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## **Subsidiary Body for Scientific and Technological Advice**

### **Fifty-seventh session**

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Item 18(b) of the provisional agenda

### **Annual reports on technical reviews**

### **Technical review of greenhouse gas inventories of Parties included in Annex I to the Convention**

## **Technical review of greenhouse gas inventories of Parties included in Annex I to the Convention**

### **Report by the secretariat**

#### *Summary*

This report provides information on the greenhouse gas inventory reviews conducted in the 2021 and 2022 review cycles, including the selection of experts and lead reviewers and the composition of the expert review teams, and on plans for the 2023 review cycle. It also provides information on review training activities under the Convention, the 19<sup>th</sup> meeting of greenhouse gas inventory lead reviewers, and progress in updating the UNFCCC roster of experts and the tools and other materials used in the reviews.



## Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
Annex I Party	Party included in Annex I to the Convention
COP	Conference of the Parties
COVID-19	coronavirus disease 2019
CR*	centralized review
CRF	common reporting format
DR*	desk review
ERT	expert review team
ETF	enhanced transparency framework under the Paris Agreement
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FMRL	forest management reference level
GHG	greenhouse gas
HWP	harvested wood products
ICR*	in-country review
IPCC	Intergovernmental Panel on Climate Change
iVTR	inventory virtual team room
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
Kyoto Protocol Supplement	<i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i>
LR	lead reviewer
LULUCF	land use, land-use change and forestry
NA	not applicable
NE	not estimated
NIR	national inventory report
non-Annex I Party	Party not included in Annex I to the Convention
SBSTA	Subsidiary Body for Scientific and Technological Advice
UNFCCC Annex I inventory reporting guidelines	“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”
UNFCCC Annex I inventory review guidelines	“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, Part III: UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”

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\* Used only in tables 1–2.

## **I. Introduction**

### **A. Mandate**

1. COP 9 requested the secretariat to prepare an annual report on GHG inventory review activities, including any recommendations resulting from the meetings of inventory LRs participating in the technical review of GHG inventories of Annex I Parties, for consideration by the SBSTA.<sup>1</sup> COP 20 requested the secretariat to report annually to the SBSTA on the composition of ERTs, including the selection of experts and LRs, and on the actions taken to ensure the application of the selection criteria for ERTs.<sup>2</sup> The annual report to the SBSTA prepared by the LRs collectively at their 19<sup>th</sup> meeting, containing suggestions on how to improve the quality, efficiency and consistency of the GHG inventory reviews,<sup>3</sup> is contained in the annex.

2. COP 20 also requested the secretariat to include in the LR report referred to in paragraph 1 above any revised set of the standardized data comparisons, for consideration by the SBSTA, as well as information on the development of new and revised review tools and materials that support the tasks of the ERTs.<sup>4</sup>

3. Furthermore, COP 20 requested the secretariat to include in its report information on the training programme for review experts for the technical review of GHG inventories of Annex I Parties, in particular on examination procedures and the selection of trainees and instructors, to allow Parties to assess the effectiveness of the programme.<sup>5</sup> In addition, SBSTA 24 requested the secretariat to include in the report information on progress in updating the UNFCCC roster of experts.<sup>6</sup>

### **B. Scope of the report**

4. This report provides information on activities relating to GHG inventory reviews conducted in the 2021 and 2022 review cycles<sup>7</sup> and plans for the 2023 review cycle.

5. The report focuses on the elements of the GHG inventory review process that are specific to the Convention and should be read in conjunction with the report on the technical review of GHG inventories and other information reported by Parties included in Annex I as defined in Article 1, paragraph 7, of the Kyoto Protocol.<sup>8</sup> The lessons learned and challenges in the review processes under the Convention and its Kyoto Protocol have many elements in common.

### **C. Possible action by the Subsidiary Body for Scientific and Technological Advice**

6. The SBSTA will be invited to take note of this report.

## **II. Submissions and review of information from Annex I Parties**

7. GHG inventory review activities, along with some training of review experts and the organization of LR meetings, are funded from the Trust Fund for the Core Budget of the UNFCCC and by voluntary contributions to specific projects via the Trust Fund for

<sup>1</sup> Decision 12/CP.9, para. 10.

<sup>2</sup> Decision 13/CP.20, annex, para. 40.

<sup>3</sup> Prepared in accordance with decision 13/CP.20, annex, para. 44.

<sup>4</sup> Decision 13/CP.20, para. 6, and annex, para. 78.

<sup>5</sup> Decision 14/CP.20, para. 3.

<sup>6</sup> FCCC/SBSTA/2006/5, para. 95.

<sup>7</sup> For the 2022 review cycle, information as at 26 September 2022 has been provided.

<sup>8</sup> FCCC/SBSTA/2022/INF.4.

Supplementary Activities. Some related work, such as strengthening the secretariat's capacity to support review and training activities and developing the GHG information system, continues to be funded by voluntary contributions to the Trust Fund for Supplementary Activities.

## A. 2021 cycle of individual greenhouse gas inventory reviews

8. The secretariat received original submissions of annual GHG inventories for 2021 from all 43 Annex I Parties.<sup>9</sup> The secretariat organized the 2021 review cycle taking into consideration the secretariat's programme budget for the biennium 2020–2021.<sup>10</sup> In accordance with this programme, while Parties continued to submit inventories on an annual basis, the core budget provided for the organization of 44 individual inventory reviews during the biennium. Additional individual reviews could be carried out if supported through supplementary funding.

9. For the 2021 review cycle, the available supplementary funding was insufficient to complement the resources from the core budget, and therefore the secretariat organized individual reviews of 22 of the submissions referred to in paragraph 8 above. Of the individual reviews, 16 were organized in five centralized reviews conducted remotely (between 6 September and 23 October 2021) and 6 in three desk reviews (between 30 August and 2 October 2021). Most of the review reports had been published by 26 September 2022.<sup>11</sup> Table 1 provides information on the 2021 review cycle and the publication date of each review report.

