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## **Report on the technical review of the fourth biennial report of Turkey**

Developed country Parties were requested by decision 2/CP.17 to submit their fourth biennial report to the secretariat by 1 January 2020. This report presents the results of the technical review of the fourth biennial report of Turkey, conducted by an expert review team in accordance with the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”. The review took place from 1 to 5 March 2021 remotely.



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## Abbreviations and acronyms

Annex II Party	Party included in Annex II to the Convention
BR	biennial report
CH <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CTF	common tabular format
ERT	expert review team
GHG	greenhouse gas
HFC	hydrofluorocarbon
INDC	intended nationally determined contribution
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NF <sub>3</sub>	nitrogen trifluoride
NO	not occurring
N <sub>2</sub> O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
RES	renewable energy source(s)
SF <sub>6</sub>	sulfur hexafluoride
TIMES	The Integrated Market Allocation–Energy Flow Optimization Model System
UNFCCC reporting guidelines on BRs	“UNFCCC biennial reporting guidelines for developed country Parties”
UNFCCC reporting guidelines on NCs	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”
WAM	‘with additional measures’
WEM	‘with measures’
WOM	‘without measures’

## **I. Introduction and summary**

### **A. Introduction**

1. This is a report on the centralized technical review of the BR4<sup>1</sup> of Turkey. The review was organized by the secretariat in accordance with the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”, particularly “Part IV: UNFCCC guidelines for the technical review of biennial reports from Parties included in Annex I to the Convention” (annex to decision 13/CP.20).

2. In accordance with the same decision, a draft version of this report was transmitted to the Government of Turkey, which did not provide any comments.

3. The review was conducted together with the review of one other Party included in Annex I to the Convention from 1 to 5 March 2021 remotely<sup>2</sup> by the following team of nominated experts from the UNFCCC roster of experts: Takeshi Enoki (Japan), Gabriela Fischerova (Slovakia), Shorai Kavu (Zimbabwe), Kakhaberi Mdivani (Georgia), Francis Mulenga Mwila (Zambia), Sergii Shmarin (Ukraine), Marius Taranu (Republic of Moldova) and Harry Vreuls (Netherlands). Mr. Taranu and Mr. Vreuls were the lead reviewers. The review was coordinated by Martina Kuehner and Davor Vesligaj (secretariat).

### **B. Summary**

4. The ERT conducted a technical review of the information reported in the BR4 of Turkey in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

#### **1. Timeliness**

5. The BR4 was submitted on 27 December 2019, before the deadline of 1 January 2020 mandated by decision 2/CP.17. The BR4 CTF tables were also submitted on 27 December 2019. The CTF tables and BR4 were resubmitted on 19 March 2021 to address issues raised during the review. The resubmission included changes to the description of the GHG projections and CTF table 6. Unless otherwise specified, the information and values from the latest submission are used in this report.

#### **2. Completeness, transparency of reporting and adherence to the reporting guidelines**

6. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Turkey in its BR4 partially adheres to the UNFCCC reporting guidelines on BRs.

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<sup>1</sup> The BR submission comprises the text of the report and the CTF tables, which are both subject to the technical review.

<sup>2</sup> Owing to the circumstances related to the coronavirus disease 2019, the technical review of the BR submitted by Turkey had to be conducted remotely.

Table 1  
**Summary of completeness and transparency of mandatory information reported by Turkey in its fourth biennial report**

<i>Section of BR</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendation(s)</i>
GHG emissions and removals	Complete	Transparent	–
Quantified economy-wide emission reduction target and assumptions, conditions and methodologies <sup>a</sup>	NA	NA	NA
Progress in achievement of targets <sup>a</sup>	Partially complete	Mostly transparent	Issues 2, 4, 7 and 12 in table 6
Provision of support to developing country Parties <sup>b</sup>	NA	NA	NA

*Note:* A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chap. III below. The assessment of completeness and transparency by the ERT in this table is based only on the “shall” reporting requirements.

<sup>a</sup> Turkey is a Party to the Convention with no target contained in document FCCC/SB/2011/INF.1/Rev.1 or any subsequent update thereto (FCCC/TP/2012/5 and FCCC/SBSTA/2014/INF.6). Therefore, in its BR4, Turkey did not include information on a quantified economy-wide emission reduction target and related conditions and assumptions in CTF table 2(a–f), or information on progress towards the target in CTF tables 3, 4, 4(a)I, 4(a)II and 4(b). Turkey reported in its BR4 and CTF table 6(a) and (b) projections for 2020 and 2030 under the WEM and WOM scenarios.

<sup>b</sup> Turkey is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paras. 3–5, of the Convention.

## II. Technical review of the information reported in the fourth biennial report

### A. Information on greenhouse gas emissions and removals related to the quantified economy-wide emission reduction target

#### 1. Technical assessment of the reported information

7. Total GHG emissions<sup>3</sup> excluding emissions and removals from LULUCF increased by 137.5 per cent between 1990 and 2018, whereas total GHG emissions including net emissions or removals from LULUCF increased by 160.6 per cent over the same period. The increase in total emissions was driven mainly by economic and population growth as well as rapid urbanization, which led to an increase in demand for housing, energy and transportation and a rise in annual electricity consumption per capita (by 83 per cent from 2002 to 2016).

