**REPORT OF THE TECHNOLOGY AND ECONOMIC ASSESSMENT PANEL**
**SEPTEMBER 2013**
**VOLUME 2**

**DECISION XXIV/7 TASK FORCE REPORT ADDITIONAL INFORMATION TO ALTERNATIVES ON ODS**

# CORRIGENDUM

**(related to the PDF version of the report)**

## A. Various corrections

Page 41, under "HCFC-1233zd(E), costs, replace "that" by "than".

Page 45, second last line, replace "ban use" by "ban the use of".

Page 55, 4th paragraph, replace "Table 1" by "Table 4-1".

Page 82, second paragraph, first line, replace "has being" by "has been".

Page 69, 3rd paragraph, 7th line, replace by: "Pham and Rajendran (2012) reported on drop-in tests with HFC-32 in an R-410A system. In the cooling mode, the capacity was about 3% higher with a 1% lower COP and in the heating mode, the capacity was about 4% higher with a negligible change in COP.

## B. Table for Stationary Air Conditioning in the ExSum (page 4) as well as pages 128 and 132

In the Executive Summary, page 4, in the table "All countries, Stationary Air Conditioning" change the number (1113.9) to (1210.1) to read

***All countries, stationary air conditioning***

| | **Total consumption (ktonnes)** | | | | **Total consumption (Mt $CO_2$-eq)** | | | |
|---|---|---|---|---|---|---|---|---|
| Year/ Substance | HCFC | HFC | Alter-Natives | Total | HCFC | HFC | Alter-natives | Total (no alternatives)* |
| **2015** | 354.6 | 220.0 | 35.6 | 610.1 | 634.6 | 431.9 | 17.6 | **1084.1 (1136.3)** |
| **2020** | 255.8 | 249.9 | 132.1 | 637.9 | 457.9 | 492.0 | 65.3 | **1015.3 (1210.1)** |
| **Aggregated 2013-20** | 2600.6 | 1832.8 | 524.3 | 4957.8 | 4655 | 3601 | 259 | **8515 (9288)** |

* Note; the amounts given in parentheses are the ones without using (lower GWP) alternatives

In the Executive Summary, page 5, 3rd line after the three tables, replace "30%" by "about 40%".

Page 127, last paragraph, delete the word "percentage" after "57.4".

Page 128, replace the first sentence in the second paragraph after Table 8-5 by:
In the year 2020, 137 Mt $CO_2$-eq. can be avoided (in a total of 805 Mt $CO_2$-eq.). This amounts to 17% of the total negative environmental impact.

Page 128, in Table 8-6, replace (1113.9) by (1210.1).

Page 129, replace the first paragraph (referring to Table 8-6) by
In the year 2020, 194.8 Mt $CO_2$-eq. can be avoided (in a total of 1210.1 $CO_2$-eq.). This amounts to 16.1% of the total negative environmental impact. Aggregated over the period 2013-2020, the percentage that can be avoided would be 8.3% (773 Mt in a total of 9288 Mt $CO_2$-eq.).

Page 132, in the first table in section 8.1.4, replace (1113.9) by (1210.1).

In section 8.1.4, in the 3rd line under the three tables, replace "30%" by "about 40%".

## C. Additional information

In section 103, the report mentions that information was received from the EC, the government of Japan and the company Shecco.

Via the Ozone Secretariat, information was also received from the government of the USA, but due to transmission problems, the Task Force did not receive it in time for review before completion of the XXIV/7 TF report. The information and comments received are as follows:

- *There are currently cars on the road using HFO-1234yf in North American and Europe. In North America, the Cadillac XTS, Chevrolet Spark (EV), are being sold with HFO-1234yf. In Europe HFO-1234yf has been adopted more widely in models including the Opel Mokka, Chevrolet Malibu and Trax, Subaru XV, Hyundai i30, and the Ford Transit Connect.*
- *According to a Final Report released by the SAE International Cooperative Research Project (CRP1234-4) on R-1234yf safety (see attachment), overall risk of vehicle fire exposure attributed to use of R-1234yf is conservatively estimated at 3 x $10^{-12}$ events per vehicle operating hour. The Report states that the overall risk is nearly six orders of magnitude less than the current risk of vehicle fires due to all causes and also well below other risks accepted by the general public.*
- *The statement in Section 3.8.1 on the cost of HFO-1234yf is misleading. Although the cost of HFO-1234yf refrigerant may be significantly higher than the cost of HFC-134a refrigerant, the system is only slightly more expensive.*
- *Commercial production of HFO-1234yf was delayed in 2012 while new chemical registration issues in China were being resolved. DuPont announced in October 2012 that China registration was complete and product was now fully available to meet the requirements of the MAC Directive.*
- *Additionally, as of 2011, other blends have been proposed for automotive AC, namely AC-5 and AC-6. These blends, proposed by Mexichem Fluor, are currently being evaluated by another SAE International Cooperative Research Program, (CRP).*
- *Ammonia-$CO_2$ refrigeration systems and compact chillers are commercially available and should be included among the alternative technologies discussed as currently being deployed (see attachments).*

The Task Force is thankful to the USA for submitting this information in writing. The comments received in writing echoed those made verbally in Bangkok, which were already considered in the revision of the Task Force report. The Task Force has again checked the six different comments against the contents of the Task Force report. Based on this check, the Task Force considers the current XXIV/7 TF report text as adequate, since there are no inconsistencies with the additional information provided in writing by the USA.