Table 1  
**2021 review cycle for greenhouse gas inventory submissions**

<i>Party</i>	<i>Review dates (review type)<sup>a</sup></i>	<i>Review report publication date</i>
Australia	6–11 September 2021 (CR)	3 March 2022
Austria	No individual review of the 2021 inventory submission	NA
Belarus	18–23 October 2021 (CR)	2 March 2022
Belgium	No individual review of the 2021 inventory submission	NA
Bulgaria	No individual review of the 2021 inventory submission	NA
Canada	18–23 October 2021 (CR)	11 May 2022
Croatia	No individual review of the 2021 inventory submission	NA
Cyprus	No individual review of the 2021 inventory submission	NA
Czechia	6–11 September 2021 (CR)	10 February 2022
Denmark	6–11 September 2021 (CR)	17 August 2022
Estonia	No individual review of the 2021 inventory submission	NA
EU	No individual review of the 2021 inventory submission	NA
Finland	No individual review of the 2021 inventory submission	NA
France	20–25 September 2021 (CR)	17 September 2022
Germany	No individual review of the 2021 inventory submission	NA
Greece	27 September to 2 October 2021 (DR)	25 April 2022

<sup>9</sup> Kazakhstan is considered to be a Party included in Annex I for the purpose of the Kyoto Protocol while remaining a non-Annex I Party for the purpose of the Convention (see document FCCC/KP/CMP/2009/21, para. 91).

<sup>10</sup> FCCC/SBI/2019/4.

<sup>11</sup> Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/inventory-review-reports-2021>.

<i>Party</i>	<i>Review dates (review type)<sup>a</sup></i>	<i>Review report publication date</i>
Hungary	6–11 September 2021 (CR)	22 February 2022
Iceland	4–9 October 2021 (CR)	Not yet published
Ireland	No individual review of the 2021 inventory submission	NA
Italy	20–25 September 2021 (CR)	23 March 2022
Japan	No individual review of the 2021 inventory submission	NA
Kazakhstan <sup>b</sup>	18–23 October 2021 (CR)	18 May 2022
Latvia	No individual review of the 2021 inventory submission	NA
Liechtenstein	No individual review of the 2021 inventory submission	NA
Lithuania	4–9 October 2021 (CR)	18 July 2022
Luxembourg	No individual review of the 2021 inventory submission	NA
Malta	4–9 October 2021 (CR)	Not yet published
Monaco	27 September to 2 October 2021 (DR)	15 September 2022
Netherlands	27 September to 2 October 2021 (DR)	27 April 2022
New Zealand	6–11 September 2021 (CR)	Not yet published
Norway	No individual review of the 2021 inventory submission	NA
Poland	No individual review of the 2021 inventory submission	NA
Portugal	No individual review of the 2021 inventory submission	NA
Romania	No individual review of the 2021 inventory submission	NA
Russian Federation	No individual review of the 2021 inventory submission	NA
Slovakia	20–25 September 2021 (CR)	Not yet published
Slovenia	No individual review of the 2021 inventory submission	NA
Spain	27 September to 2 October 2021 (DR)	23 February 2022
Sweden	No individual review of the 2021 inventory submission	NA
Switzerland	6–11 September 2021 (CR)	18 January 2022
Türkiye	4–9 October 2021 (CR)	5 May 2022
Ukraine	30 August to 4 September 2021 (DR)	1 March 2022
United Kingdom	30 August to 4 September 2021 (DR)	1 March 2022
United States	No individual review of the 2021 inventory submission	NA

<sup>a</sup> In the secretariat's programme budget for the biennium 2020–2021, the core budget provided for the organization of 44 individual inventory reviews during the biennium. Additional individual reviews could be carried out if supported through supplementary funding.

<sup>b</sup> See footnote 9.

## **B. 2022 cycle of individual greenhouse gas inventory reviews**

### **1. Greenhouse gas inventory submissions**

10. The secretariat received original submissions of annual GHG inventories for 2022 from all 43 Annex I Parties (see table 2).

11. The secretariat organized the 2022 review cycle taking into consideration the secretariat's programme budget for the biennium 2022–2023.

12. For the 2022 review cycle, the secretariat organized individual reviews of 38 of the submissions referred to in paragraph 10 above.<sup>12</sup> Of the individual reviews, 37 were organized in 11 centralized reviews (10 held in Bonn, and 1 held in Canberra, Australia (between 5 September and 10 December 2022)), and 1 as an in-country review (29 August to 3 September 2022 in Tokyo, Japan). Table 2 shows the review dates and type of review for each Party.

Table 2  
**Submission and review of greenhouse gas inventories in 2022**

<i>Party</i>	<i>Original submission date</i>		<i>Review dates (review type)<sup>a</sup></i>
	<i>NIR</i>	<i>CRF tables</i>	
Australia	27 May 2022	27 May 2022	12–17 September 2022 (CR)
Austria	15 April 2022	15 April 2022	26 September to 1 October 2022 (CR)
Belarus	15 April 2022	15 April 2022	No individual review of the 2022 inventory submission
Belgium	14 April 2022	14 April 2022	10–15 October 2022 (CR)
Bulgaria	15 April 2022	15 April 2022	17–22 October 2022 (CR)
Canada	14 April 2022	14 April 2022	No individual review of the 2022 inventory submission
Croatia	12 April 2022	13 April 2022	10–15 October 2022 (CR)
Cyprus	5 April 2022	24 March 2022	5–10 September 2022 (CR)
Czechia	14 April 2022	14 April 2022	10–15 October 2022 (CR)
Denmark	15 April 2022	15 April 2022	26 September to 1 October 2022 (CR)
Estonia	12 April 2022	12 April 2022	12–17 September 2022 (CR)
EU	14 April 2022	14 April 2022	5–10 December 2022 (CR)
Finland	14 April 2022	14 April 2022	12–17 September 2022 (CR)
France	14 April 2022	12 April 2022	19–24 September 2022 (CR)
Germany	14 April 2022	8 April 2022	10–15 October 2022 (CR)
Greece	15 April 2022	15 April 2022	5–10 September 2022 (CR)
Hungary	15 April 2022	15 April 2022	10–15 October 2022 (CR)
Iceland	12 April 2022	12 April 2022	19–24 September 2022 (CR)
Ireland	8 April 2022	8 April 2022	19–24 September 2022 (CR)
Italy	12 April 2022	8 April 2022	26 September to 1 October 2022 (CR)
Japan	15 April 2022	15 April 2022	29 August to 3 September 2022 (ICR)
Kazakhstan <sup>b</sup>	15 April 2022	15 April 2022	No individual review of the 2022 inventory submission
Latvia	14 April 2022	14 April 2022	10–15 October 2022 (CR)
Liechtenstein	14 April 2022	14 April 2022	19–24 September 2022 (CR)
Lithuania	15 April 2022	12 April 2022	5–10 September 2022 (CR)
Luxembourg	14 April 2022	14 April 2022	12–17 September 2022 (CR)
Malta	11 April 2022	13 April 2022	12–17 September 2022 (CR)
Monaco	11 April 2022	11 April 2022	19–24 September 2022 (CR)

<sup>12</sup> Australia, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, EU, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland and United States of America.