8. Table 2 illustrates the emission trends by sector and by gas for Turkey. Note that information in this paragraph and table 2 is based on Turkey’s 2020 annual submission, version 1.0. All emission data in subsequent chapters are based on Turkey’s BR4 CTF tables unless otherwise noted. The emissions reported in the 2020 annual submission are the same as those reported in CTF table 1.

Table 2  
**Greenhouse gas emissions by sector and by gas for Turkey for 1990–2018**

<i>Sector</i>	<i>GHG emissions (kt CO<sub>2</sub> eq)</i>					<i>Change (%)</i>		<i>Share (%)</i>	
	<i>1990</i>	<i>2000</i>	<i>2010</i>	<i>2017</i>	<i>2018</i>	<i>1990–</i>	<i>2017–</i>	<i>1990</i>	<i>2018</i>
						<i>2018</i>	<i>2018</i>		
1. Energy	139 601.24	216 053.71	287 047.24	379 900.74	373 101.34	167.3	–1.0	63.6	71.6
A1. Energy industries	37 253.19	77 742.54	113 324.26	154 971.47	158 490.44	325.4	–0.2	17.0	30.4

<sup>3</sup> In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified.

	GHG emissions (kt CO <sub>2</sub> eq)					Change (%)		Share (%)	
	1990	2000	2010	2017	2018	1990–	2017–	1990	2018
						2018	2018		
A2. Manufacturing industries and construction	37 161.74	57 936.31	52 332.01	60 180.35	59 578.22	60.3	–14.3	16.9	11.4
A3. Transport	26 968.90	36 464.87	45 391.99	84 659.19	84 501.98	213.3	–14.3	12.3	16.2
A4. and A5. Other	33 707.42	37 764.47	67 772.80	73 390.89	62 868.72	86.5	–	15.4	12.1
B. Fugitive emissions from fuels	4 509.85	6 145.39	8 226.06	6 698.73	7 661.85	69.9	14.4	2.1	1.5
C. CO <sub>2</sub> transport and storage	0.13	0.13	0.13	0.13	0.13	0.0	0.0	0.0	0.0
2. IPPU	22 836.47	26 227.12	48 149.31	63 610.33	65 204.48	185.5	2.5	10.4	12.5
3. Agriculture	45 849.28	42 137.72	44 148.82	62 845.66	64 871.88	41.5	3.2	20.9	12.5
4. LULUCF	–55 777.00	–61 552.67	–73 419.47	–99 882.35	–94 569.69	69.5	–5.3	NA	NA
5. Waste	11 080.83	14 341.27	19 537.20	17 396.11	17 763.89	60.3	2.1	5.1	3.4
6. Other	NO	NO	NO	NO	NO	–	–	–	–
<i>Gas<sup>a</sup></i>									
CO <sub>2</sub>	151 508.47	229 790.60	314 380.03	425 329.23	419 194.75	176.7	–1.4	69.1	80.5
CH <sub>4</sub>	42 405.06	43 557.40	51 319.22	54 231.17	57 576.12	35.8	6.2	19.3	11.1
N <sub>2</sub> O	24 828.99	24 681.83	29 601.83	38 841.75	38 923.81	56.8	0.2	11.3	7.5
HFCs	NO	115.66	3 054.28	5 159.25	5 081.90	–	–1.5	–	1.0
PFCs	625.30	601.00	461.74	73.11	36.62	–94.1	–49.9	0.3	0.0
SF <sub>6</sub>	NO	13.34	65.48	118.33	128.39	–	8.5	–	0.0
NF <sub>3</sub>	NO	NO	NO	NO	NO	–	–	–	–
<b>Total GHG emissions excluding LULUCF</b>	<b>219 367.81</b>	<b>298 759.82</b>	<b>398 882.58</b>	<b>523 752.84</b>	<b>520 941.59</b>	<b>137.5</b>	<b>–0.5</b>	<b>100.0</b>	<b>100.0</b>
<b>Total GHG emissions including LULUCF</b>	<b>163 590.81</b>	<b>237 207.15</b>	<b>325 463.11</b>	<b>423 870.49</b>	<b>426 371.90</b>	<b>160.6</b>	<b>0.6</b>	<b>NA</b>	<b>NA</b>

Source: GHG emission data: Turkey's 2020 annual submission, version 1.0.

<sup>a</sup> Emissions by gas without LULUCF. The Party did not report indirect CO<sub>2</sub> emissions.

9. In brief, Turkey's national inventory arrangements were established in accordance with the Statistics Law (5429) of Turkey, and there have been no changes in these arrangements since the BR3. The Ministry of Environment and Urbanisation is the national focal point for the UNFCCC as well as the Coordination Board on Climate Change and Air Management, a public body and the first legal entity for the national inventory system in Turkey. GHG inventories are prepared by the GHG Emission Inventory Working Group, which was established by the Coordination Board on Climate Change and Air Management and consists of members from the Turkish Statistical Institute, the Ministry of Energy and Natural Resources, the Ministry of Transport and Infrastructure, the Ministry of Environment and Urbanisation and the Ministry of Agriculture and Forestry.

