collection systems;

(v) Impossibility of providing in the CTF tables quantitative estimates of the impact of core funding on multilateral organizations;

(vi) The complexity of attributing mobilized private finance to relevant public contributors.

18. To improve clarity, consistency and transparency, efforts to further improve the reporting guidelines and formats could aim to address the issues noted above.