Party	Original submission date		Review dates (review type) <sup>a</sup>
	NIR	CRF tables	
Netherlands	14 April 2022	14 April 2022	17–22 October 2022 (CR)
New Zealand	14 April 2022	14 April 2022	12–17 September 2022 (CR)
Norway	8 April 2022	8 April 2022	12–17 September 2022 (CR)
Poland	13 April 2022	13 April 2022	17–22 October 2022 (CR)
Portugal	7 April 2022	7 April 2022	26 September to 1 October 2022 (CR)
Romania	14 April 2022	14 April 2022	19–24 September 2022 (CR)
Russian Federation	15 April 2022	15 April 2022	No individual review of the 2022 inventory submission
Slovakia	14 April 2022	13 April 2022	17–22 October 2022 (CR)
Slovenia	15 April 2022	13 April 2022	10–15 October 2022 (CR)
Spain	12 April 2022	12 April 2022	19–24 September 2022 (CR)
Sweden	12 April 2022	12 April 2022	12–17 September 2022 (CR)
Switzerland	14 April 2022	14 April 2022	5–10 September 2022 (CR)
Türkiye	14 April 2022	14 April 2022	No individual review of the 2022 inventory submission
Ukraine	13 May 2022	13 May 2022	No individual review of the 2022 inventory submission
United Kingdom	14 April 2022	14 April 2022	19–24 September 2022 (CR)
United States	15 April 2022	15 April 2022	12–17 September 2022 (CR)

<sup>a</sup> In the secretariat's programme budget for the biennium 2022–2023, the core budget provides for the organization of 44 individual inventory reviews during the biennium. Additional individual reviews could be carried out if supported through supplementary funding.

<sup>b</sup> See footnote 9.

## 2. Organization of reviews and composition of expert review teams

13. In accordance with the UNFCCC Annex I inventory review guidelines, the GHG inventory review process is conducted in two stages: initial assessment by the secretariat, which results in status reports and assessment reports, and individual review by ERTs, which results in review reports.

14. The initial assessment stage provides an immediate quality assessment aiming to verify that the GHG inventory submission is consistent, complete and timely and that its format is correct. Status reports for 38 GHG inventory submissions subject to an individual review under the Convention were prepared and published on the UNFCCC website.<sup>13</sup> Assessment reports provide a preliminary assessment of the inventory of an individual Party and identify any potential inventory problems, which are then assessed during the individual review stage.<sup>14</sup> Assessment reports were prepared for all Parties that were subject to individual review during the 2022 review cycle.

15. In the 2022 review cycle, the secretariat coordinated the review of the GHG inventories of 38 Parties (see para. 12 above). The reports on the reviews were in preparation at the time of publication of this document.

<sup>13</sup> <https://unfccc.int/ghg-inventories-annex-i-parties/2022>. Aside from the 38 status reports prepared for Parties subject to individual review under the Convention in 2022, the secretariat prepared a status report for one other Party.

<sup>14</sup> Assessment reports are not published but are provided to the respective Party and to the ERTs for use in individual reviews.

16. New experts who have taken the training courses for reviews under the Convention and have passed the corresponding examinations can participate in an ERT.<sup>15</sup> In 2022, the secretariat invited 262 experts to participate in the GHG inventory reviews, 96 of whom declined on account of other obligations, a heavy workload, lack of financial resources or other reasons. Another 22 experts informed the secretariat of their availability on dates other than the scheduled review dates on which they were invited to participate or of their availability only on particular dates, which introduced additional challenges when planning the reviews.

17. In selecting members of ERTs, the secretariat seeks to ensure an overall geographical balance in the number of experts from Annex I and non-Annex I Parties. In the 2022 review cycle, 162 individuals from 64 Parties served as inventory experts on review teams, of which 67 were from non-Annex I Parties, 19 from Annex I Parties with economies in transition and 76 from other Annex I Parties (see table 3).

18. Between 2000, when individual reviews of GHG inventory submissions were first conducted during the trial period, and 2022, 523 individual experts from 100 Parties (41 Annex I Parties and 59 non-Annex I Parties) participated in GHG inventory review activities.

19. Table 3 provides a breakdown of the participation of experts by nominating Party in the 2022 review cycle (an expert participating in multiple reviews is counted as a different expert for each review). The table shows that experts from the following Annex I Parties were not involved in the review process in 2022: Croatia, Cyprus, Iceland, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Russian Federation, Slovakia and Slovenia. There were several general reasons for experts not participating in the 2022 review cycle: (1) some Annex I Parties, namely Croatia, Cyprus, Iceland, Kazakhstan, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Russian Federation and Slovenia, had not nominated any experts; (2) some Parties had nominated experts but those experts had not yet taken the training courses and passed the relevant examinations; (3) some Parties had not fully updated their nominations to the UNFCCC roster of experts and some nominated experts included in the roster were not available for the reviews; and (4) some experts had a heavy workload or other obligations during the review period.

20. Table 3 also shows that many Parties continued to strongly support the review process by providing multiple experts, and that experts from 16 Parties participated in four or more reviews in 2022: Such strong support is a key factor for the success of the reviews.