## 2. Assessment of adherence to the reporting guidelines

10. The ERT assessed the information reported in the BR4 of Turkey and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

## B. Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies

### Technical assessment of the reported information

11. For Turkey the Convention entered into force on 24 May 2004. Turkey is a Party to the Convention with no quantified economy-wide emission reduction target contained in

document FCCC/SB/2011/INF.1/Rev.1 or any subsequent update thereto (FCCC/TP/2012/5 and FCCC/SBSTA/2014/INF.6). Therefore, the Party is not obliged to report on a quantified economy-wide emission reduction target and related conditions and assumptions in its BR4 and CTF tables.

12. In the BR4, Turkey provided a description of its status under the Convention and its Kyoto Protocol as well as under the Doha Amendment to the Kyoto Protocol, and explained that it does not have a quantified economy-wide emission reduction target.

## **C. Progress made towards achievement of the quantified economy-wide emission reduction target**

### **1. Mitigation actions and their effects**

#### **(a) Technical assessment of the reported information**

13. Although Turkey has been a Party to the Convention since 2004, it does not have commitments inscribed in Annex B to the Kyoto Protocol or under the Doha Amendment to the Kyoto Protocol. As such, it does not have a quantified economy-wide emission reduction target or any obligation to report on associated mitigation actions. The Party did not report any PaMs in the BR4 and left CTF table 3 blank. However, it provided some information relevant to mitigation actions and their effects during the review, which is summarized below.

14. The Party's main policy documents on climate change are the National Climate Change Strategy (2010–2023), the National Climate Change Action Plan (2011–2023), which is based on the Strategy, and the National Energy Strategy (2019–2023). The Tenth Development Plan, covering 2014–2018, is also a significant document, owing to the introduction of the concept of “green growth” to government policies in several sectors, such as energy, industry, agriculture, transport, construction, services and urbanization. It also sets a long-term development goal of improving Turkey's global position and enhancing citizen welfare through structural transformation based on key social values and expectations, and is designed to help institutions and economic actors act more consistently and deliberately in forward-looking decision-making processes. These documents form the basis for all the Party's cross-cutting and sectoral climate change PaMs.

15. Turkey reported that its climate change mitigation measures focus on energy efficiency, deployment of RES, GHG emission reduction in transportation, and waste management.

16. The National Energy Strategy (2019–2023), shared with the ERT during the review, indicates Turkey's intention to increase electricity generation by 4–6 per cent annually until 2023 in line with its increasing energy demand, which will be met largely by electricity generated from RES and by the newly built Akkuyu nuclear power plant, which will be operational as of 2023. In 2017, the largest share of electricity was generated from natural gas (37.3 per cent) and coal (32.8 per cent), followed by hydropower (19.6 per cent) and RES and waste (10.0 per cent). In the National Energy Strategy, the following amounts of electricity generation were reported for 2019: hydropower, 29,748 MW; domestic lignite, 10,664 MW; wind, 7,633 MW; solar, 5,750 MW; and geothermal (including biomass), 2,678 MW. In it, the Party set out a goal of increasing the shares of installed capacity of RES and domestically produced lignite collectively by 6 per cent (from 59 to 65 per cent) by 2023, with the majority of the additional capacity stemming from hydropower (32,037 MW) and domestic lignite (14,664 MW), followed by wind (11,883 MW), solar (10,000 MW) and geothermal, including biomass (2,884 MW).

#### **(b) Response measures**

17. As Turkey does not have a quantified economy-wide emission reduction target under the Convention, the Party is not obliged to report on response measures.

## 2. Estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry

### Technical assessment of the reported information

18. Since Turkey does not have a quantified economy-wide emission reduction target, the reporting of information in CTF tables 4, 4(a)I, 4(a)II and 4(b) is not applicable. The Party included a footnote to those tables explaining that they were left blank for that reason.

19. In its BR4, however, Turkey indicated its intention to participate in voluntary markets for obtaining emission credits through emission reduction projects.

## 3. Projections overview, methodology and results

### (a) Technical assessment of the reported information

20. Turkey reported updated projections for 2020 and 2030 relative to actual inventory data for 1990, 1995, 2000, 2005, 2010, 2015 and 2017 under the WEM scenario (referred to as the “mitigation scenario” in the BR4).

21. The WEM scenario reported in the BR4 is based on the PaMs listed in Turkey’s INDC, which does not include information on objective, GHGs affected, type of instrument, status (implemented, planned, adopted), start year of implementation, implementing entities, or estimated mitigation impact for the PaMs. Therefore, the ERT was not able to assess whether the WEM scenario reported by Turkey is in line with the UNFCCC reporting guidelines on BRs.

22. In addition to the WEM scenario, Turkey reported the WOM scenario (referred to as the “business as usual scenario” in the BR4), which excludes all PaMs implemented, adopted or planned after 2012.