Table 3

**Number of experts participating in the 2022 greenhouse gas inventory review cycle, by nominating Party**

<i>Annex I Parties</i>	<i>Annex I Parties with economies in transition</i>	<i>Non-Annex I Parties</i>
Australia – 8	Japan – 7	Belarus – 3
Austria – 3	Netherlands – 5	Algeria – 1
Belgium – 4	New Zealand – 5	Mongolia – 1
Canada – 2	Norway – 2	Bosnia and Herzegovina – 1
Denmark – 2	Poland – 1	Brazil – 14
EU – 2	Portugal – 1	Chile – 3
Finland – 2	Spain – 2	China – 4
France – 2	Sweden – 2	Colombia – 1
Germany – 4	Switzerland – 5	Costa Rica – 1
Greece – 2	Türkiye – 5	Egypt – 1
Hungary – 1	United Kingdom – 6	El Salvador – 1
Ireland – 2	United States – 4	Eswatini – 2
		Georgia – 2
		Ghana – 4
		Mozambique – 1
		North Macedonia – 1
		Peru – 2
		Republic of Moldova – 1
		San Marino – 2
		South Africa – 3
		Sudan – 1
		Thailand – 5
		United Republic of Tanzania – 3
		Venezuela (Bolivarian Republic of) – 1

<sup>15</sup> As per decisions 12/CP.9, annex I, and 14/CP.20, annex. For more information on the training of review experts, see document FCCC/SBSTA/2020/INF.4, chap. V.

<i>Annex I Parties</i>	<i>Annex I Parties with economies in transition</i>	<i>Non-Annex I Parties</i>	
Italy – 2		Guyana – 1	Viet Nam – 1
		Kenya – 1	Zambia – 1
		Malawi – 1	Zimbabwe – 4
		Mauritius – 1	
		Mexico – 1	

21. When inviting experts to participate as LRs, the secretariat seeks to ensure an overall geographical balance in the number of experts from Annex I and non-Annex I Parties. It also takes into consideration the experts' experience in preparing and managing GHG inventories, previous participation in reviews, technical expertise in the GHG inventory sectors and successful completion of the training courses. In 2022, 24 experts from 17 Parties served as LRs, of which 14 were from Annex I Parties (of which 1 was an Annex I Party with an economy in transition) and 10 from non-Annex I Parties.

22. For each review, the secretariat invited two to four review experts for each sector and two generalists to cover cross-cutting issues. In accordance with the conclusions and recommendations from the 11<sup>th</sup> meeting of inventory LRs, the secretariat sought to ensure that no LULUCF experts acted as LRs.<sup>16</sup>

23. The secretariat continues to reinforce ERTs undertaking centralized reviews with new review experts, which is important for ensuring a sufficient number of experienced experts for future reviews. In 2022, 21 new experts who had taken the training courses and passed the examinations participated in reviews, assuming full responsibility as reviewers with some support from the LRs and experienced reviewers.

24. The secretariat is making efforts to further improve the timeliness of the publication of the review reports during the 2022 review cycle while maintaining the required quality, in particular by increasing the number of experts per team and updating the review tools and materials (see chap. VI below).

### C. 2023 cycle of individual greenhouse gas inventory reviews

25. Annex I Parties are to submit their 2023 GHG inventory submissions in accordance with the UNFCCC Annex I inventory reporting guidelines by 15 April 2023. The inventories will be reviewed in accordance with the UNFCCC Annex I inventory review guidelines and taking into consideration the decisions adopted on the secretariat's programme budget for the biennium 2022–2023.

## III. Meeting of greenhouse gas inventory lead reviewers

26. The 19th meeting of GHG inventory LRs took place on 2 March and from 14 to 17 March 2022 as a virtual meeting owing to circumstances related to the COVID-19 pandemic. A total of 70 experts from Annex I Parties were invited and 54 attended. Of the 53 experts from non-Annex I Parties invited to the meeting, 23 attended. In addition, one co-lead of the technical analysis of biennial update reports, five LULUCF reviewers, two representatives of FAO and two representatives of the European Environment Agency attended the meeting as observers.

27. The meeting facilitated the work of the LRs in fulfilling their task of ensuring the consistency of reviews across Parties and in providing suggestions on how to improve the quality, efficiency and consistency of the reviews.<sup>17</sup> Such reports provide the SBSTA with

<sup>16</sup> FCCC/SBSTA/2014/INF.17, para. 45.

<sup>17</sup> As per decision 13/CP.20, annex; decision 22/CMP.1, annex, in conjunction with decision 4/CMP.11; and decision 24/CMP.1, annex II.

input for its guidance to the secretariat on selecting experts and coordinating ERTs and the review process. LRs were also invited to provide guidance on matters such as review tools and materials and review report templates.<sup>18</sup> The conclusions and recommendations from the meeting, for consideration by the SBSTA,<sup>19</sup> can be found in the annex.

#### **IV. UNFCCC roster of experts and availability of nominated experts**

28. As at 15 September 2022, the UNFCCC roster of experts included 2,069 GHG inventory experts: 1,373 from non-Annex I Parties, 692 from Annex I Parties and 4 from international organizations.<sup>20</sup> Among them, 670 had passed all mandatory examinations to participate in the annual reviews of GHG inventory submissions under the Convention by Annex I Parties.

29. Each year, national focal points are requested to nominate more GHG inventory experts to the roster. In December 2021, before registration opened for the first cycle of the 2022 basic course of the training programme for review experts for the technical review of GHG inventories of Annex I Parties, the secretariat sent a letter to all national focal points calling for nominations of new experts who could participate in the reviews of GHG inventories and who would be available to take the basic course in 2022. The letter contained a link to the online form available on the UNFCCC website to facilitate experts' self-nomination to the roster and approval by the national focal points.

30. In addition, in 2021–2022, the secretariat invited and encouraged nominated experts to successfully complete the mandatory training courses for reviews under the Convention and its Kyoto Protocol by passing all the relevant examinations. Further, the secretariat directly contacted experts who had participated in the basic course in recent years but failed one of the two mandatory examinations and encouraged them to retake the examinations, noting that examinations have been available online since 2021, thus addressing the issue of travel restrictions due to the COVID-19 pandemic.

#### **V. Training programme for experts for the technical review of greenhouse gas inventories of Annex I Parties**

31. The basic course of the training programme for review experts for the technical review of GHG inventories of Annex I Parties, mandated by the COP and implemented by the secretariat,<sup>21</sup> provides a comprehensive introduction to the UNFCCC Annex I inventory review guidelines, an overview of the UNFCCC Annex I inventory reporting guidelines, guidance on procedures and approaches for the technical review of GHG inventories based on the methodological guidance provided by the IPCC and detailed information on the specific aspects of the review of the five GHG inventory sectors. The secretariat offers the basic course as an instructed course facilitated by instructors or, for experts with sufficient experience of national GHG inventories, as an online course without the support of instructors.

32. In 2022, two cycles of the basic course facilitated by instructors online (7 February to 13 April 2022 and 18 April to 22 June 2022) were held virtually. Each cycle included webinars (on cross-cutting and sector-specific review) and a three-day review simulation exercise facilitated by the instructors. The final examinations were organized on an online examination platform with remote invigilation. In total, 59 experts took part in the instructed basic course in 2022: 24 in the first cycle and 35 in the second. Together with the participants of the instructed and non-instructed courses and the participants of previous cycles who retook the examinations (see para. 25 above), 70 experts took the examinations. As a result,

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<sup>18</sup> See decision 13/CP.20, annex, para. 48.

<sup>19</sup> As per decisions 13/CP.20, annex, para. 44, and 22/CMP.1, annex, para. 40(a).

<sup>20</sup> The roster is available at <https://www4.unfccc.int/sites/roestaging/Pages/Home.aspx>.

<sup>21</sup> Decision 14/CP.20.

27 experts (13 from non-Annex I Parties and 14 from Annex I Parties) became eligible to take part in the reviews.

33. In 2022, a refresher seminar for experienced GHG inventory reviewers, scheduled to be held in conjunction with the 19<sup>th</sup> meeting of GHG inventory LRs, was postponed again (as in 2020–2021) owing to that meeting being held virtually and the limited time slots in which participants from different time zones can meet.

34. Since June 2012, the secretariat has offered an online course on the review of complex models and higher-tier methods to both experienced and new experts. In this reporting cycle, no experts took the course.

35. The secretariat continues its efforts to facilitate the access of experts to the relevant training programmes, periodically invite national focal points to nominate technical experts for the training programmes and provide information on the training courses on the UNFCCC website and by other means of outreach.

## **VI. Review tools and materials**

36. Providing support for the UNFCCC reporting and review processes requires a number of information technology systems and tools that differ in purpose, scope, size and degree of support. They vary from extensive, complex databases, such as the data warehouse and the GHG Locator tool, to smaller, focused review tools serving particular analytical purposes in the review process, such as the Statistical Outlier Detection Tool.

### **A. Greenhouse gas data warehouse and review tools**

37. In order to fulfil its mandates, the secretariat established a data warehouse for storing and managing data related to GHG inventories and other submissions. Such a complex database is needed to process the extensive sets of GHG data reported by Parties, and it enables key reports and review tools to be generated and information in the GHG data interface to be updated. An upgrade of the data warehouse addressing the revised UNFCCC Annex I inventory reporting guidelines and the UNFCCC Annex I inventory review guidelines and technology obsolescence issues was completed in 2019.

### **B. Aggregate information on greenhouse gas emissions by sources and removals by sinks**

38. COP 20 requested the secretariat to compile and tabulate aggregate information and trends concerning GHG emissions by sources and removals by sinks from the latest available GHG inventory submissions of Annex I Parties, and any other inventory information, and to publish that information on the UNFCCC website and in a stand-alone document.<sup>22</sup> The latest aggregate GHG information was published on 1 July 2022.<sup>23</sup>

### **C. Greenhouse gas data interface**

39. The GHG data interface is a portal on the UNFCCC website<sup>24</sup> that provides public access to GHG data reported by Parties under the Convention and its Kyoto Protocol. The data in the interface were updated in June 2022 to include information from the GHG inventory submissions that had been received as at 27 May 2022. A new update is anticipated to take place in October 2022, to include information as at 27 October 2022.

<sup>22</sup> Decision 13/CP.20, para. 8.

<sup>23</sup> FCCC/WEB/AGI/2022 (available at <https://unfccc.int/documents/510888>).

<sup>24</sup> <https://unfccc.int/process-and-meetings/transparency-and-reporting/greenhouse-gas-data/ghg-data-unfccc/ghg-data-from-unfccc>.

## **D. Standardized set of data comparisons**

40. COP 20 requested the secretariat to develop and implement a standardized set of data comparisons and to include information on those data comparisons in its annual report to the SBSTA.<sup>25</sup> A total of 39 status reports were generated for the 2022 review cycle.<sup>26</sup>

## **E. GHG Locator and other review tools**

41. The GHG Locator tool presents the time-series data from submitted CRF tables of all Annex I Parties in a user-friendly format.<sup>27</sup> It shows quantitative information (e.g. emission estimates, implied emission factors and activity data) and qualitative information (e.g. notation keys) reported by all Annex I Parties. The Comparison tool compares submissions and parameters in a user-friendly format.<sup>28</sup> Other review tools, such as the Statistical Outlier Detection Tool,<sup>29</sup> are mostly used internally by review officers to prepare necessary outputs throughout different stages of the review process.

42. At their 19<sup>th</sup> meeting, the LRs welcomed the information provided by the secretariat on the review tools, especially with regard to the improved version of the Statistical Outlier Detection Tool. The LRs noted with appreciation the usefulness of the review tools in supporting the review process and were interested to hear that the overall functionality and performance of the review tools had produced data that were more user-friendly.<sup>30</sup>

## **F. Inventory virtual team room**

43. The GHG iVTR is an online application facilitating the review of GHG inventories of Annex I Parties. It supports the consistency, timeliness and efficiency of the review process by providing a collaborative environment for the work of ERTs, Parties and the secretariat before, during and after the review week. The iVTR is a platform where users can share and store documents, raise and clarify issues identified during reviews, ask technical questions, exchange information, and prepare and monitor the progress of the review reports.