23. The projections are presented on a sectoral basis and on a gas-by-gas basis for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, HFCs and SF<sub>6</sub> (treating PFCs and HFCs collectively in each case) for 1990–2030. The projections are also provided in an aggregated format for each sector and for a Party total using global warming potential values from the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

### (b) Methodology, assumptions and changes since the previous submission

24. The methodology used for the preparation of the projections is identical to that used for the preparation of the emission projections for the NC7. Turkey did not provide information on the changes since the submission of its NC7 in the assumptions, methodologies, models and approaches used for the projection scenarios, as there have been no changes.

25. Turkey reported that a TIMES-MACRO model was used for the projections for energy consumption in the energy and IPPU sectors. For the remaining sectors, Turkey informed the ERT during the review that it used a combination of linear regression, expert judgment and local modelling for the projections.

26. The mathematical modelling approach to estimating energy-related emissions was applied using the TIMES energy system model from the Energy Technology Systems Analysis Program of the International Energy Agency.<sup>4</sup> This bottom-up, linear dynamic model has the objective of total cost minimization under a given set of constraints (e.g. level of energy demand, GHG emission limits).

27. To prepare its projections, Turkey relied on key underlying assumptions and variables relating to population and economic development indicators, as reported in CTF table 5. The assumptions were not updated on the basis of the most recent economic developments known at the time of the preparation of the projections. Turkey did not report information on other underlying assumptions relating, for example, to electricity demand and energy intensity in the residential and commercial sectors that were used for the projections. During the review,

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<sup>4</sup> See <https://iea-etsap.org/>.



Turkey explained that several other parameters were also considered in the projections, but information thereon was not included in the BR4 owing to potential confidentiality issues.

(c) **Results of projections**

28. The projected emission levels under different scenarios are presented in table 3 and figure 1. Owing to its special circumstances, Turkey does not have an emission reduction target under the Kyoto Protocol or a quantified economy-wide emission reduction target under the Convention. Therefore, the results of the projections cannot be compared with a target. According to its INDC, Turkey intends to reduce its GHG emissions including LULUCF by up to 21 per cent compared with the projected emission level under the WOM scenario by 2030.

Table 3

**Summary of greenhouse gas emission projections for Turkey**

	<i>GHG emissions (kt CO<sub>2</sub> eq/year)</i>	<i>Change in relation to base-year level (%)</i>	<i>Change in relation to 1990 level (%)</i>
Quantified economy-wide emission reduction target under the Convention <sup>a</sup>	NA	NA	NA
Inventory data 1990	163 437.03	NA	0.0
Inventory data 2017	426 345.50	NA	160.9
WOM projections for 2020	672 900.80	NA	311.7
WEM projections for 2020	599 216.89	NA	266.6
WOM projections for 2030	1 174 780.58	NA	618.8
WEM projections for 2030	928 987.17	NA	468.4

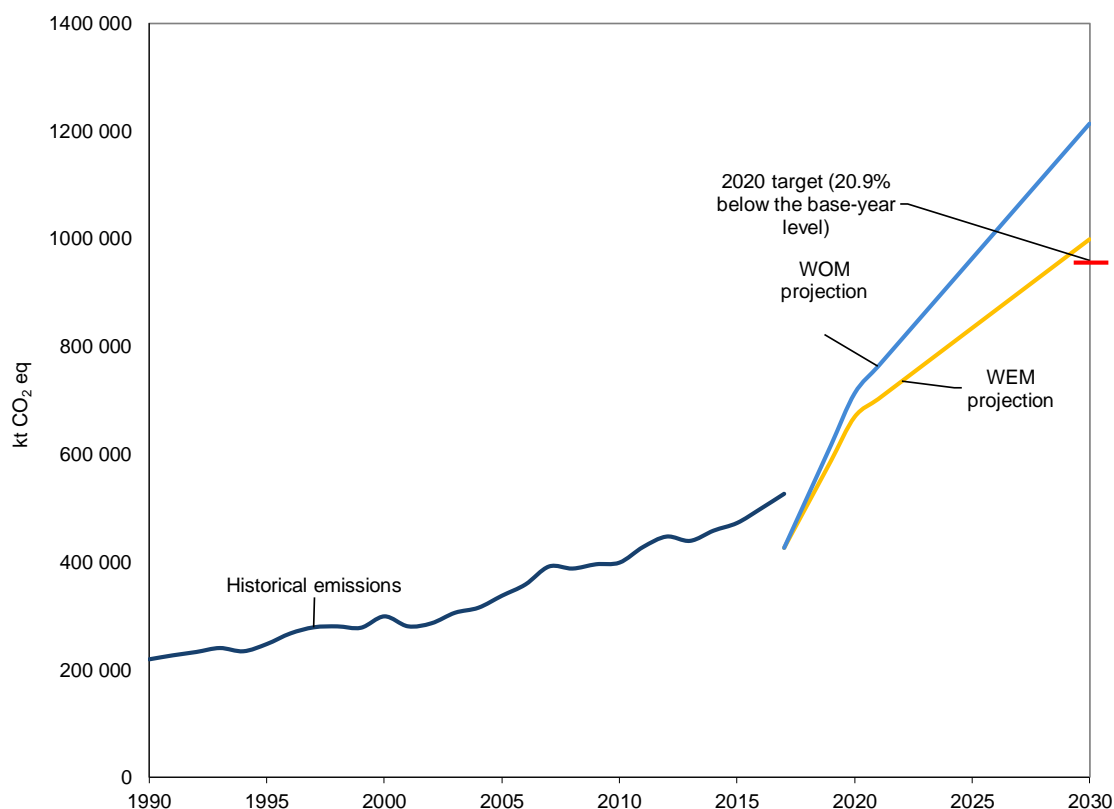
*Source:* Turkey's BR4 and BR4 CTF table 6, version 2.0.

*Note:* The projections are for GHG emissions with LULUCF.

<sup>a</sup> Turkey does not have such a target or an emission target under the Kyoto Protocol.

Figure 1

**Greenhouse gas emission projections reported by Turkey**



*Source:* Turkey's BR4 and BR4 CTF tables 1 and 6 (total GHG emissions including LULUCF).

29. Under the WEM and WOM scenarios, the Party’s total GHG emissions including LULUCF are projected to be 266.6 and 311.7 per cent, respectively, above the 1990 level in 2020, and 468.4 and 618.8 per cent, respectively, above the 1990 level in 2030.

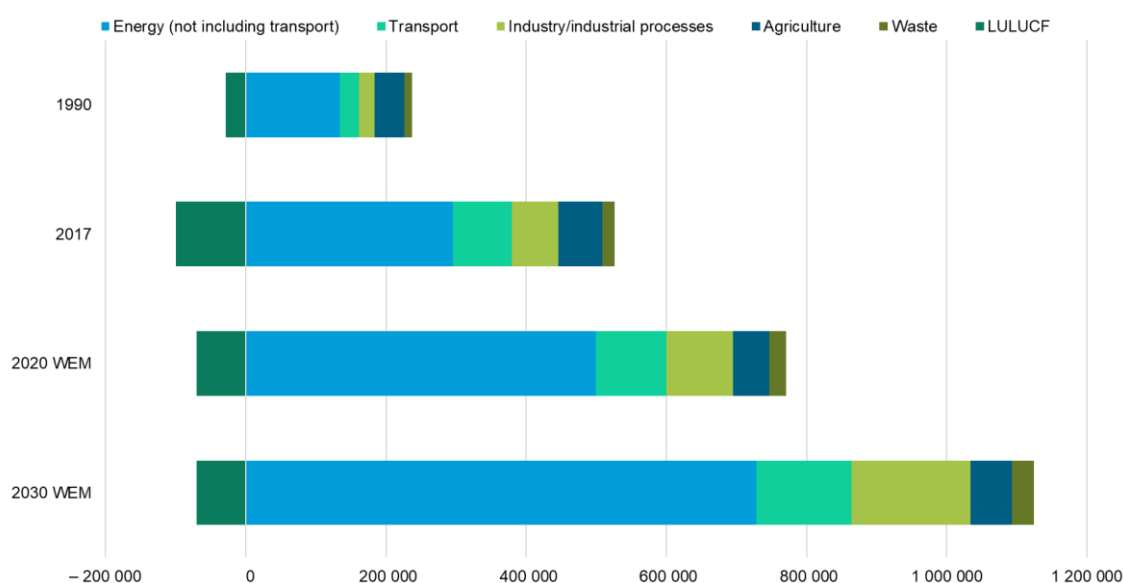
30. Turkey’s reported projections of total GHG emissions for 2020 and 2030 show an increasing emission trend. Its total GHG emissions including LULUCF are projected to be 599,216.89 and 928,987.17 kt CO<sub>2</sub> eq in 2020 and 2030, respectively, under the WEM scenario, which is an increase of 266.6 and 468.4 per cent, respectively, above the 1990 level. According to the WEM scenario, GHG emissions including LULUCF are projected to be 20.9 per cent below the emission level under the WOM scenario by 2030, which is in line with Turkey’s INDC (up to 21 per cent GHG emission reduction).

31. Turkey presented the WEM scenario by sector for 2020 and 2030, as summarized in figure 2 and table 4.

Figure 2

**Greenhouse gas emission projections for Turkey presented by sector**

(kt CO<sub>2</sub> eq)



Source: Turkey’s BR4 CTF table 6.

Table 4

**Summary of greenhouse gas emission projections for Turkey presented by sector**

Sector	GHG emissions and removals (kt CO <sub>2</sub> eq)			Change (%)	
	1990	2020 WEM	2030 WEM	1990–2020 WEM	1990–2030 WEM
Energy (including transport)	139 601.24	499 335.53	728 265.86	257.7	421.7
Transport	26 250.81	101 112.82	135 994.48	285.2	418.1
Industry/industrial processes	22 836.47	94 750.20	169 753.80	314.9	643.3
Agriculture	45 679.99	51 557.04	59 277.89	12.9	29.8
LULUCF	-55 764.67	-70 035.88	-69 710.38	25.6	25.0
Waste	11 083.99	23 610.00	31 400.00	113.0	183.3
Other	-	-	-	-	-
<b>Total GHG emissions excluding LULUCF</b>	<b>219 201.70</b>	<b>669 252.77</b>	<b>998 697.55</b>	<b>217.6</b>	<b>374.0</b>

Source: Turkey’s BR4 CTF table 6, version 2.0.