44. At their 19<sup>th</sup> meeting, the LRs noted with appreciation the information provided by the secretariat on its recent work updating the GHG iVTR. The LRs acknowledged the plans presented by the secretariat for providing the existing tools without any modifications in the next review cycle and welcomed its proposal to provide training to experts on these tools before the review cycle or during the kick-off meetings and to promote the use of the review issues database module of the iVTR in future review cycles.

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<sup>25</sup> Decision 13/CP.20, paras. 4 and 6.

<sup>26</sup> See footnote 13 above.

<sup>27</sup> Available at <http://rt.unfccc.int/locator>.

<sup>28</sup> Available at <http://rt.unfccc.int/comparison>.

<sup>29</sup> Available at <http://rt.unfccc.int/sodt>.

<sup>30</sup> See the relevant conclusions and recommendations from the 16<sup>th</sup> and 17<sup>th</sup> meetings of GHG inventory LRs: documents FCCC/SBSTA/2019/INF.4, annex, paras. 18, 19, 23 and 24, and FCCC/SBSTA/2020/INF.3, annex, para. 10, respectively.

## Annex

# Conclusions and recommendations from the 19<sup>th</sup> meeting of greenhouse gas inventory lead reviewers

## I. Introduction

1. The 19<sup>th</sup> meeting of GHG inventory LRs took place on 2 March and from 14 to 17 March 2022 as a virtual meeting owing to the circumstances related to the COVID-19 pandemic. A total of 53 experts from non-Annex I Parties and 70 experts from Annex I Parties were invited to the meeting. Of the 114 experts who registered for the meeting, 77 attended, of whom 23 were from non-Annex I Parties and 54 were from Annex I Parties. In addition, one co-lead of the technical analysis of biennial update reports and 5 LULUCF reviewers attended the meeting as observers.

2. Two representatives of FAO and two representatives of the European Environment Agency attended the meeting as observers. The LRs noted with appreciation the presentations made by the representatives of FAO on using FAO data to support GHG inventory reviews for the agriculture and land-use sectors. The LRs highlighted the usefulness of FAO data sources for supporting GHG inventory reviews and encouraged ERTs to continue using FAO data resources.

3. In accordance with the annex to decision 13/CP.20, the annex to decision 22/CMP.1 in conjunction with decision 4/CMP.11, and annex II to decision 24/CMP.1, the meeting helped to facilitate the work of LRs in fulfilling their task to ensure consistency of GHG inventory reviews across Parties and the quality and objectivity of the technical examinations therein, and in providing suggestions on how to improve the quality, efficiency and consistency of the reviews.<sup>1</sup> In addition, at the meeting the LRs provided guidance on matters such as review tools and procedures.<sup>2</sup> These conclusions and recommendations will be reported to SBSTA 57.<sup>3</sup> Such reports provide the SBSTA with inputs for providing further guidance to the secretariat on selecting experts and coordinating ERTs and the GHG inventory review process.

## II. Organization of the 2022 greenhouse gas inventory review process

4. The LRs took note of the information provided by the secretariat on the plan for organizing the 2022 GHG inventory review cycle and invited the secretariat to proceed with the remaining steps in organizing the 2022 review cycle, taking into consideration the conclusions and recommendations outlined in paragraphs 5–8 and 12 below.

5. The LRs noted the continued challenges in organizing and conducting the 2021 review cycle resulting from the pandemic and associated travel restrictions, including the limited availability of experts and the impact of remote working on ERTs and Parties. Despite these challenges, the 2021 review cycle was successfully organized and the review reports are complete and of good quality. The timing of the publication of the reports has not been significantly affected. Although it is expected that the reviews in 2022 will be conducted in person, the LRs encourage the secretariat to continue organizing the reviews taking into consideration the practices implemented during the 2021 review cycle, which significantly contributed to minimizing the impacts of the pandemic and associated travel restrictions and facilitating collaboration across different time zones on the review process. These practices include increasing the time allotted for the reviews, holding sectoral meetings, selecting ERTs with due consideration for regional and gender balance, and prioritizing crucial review tasks. The LRs noted the secretariat's plan to organize in-person centralized reviews and

<sup>1</sup> As per decision 13/CP.20, annex, paras. 42 and 44.

<sup>2</sup> See decision 13/CP.20, annex, para. 48.

<sup>3</sup> As per decisions 13/CP.20, annex, para. 44, and 22/CMP.1, annex, para. 40(a).

in-country reviews for the 2022 review cycle. However, noting the uncertainty regarding the evolution of the pandemic and associated travel restrictions, the LRs invited the secretariat to develop contingency plans for holding remote reviews in 2022 to minimize the impacts of any such remote work on the review process, and to implement the contingency plans if necessary.

6. The LRs noted that 2022 is the last review cycle of the second commitment period of the Kyoto Protocol. Therefore, the LRs agreed to encourage ERTs to prioritize assessing the issues in previous reviews that have not yet been addressed by Parties, any issues resulting from recalculations that have changed emission/removal estimates, and those issues that have implications for the accounting under the Kyoto Protocol, particularly those related to KP-LULUCF. The LRs also agreed to make every effort to guide ERTs during the 2022 review cycle so that they are focused, pragmatic and efficient.

7. The LRs noted that more experts will be required for the 2022 review cycle than for previous years, in particular because all Annex I Parties with commitments under the second commitment period of the Kyoto Protocol have to be reviewed during this cycle and because of the additional tasks related to the full review of KP-LULUCF, both for Parties that have elected annual accounting and those that have elected commitment period accounting. The LRs noted with concern that a lack of sufficient experts to be available for the 2022 review cycle could risk the timely completion of the review process and the quality of the review reports.

8. The LRs reiterated the need for Parties to continue encouraging, supporting, funding and facilitating the participation of their nominated experts in GHG inventory reviews, particularly in remote reviews, to ensure completeness of ERTs, an appropriate balance of expertise in ERTs and the high quality of review reports.

### **III. Training of greenhouse gas inventory review experts in 2021 and future activities**

9. The LRs welcomed the information on training activities undertaken by the secretariat in 2021 and on ongoing and planned training activities in 2022 for review experts for the technical review of GHG inventories of Annex I Parties and for members of ERTs participating in annual reviews under Article 8 of the Kyoto Protocol.