32. According to the projections reported for 2020 under the WEM scenario, the most significant absolute emission increases are expected to occur in the energy, transport and IPPU sectors. The pattern of projected emissions reported for 2030 under the same scenario remains the same, although the IPPU sector becomes more important than the transport sector in terms of absolute emissions in 2030. As Turkey did not report all key underlying

assumptions or any PaMs in the BR4, the ERT was not able to assess the reasons for the difference in projection trends between the two time frames.

33. Turkey presented the WEM scenario by gas for 2020 and 2030, as summarized in table 5.

Table 5

**Summary of greenhouse gas emission projections for Turkey presented by gas**

Gas	GHG emissions and removals (kt CO <sub>2</sub> eq)			Change (%)	
	1990	2020 WEM	2030 WEM	1990–2020 WEM	1990–2030 WEM
CO <sub>2</sub> <sup>a</sup>	95 617.44	494 057.44	790 338.43	416.7	726.6
CH <sub>4</sub>	42 483.05	71 214.67	91 824.92	67.6	116.1
N <sub>2</sub> O	24 711.24	25 170.91	31 104.62	1.9	25.9
HFCs	–	7 504.22	13 444.50	–	–
PFCs	625.30	–	–	–	–
SF <sub>6</sub>	–	1 269.65	2 274.70	–	–
NF <sub>3</sub>	–	–	–	–	–
<b>Total GHG emissions without LULUCF</b>	<b>210 714.73</b>	<b>669 252.77</b>	<b>998 697.55</b>	<b>205.3</b>	<b>355.6</b>

Source: Turkey's BR4 CTF table 6, version 2.0.

<sup>a</sup> Turkey did not include indirect CO<sub>2</sub> emissions in its projections.

34. For 2020, the most significant absolute increases are projected for CO<sub>2</sub> emissions: 416.7 per cent between 1990 and 2020.

35. For 2030, the most significant absolute increases are likewise projected for CO<sub>2</sub> emissions: 726.6 per cent between 1990 and 2030.

**(d) Assessment of adherence to the reporting guidelines**

36. The ERT assessed the information reported in the BR4 of Turkey and identified issues relating to completeness, transparency and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 6.

Table 6

**Findings on greenhouse gas emission projections reported in the fourth biennial report of Turkey**

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in paragraph 28 Issue type: completeness Assessment: encouragement	The Party did not report a WAM scenario in its BR4. During the review, Turkey explained that new scenarios, including a WAM scenario, will be included in the BR once the INDC has been revised. The ERT reiterates the encouragement from the previous review report for the Party to improve the completeness of its reporting by providing WAM projections in future BRs.
2	Reporting requirement specified in paragraph 29 Issue type: transparency Assessment: recommendation	The Party reported WEM projections in its BR4, but did not explain how the WEM scenario (referred to as the "mitigation scenario" in the BR4) was defined. During the review, Turkey provided information on the plans and policies included in the WEM scenario, which are the PaMs listed in its INDC, but did not include information on their status (implemented, planned, adopted), start year of implementation or estimated mitigation impacts. The ERT reiterates the recommendation from the previous review report for Turkey to improve the transparency of its reporting by clearly identifying the PaMs included in its WEM scenario and their status (e.g. implemented or adopted).
3	Reporting requirement specified in paragraph 30	The Party did not report a sensitivity analysis for any of the projections in its BR4.

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
	<p>Issue type: completeness</p> <p>Assessment: encouragement</p>	<p>During the review, the Party explained that an uncertainty analysis was undertaken for the national GHG inventory for 1990–2017, which includes sensitivity values. However, the ERT noted that the sensitivity analysis is to be conducted for future, not past, emissions.</p> <p>The ERT reiterates the encouragement from the previous review report for the Party to improve the completeness of its reporting by including in the BR a sensitivity analysis for its projections.</p>
4	<p>Reporting requirement specified in paragraph 31</p> <p>Issue type: transparency</p> <p>Assessment: recommendation</p>	<p>The Party presented projections relative to actual inventory data for the preceding years. However, for 2017, the data for CO<sub>2</sub> emissions including LULUCF were inserted in the cell for CO<sub>2</sub> emissions excluding LULUCF, and vice versa; and the historical data in figures 24–25 in the BR4 do not match the GHG inventory data in CTF table 1, other than for 2017.</p> <p>During the review, the Party explained that the mistake will be corrected in its next BR.</p> <p>The ERT recommends that Turkey improve the transparency of its reporting by including correct and consistent inventory and projection emission data in its next BR.</p>
5	<p>Reporting requirement specified in paragraph 32</p> <p>Issue type: transparency</p> <p>Assessment: encouragement</p>	<p>The Party reported WEM projections in its BR4. The ERT understands that the projections have not been updated since the Party’s INDC was submitted in 2015, and the starting point for the projections is the same as for the inventory prepared for the INDC (i.e. 2012).</p> <p>During the review, Turkey confirmed that the starting point for the projections was 2012.</p> <p>The ERT encourages the Party to increase the transparency of its reporting by using the latest year for which inventory data are available as the starting point for the projection scenarios in its BR.</p>
6	<p>Reporting requirement specified in paragraph 35</p> <p>Issue type: completeness</p> <p>Assessment: encouragement</p>	<p>The Party did not report in its BR4 projections of indirect GHGs (carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides).</p> <p>During the review, Turkey explained that the share of the indirect GHG emissions in the total national emissions is negligible in the GHG inventory, and so it did not report indirect emissions in detail for the projections.</p> <p>The ERT reiterates the encouragement from the previous review report for Turkey to improve the completeness of its reporting by including in its next BR projections of indirect GHG emissions or providing a duly substantiated explanation as to why they are considered negligible.</p>
7	<p>Reporting requirement specified in paragraph 36</p> <p>Issue type: completeness</p> <p>Assessment: recommendation</p>	<p>The Party did not explain in its BR4 whether emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and not included in the totals.</p> <p>During the review, Turkey explained that it plans to include aviation in the national measurement, reporting and verification legislation and that all aircraft data will be monitored under the Carbon Offsetting and Reduction Scheme for International Aviation.</p> <p>The ERT reiterates the recommendation from the previous review report for Turkey to improve the completeness of its BR by reporting separately and without including in the totals, to the extent possible, emission projections related to fuel sold to ships and aircraft engaged in international transport.</p>
8	<p>Reporting requirement specified in paragraph 43</p> <p>Issue type: completeness</p> <p>Assessment: encouragement</p>	<p>The Party reported in its BR4 that a TIMES-MACRO model was used for estimating emissions for the energy and IPPU sectors, while various national models and studies were used for estimating non-energy emissions. However, information on the characteristics of those models and studies, their strengths and weaknesses, and how they account for overlap or synergies between PaMs was not provided.</p> <p>During the review, the Party provided information on the characteristics of the TIMES-MACRO model and information on the methods used for estimating emissions for the non-energy sectors (i.e. a combination of linear regression, expert judgment and local modelling). The Party explained that it is considering which models are appropriate for the non-energy sectors, that a modelling approach for these sectors will be applied in revising its INDC, and that explanations of the models and approaches, including their strengths and weaknesses, will be elaborated in the next BR and NC.</p> <p>The ERT encourages the Party improve the completeness of its reporting by describing, in its next BR, the characteristics, strengths and weaknesses of each model or approach used, and how they account for overlap or synergies between PaMs.</p>

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
9	Reporting requirement specified in paragraph 44  Issue type: completeness  Assessment: encouragement	The Party did not provide references containing detailed information on the TIMES-MACRO model in its BR4.  During the review, the Party provided information on the TIMES-MACRO model, which is used for estimating emissions from the energy (including transport) and IPPU sectors, and provided a weblink as well as a reference.  The ERT encourages Turkey to improve the completeness of its reporting by providing references containing detailed information on the models or approaches used.
10	Reporting requirement specified in paragraph 46  Issue type: completeness  Assessment: encouragement	The Party did not report a sensitivity analysis in its BR4.  During the review, the Party explained that an uncertainty analysis was undertaken for the national GHG inventory for 1990–2017, which includes sensitivity values.  The ERT reiterates the encouragement from the previous review report for Turkey to improve the completeness of its next BR by discussing qualitatively and, where possible, quantitatively the sensitivity of the projections to the underlying assumptions.
11	Reporting requirement specified in paragraph 47  Issue type: transparency  Assessment: encouragement	The Party only reported economic and population growth as a key underlying assumption and variable in its BR4. However, the ERT considers that variables such as tax levels, fuel prices, energy demand and intensity, income and household size are important for reviewing emission trends in various sectors under both the WEM and the WOM scenarios.  During the review, Turkey explained that many other variables were considered in the projections but they are confidential.  The ERT reiterates the encouragement from the previous review report for the Party to increase the transparency of its next BR by reporting information on the variables mentioned above.
12	Reporting requirement specified in paragraph 48  Issue type: completeness  Assessment: recommendation	The Party reported its emission trends for 1990–2012 and for 2012 to 2020 and 2030. However, it did not provide any relevant information on the factors and activities driving these emission trends for each sector.  During the review, the Party explained that the BR4 includes descriptions of past and future emission trends by sector.  The ERT recommends that Turkey improve the completeness of its next BR by presenting relevant information on factors and activities driving emission trends for each sector in tabular format in order to provide the reader with an understanding of the emission trends in 1990–2020 and 1990–2030.

*Note:* Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs, as per para. 11 of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and thus adhering to the UNFCCC reporting guidelines on NCs and on BRs.