10. The LRs stressed the importance of Parties nominating experts with GHG inventory experience and sectoral technical expertise to the UNFCCC roster of experts, regularly updating their nominations and supporting experts in completing the required training activities and examinations.

### **IV. Improvements to the greenhouse gas inventory virtual team room and review tools**

11. The LRs welcomed the information provided by the secretariat on the existing review tools (e.g. GHG Locator, Comparison Tool, Statistical Outlier Detection Tool) and communication tools (e.g. GHG iVTR) used in the past and current review cycles. The LRs noted with appreciation the usefulness of the review tools in supporting the review process.

12. The LRs acknowledged the plans envisaged by the secretariat for providing the existing tools without any modifications in the next review cycle. The LRs welcomed the proposal of the secretariat to provide training for experts on existing review and communication tools before the review week or during the kick-off meetings with review experts and to promote the use of the review issues database module of the iVTR in the next review cycle.

## **V. Improvements to the quality, efficiency and consistency of reviews in accordance with decisions 13/CP.20 and 4/CMP.11**

### **A. Reporting and review of activities under Article 3, paragraphs 3–4, of the Kyoto Protocol in 2022**

13. The LRs welcomed the seminar for LRs and LULUCF reviewers held by the secretariat on 14 March 2022 focusing on the review of KP-LULUCF for the last reporting year of the second commitment period of the Kyoto Protocol. The LRs noted potential challenges for both Parties and reviewers, such as limited time for reviewing KP-LULUCF accounting information for Parties with commitment period accounting, limited time for Parties to address new findings of the ERTs, the large number of issues identified in previous review cycles that have not yet been addressed and the need to ensure consistency in addressing issues of the same nature across Parties.

14. The LRs noted with appreciation that, in the context of the assessment reports for the 2021 review cycle, the secretariat, with the support of a small group of LULUCF experts, prepared a list of KP-LULUCF key checks for Parties to the Kyoto Protocol with quantified emission limitation or reduction commitments, in response to a request by the LRs at their 18<sup>th</sup> meeting.<sup>4</sup> To promote the efficiency of the 2022 review cycle, and in preparing the assessment reports during the early stages of this cycle, the LRs requested the secretariat once more to prepare a list of KP-LULUCF key checks following the Parties' 2022 submissions and to share without delay the results from the key checks with the respective Parties for their comments. To support the ERTs in their activities, the results from the key checks will be provided to ERTs ahead of the review week.

15. The LRs noted that all issues and recommendations for KP-LULUCF, in particular those with an impact on accounting, should be resolved within the time frame of the 2022 review process, including any application of adjustments.

16. The LRs encouraged the LULUCF experts to revisit the training programme for members of ERTs participating in annual reviews under Article 8 of the Kyoto Protocol to refresh their knowledge and better prepare them for the 2022 review cycle.<sup>5</sup> The LRs suggested that the materials presented at the seminar for LRs and LULUCF reviewers be used as a basis for a supporting tool to facilitate the review of KP-LULUCF and proposed that the secretariat share the materials with all LRs and LULUCF experts engaged in the 2022 review cycle.

### **B. Improvements to the consistency of reviews**

17. The LRs discussed specific ways of improving the GHG inventory review process on the basis of experience from the 2021 review cycle and the background paper prepared by the secretariat on consistency issues. The LRs agreed on conclusions and recommendations on four consistency issues, consisting of one issue identified during the 2021 review cycle on the review of estimates of HWP under the Convention, and three issues identified during the 2020 review cycle that the LRs asked to be included for consideration at their 19<sup>th</sup> meeting because they had been unable to complete their consideration of them at their 18<sup>th</sup> meeting.<sup>6</sup> The latter three issues concern the review of technical corrections to the FMRL during the annual accounting year or commitment period accounting year; the assessment of the application of the insignificance criteria within a given category; and the scope of and approach to the review of the EU GHG inventory. Together with the consistency issue identified during the 2021 review cycle, these three issues were included in the background paper prepared by the secretariat on consistency issues.

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<sup>4</sup> See para. 17(a) of the conclusions and recommendations from the 18<sup>th</sup> meeting of GHG inventory LRs. Available at [https://unfccc.int/sites/default/files/resource/Conclusions%20GHG\\_LRs\\_2021.pdf](https://unfccc.int/sites/default/files/resource/Conclusions%20GHG_LRs_2021.pdf).

<sup>5</sup> Available at <https://climate.csod.com>.

<sup>6</sup> See para. 13 of the conclusions and recommendations from the 18<sup>th</sup> meeting of GHG inventory LRs. Available at [https://unfccc.int/sites/default/files/resource/Conclusions%20GHG\\_LRs\\_2021.pdf](https://unfccc.int/sites/default/files/resource/Conclusions%20GHG_LRs_2021.pdf).

18. The LRs recommended that LRs promote the following guidance and procedures:
- (a) Review of the technical correction to the FMRL during the annual accounting year or commitment period accounting year:
    - (i) In the case of Parties with annual accounting, the LRs noted that the accounting quantity for KP-LULUCF is calculated on the basis of cumulative emissions and removals, using the most recent inventory data, and that any recalculations of emissions and removals for previous years will be incorporated automatically into the accounting quantity for the current reported year. If the Party recalculates historical data on forest management or forest land remaining forest land used for the calculation of the FMRL without calculating a technical correction that ensures methodological consistency between the FMRL corrected (FMRL plus technical correction) and FM estimates during the second commitment period of the Kyoto Protocol, the review of the technical correction and any possible adjustment will take into account the historical years used for the calculation of the FMRL;
    - (ii) The LRs concluded that, as soon as possible, the ERT must alert the Party concerned of any potential problem identified with the technical correction and provide the Party with the opportunity to submit additional information or correct the problem. If this is not possible during the review week, the ERT should follow the procedures set out for formulating the list of potential problems and further questions raised by the ERT in accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” and raise a potential problem regarding the technical correction value, if the change in the value of the adjusted technical correction (the difference between the adjusted FMRL corrected and the FMRL corrected submitted by the Party) exceeds the thresholds of insignificance (0.05 per cent of total national GHG emissions without LULUCF for the latest reported inventory year, or 500 kt carbon dioxide equivalent);
    - (iii) If the Party revises its technical correction estimate before or during the review week to correct the potential problem identified by the ERT, the ERT should request that the Party officially resubmit its complete CRF tables containing the revised technical correction estimates and relevant related information in accordance with the Kyoto Protocol Supplement;
  - (b) Assessment of the application of the insignificance criteria within a given category:
    - (i) The LRs noted that the insignificance criteria defined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines apply at the category/subcategory level,<sup>7</sup> where the notation key “NE” may be used in the CRF tables;
    - (ii) Where a Party does not estimate emissions for sources within a category/subcategory, the ERT should not include this issue in the list of potential problems and further questions raised by the ERT if the change resulting from an adjustment related to this issue at the mandatory category/subcategory level is likely below the thresholds given in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines;<sup>8</sup>
    - (iii) The LRs recalled that at their 16<sup>th</sup> meeting they agreed to use a decision tree that clarifies how the thresholds defined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines should be applied when considering issues for inclusion in the list of potential problems and further questions raised by the ERT.<sup>9</sup> The LRs requested the secretariat to revise the decision tree taking into consideration the conclusions and recommendations at their 18<sup>th</sup> and 19<sup>th</sup> meetings;

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<sup>7</sup> Including categories and subcategories under “other” and carbon pools in the reporting under LULUCF.

<sup>8</sup> See decision 4/CMP.11, annex II, para. 19.

<sup>9</sup> See para. 27(a) of the conclusions and recommendations from the 16<sup>th</sup> meeting of GHG inventory LRs. Available at [https://unfccc.int/sites/default/files/resource/04\\_GHG-LRs-2019-conclusions.pdf](https://unfccc.int/sites/default/files/resource/04_GHG-LRs-2019-conclusions.pdf).

(c) Scope of and approach to the review of the EU GHG inventory: The LRs concluded that the conclusions from the 16<sup>th</sup> meeting of LRs on the focus of the EU review,<sup>10</sup> considering elements of the conclusions from the 3<sup>rd</sup> meeting of LRs, should be supplemented with the following recommendations for ERTs:

(i) At the start of the review, the LRs should request the ERT to focus the review on the transparency of the information reported in the EU NIR and provide guidance thereon, particularly for key categories identified at the EU level, followed by categories for which recalculations have been performed, and categories that are the subject of recommendations in the previous review report, as well as for findings in the initial assessment and progress in the implementation of planned improvements. The LRs recalled that the EU GHG inventory is compiled from the national GHG inventories of the EU member States, Iceland and the United Kingdom of Great Britain and Northern Ireland<sup>11</sup> and that the ERT should assess whether the EU GHG inventory is compiled in accordance with the UNFCCC Annex I inventory reporting guidelines;

(ii) The LRs should ensure that recommendations in the review report are addressed to the EU, because the inventories of the member States, Iceland and the United Kingdom fall outside the scope of the EU review;

(iii) The LRs noted that the ERT may also consider information on the efforts undertaken at the EU level to address the main issues pertaining to the member States, Iceland and the United Kingdom, as reflected in previous EU review reports;

(d) Review of estimates of HWP under the Convention:

(i) The LRs concluded that, to ensure comparability and accuracy, the ERTs should review the information on the reporting of HWP under the Convention and ensure that Annex I Parties demonstrate that HWP estimates are consistent with the 2006 IPCC Guidelines as implemented through the UNFCCC Annex I inventory reporting guidelines, independently of the fact that for providing information on KP-LULUCF, Annex I Parties that are Parties to the Kyoto Protocol shall also apply the Kyoto Protocol Supplement, as appropriate and in a manner consistent with decision 2/CMP.7, and consistent with the UNFCCC Annex I inventory reporting guidelines;

(ii) In the particular case of HWP reporting under the Convention and in accordance with the 2006 IPCC Guidelines, the ERT should review the related reported information and, if necessary, provide recommendations to ensure that, where the HWP contribution is reported as zero, Parties clearly demonstrate that the annual HWP carbon stock changes in the HWP pool are “insignificant”<sup>12</sup> (which in this context means that the annual HWP carbon stock change, expressed in units of carbon dioxide, is less than the size of any key category).

## VI. Other matters

19. On 2 March 2022, the joint opening of the 2022 annual meetings of GHG inventory LRs and LRs for the review of biennial reports and national communications was held to provide an update on the transparency-related outcomes of COP 26 and an overview of the key timelines and deliverables for the transition from the existing measurement, reporting and verification arrangements to the ETF under the Paris Agreement. The LRs took note of the recent decisions on the ETF adopted at COP 26 and the secretariat’s updates on and plans for the period of transition to the ETF and requested the secretariat to inform the LRs about the specific plan for the development of training materials for the expert review and the

<sup>10</sup> See para. 27(c) of the conclusions and recommendations from the 16<sup>th</sup> meeting of GHG inventory LRs. Available at [https://unfccc.int/sites/default/files/resource/04\\_GHG-LRs-2019-conclusions.pdf](https://unfccc.int/sites/default/files/resource/04_GHG-LRs-2019-conclusions.pdf).

<sup>11</sup> The 2021 EU national inventory report (p.i) indicates that the EU GHG inventory refers to the EU GHG inventory under the UNFCCC (scope: EU and the United Kingdom) and the Kyoto Protocol (scope: EU, Iceland and the United Kingdom).

<sup>12</sup> As defined in the 2006 IPCC Guidelines (vol. 4, chap. 12.2.21, p.12.8).

simplified review under the ETF, in order to allow the provision of technical advice in a timely manner.

20. The LRs also took note of the work to be done in preparation for the ETF in the limited time available, including developing the necessary procedures for simplified reviews of NIRs. Further, the LRs noted that experience in the review of GHG inventories, including that of GHG inventory LRs, could prove valuable for developing review approaches under the ETF, and requested the secretariat to provide relevant information at the meeting of LRs under the Paris Agreement.

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