#### **D. Provision of financial, technological and capacity-building support to developing country Parties**

37. Turkey is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3–5, of the Convention.

### **III. Conclusions and recommendations**

38. The ERT conducted a technical review of the information reported in the BR4 and BR4 CTF tables of Turkey in accordance with the UNFCCC reporting guidelines on BRs. Taking into account that Turkey is a Party to the Convention with no target contained in document FCCC/SB/2011/INF.1/Rev.1 or any subsequent update thereto (FCCC/TP/2012/5 and FCCC/SBSTA/2014/INF.6), it is not required to provide information on a quantified economy-wide emission reduction target or progress towards that target in accordance with the UNFCCC reporting guidelines on BRs. The ERT concludes that the reported information partially adheres to the UNFCCC reporting guidelines on BRs.

39. Turkey's total GHG emissions excluding LULUCF were estimated to be 137.5 per cent above the 1990 level, and total GHG emissions including LULUCF were estimated to be 160.6 per cent above the 1990 level, in 2018. The increases in total emissions were driven by economic and population growth as well as rapid urbanization, which led to increased demand for housing, energy and transportation.

40. The GHG emission projections provided by Turkey in its BR4 correspond to the WOM and WEM scenarios. Under these scenarios, emissions including LULUCF are projected to be 311.7 and 266.6 per cent, respectively, above the 1990 level by 2020. In 2030, emissions including LULUCF are projected to be 618.8 and 468.4 per cent, respectively, above the 1990 level. The GHG emissions including LULUCF in the WEM scenario are projected to be 20.9 per cent below the emission level under the WOM scenario by 2030, which is in line with Turkey's INDC (up to 21 per cent GHG emission reduction).

41. Turkey's main energy and climate change related documents that define all its cross-cutting and sectoral climate change PaMs are the National Climate Change Strategy (2010–2023), the related National Climate Change Action Plan (2011–2023), the National Energy Strategy (2019–2023) and the Tenth Development Plan (2014–2018), in which the concept of “green growth” was introduced to government policies in several sectors, such as energy, industry, agriculture, transport, construction, services and urbanization. An aim of the National Energy Strategy is to increase the shares of installed capacity of domestically produced lignite and RES (predominantly hydropower) collectively by 6 per cent (from 59 to 65 per cent) by 2023, and to meet the increasing demand for electricity with nuclear power generated at a plant currently under construction.

42. Owing to its special circumstances, Turkey does not have emission targets under the Convention or its Kyoto Protocol and thus is not obliged to report associated mitigation actions.

43. Turkey is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3–5, of the Convention.

44. In the course of the review, the ERT formulated the following recommendations for Turkey to improve its adherence to the UNFCCC reporting guidelines on BRs in its next BR:

- (a) To improve the completeness of its reporting by:
  - (i) Reporting separately and without including in the totals, to the extent possible, emission projections related to fuel sold to ships and aircraft engaged in international transport (see issue 7 in table 6);
  - (ii) Presenting relevant information on factors and activities driving emission trends for each sector in order to provide the reader with an understanding of the emission trends in 1990–2020 and 1990–2030 (see issue 12 in table 6);
- (b) To improve the transparency of its reporting by:
  - (i) Clearly identifying the PaMs included in its WEM scenario and their status (e.g. implemented or adopted) (see issue 2 in table 6);
  - (ii) Reporting correct and consistent inventory and projection emission data (see issue 4 in table 6).

## Annex

### Documents and information used during the review

#### A. Reference documents

2019 GHG inventory submission of Turkey. Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019>.

2020 GHG inventory submission of Turkey. Available at <https://unfccc.int/ghg-inventories-annex-i-parties/2020>.

BR4 of Turkey. Available at <https://unfccc.int/BRs>.

BR4 CTF tables of Turkey. Available at <https://unfccc.int/BRs>.

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”. Annex I to decision 24/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf>.

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”. FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

“Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”. Annex to decision 13/CP.20. Available at <http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf>.

Report on the individual review of the annual submission of Turkey submitted in 2019. FCCC/ARR/2019/TUR. Available at [https://unfccc.int/sites/default/files/resource/arr2019\\_TUR.pdf](https://unfccc.int/sites/default/files/resource/arr2019_TUR.pdf).

Report on the technical review of the BR3 of Turkey. FCCC/TRR.3/TUR. Available at [https://unfccc.int/sites/default/files/resource/trr3\\_TUR.pdf](https://unfccc.int/sites/default/files/resource/trr3_TUR.pdf).

“UNFCCC biennial reporting guidelines for developed country Parties”. Annex I to decision 2/CP.17. Available at <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf>.

#### B. Additional information provided by the Party

Responses to questions during the review were received from Hakan Aydoğan (Ministry of Environment and Urbanization of Turkey), including additional material. The following documents<sup>1</sup> were provided by Turkey:

Ministry of Environment and Urbanization of Turkey, 2021, Climate Change and Air Management Coordination Board (CCAMB), one-pager.

Ministry of Energy and Natural Resources of Turkey, 2019, 2019-2023 Strategic Plan (in Turkish).

Ministry of Environment and Urbanization of Turkey, 2021, Turkey’s Long-term Low Emissions and Development Strategies, one pager.

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<sup>1</sup> References reproduced as received from the Party.