Technology and Economic Assessment Panel

Progress of work and emerging issues
37th MOP High-level Segment

UN environment
United Nations Environment Programme

TEAP

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TEAP Membership 2025

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TEAP Planned Reports 2026 & 2027

2026: 9 expected reports (excluding any new MOP-37 decisions)

- Progress Report (sector updates, organizational matters/TOR/matrix, life-cycle refrigerant management (LRM))
- Study on MLF replenishment and supplemental report, if needed
- Quadrennial assessment (TEAP and five TOCs assessment reports)

2027: 3 expected reports (excluding any new MOP-37 decisions)

- Progress Report
- Synthesis Report
- Decision XXVIII/2 para 4 Report (periodic review of alternatives to HFCs)

Preparing for Replenishment Study

- TEAP has begun preliminary work
- Updating approach to modelling
- Awaiting final Terms of Reference
- Noting short timeframe for completion of study (~4 months)
- Coordination with Ozone and Multilateral Fund Secretariats for updated data and information up to end of 2025

Decision XXXV/3: TEAP 2026 Assessment (1)

Parties have requested that the 2026 report of the TEAP should include an assessment and evaluation of the following 11 topics:

a) Technical progress in the production and consumption sectors in the transition to alternatives for controlled substances in all sectors

b) Process agents and feedstock uses

c) An assessment of information relating to emissions of controlled substances from feedstock and production processes and other manufacturing processes

d) Status of banks and stocks of controlled substances

e) Challenges facing all parties to the Montreal Protocol in implementing obligations under the Protocol and maintaining the phase-outs already achieved

f) The impact of the phase-out of ODS and the phasedown of HFCs on sustainable development

Decision XXXV/3: 2026 Assessment (2)

g) Technical advances in developing alternatives to HFCs taking into account, in particular, EE, safety, and suitability for use in high-ambient-temperature countries

h) Information on uses where HCFCs were not previously used and HFCs have been used and are currently used, such as electronics manufacturing

i) Assessment of whether production of HFOs results in fugitive emissions of HFCs

j) Potential impacts of evolving policies and regulations (e.g., on PFAS) in relation to the management of controlled substances and their alternatives and breakdown products

k) Information on refrigerant management, with particular attention to leakage prevention and end-of-life management

Additional Standing Decisions in 2026 Assessment

- Decision XXXXI/5: Laboratory and analytical uses
- Decision XXXI/6: Process agents
- Decision XXIX/12: HFCs not listed in Annex F
- Decision XXX/2: HCFC availability
- Decision XXXVI/2: LRM
- Decision XXXVI/4: Additional information on VSLS
- Decision XXXVI/6: Developments regarding MDIs
- Decision XXXVI/10: Alternatives to HFCs in Group 2 parties

Sector Focus Areas for the 2026 Assessment Reports

Foams

- Successful transitions from HCFCs and HFCs continue for most foam types.
- Costs of fluorinated FBAs (i.e., HFCs, HFOs, and HCFOs) have incentivized many companies to transition to non-fluorinated alternatives or blends with smaller amounts of fluorinated FBAs.
- Because, fluorinated FBAs can enhance thermal performance, foams with smaller amounts of fluorinated FBAs may have difficulty meeting thermal standards
  - Water-blown foams have become more common where thermal performance is not critical.
- Some non-fluorinated FBAs have higher flammability and toxicity than fluorinated FBAs and may require different handling and precautions for their safe use.
  - Some SMEs have reportedly adopted flammable FBAs without safety precautions, including testing in spray foam.
  - Owing to toxicity concerns, 1,2 dichloroethylene (1,2-DCE) use in PU foam is currently being reviewed by at least one party.

Fire Suppression

- Owing to uncertainty created by PFAS regulations, ICAO removed the 2024 moratorium on using halon 1301 in cargo compartments of completely new aircraft designs, Resolution A42-11
- Therefore, civil aviation is committing to require halon 1301 for at least 50+ years, well beyond all estimated run-out dates
- FSTOC continues to work with ICAO and monitor their efforts on a potential halon 1301 EUN
- PFAS uncertainty of some existing halon alternatives means that other enduring uses may require halons for longer, further increasing the possibility of an EUN
- Agent Lifecycle Management (ALM) remains necessary to minimize emissions to conserve banks of fire suppression agents for future use

Methyl Bromide

- Data for 2024 shows an increase of approx. 2000 t of QPS use (i.e. 25%)
- MB emissions are no longer declining, and a substantial gap remains with respect to natural baselines.
- Alternatives exist for the remaining ~10,000 t of QPS use and some are being adopted for key sectors including timber and grain (e.g. phosphine, ethyl formate, ethane dinitrile). In particular, alternatives are available for most pre-shipment (PS) uses (~35% of QPS use)
- A review of the technical justification of preplant soil uses being QPS will be discussed.
- The impact of decreasing worker safety limits (5 ppm to 1 ppm) for human toxicity will be a key issue for the report for both remaining MB uses and its alternatives.
- All non-QPS MB consumption has reportedly been phased out. The phase out for 62,000 t of non-QPS MB and the huge benefits already achieved for the ozone layer and the Montreal Protocol will be addressed.

Medical & Chemicals

- Production and feedstocks use of Controlled Substances and information received from parties under Decision XXXVI/5
- Updated information on HFC-23, CTC, VSLS, n-propyl bromide, process agents, laboratory and analytical uses, including relevant information on alternatives
- HFCs not listed in Annex F, including information on the use of products, where available, as identified by the SAP
- An update on increasing quantities used in surface coating of chips of semiconductor and other electronics manufacturing
- Updated information, if available, on destruction technologies
- Trends in use of controlled substances and availability and adoption of alternatives for aerosols and pressurized metered dose inhalers (MDIs)

Refrigeration, Air Conditioning, and Heat Pumps

- Since the previous report, no new single-component refrigerants have been introduced. Only a limited number of zeotropic blends have been announced.
- All RACHP sectors continue to transition to lower GWP A1, A2L/B2L and A3 refrigerants, though the pace of change differs by region.
- Information and knowledge of the use of flammable refrigerants, both A2L and A3, continues to be a significant hurdle for the adoption of lower GWP refrigerants, both in A5 and some non-A5 parties.
- Cross-cutting issues such as energy efficiency, LRM as well as data centers growth are among the more important topics for the sector.

PFAS regulations: Potential impact on Montreal Protocol controlled substances/alternatives (MP-CS&A)

- Over 15 PFAS definitions largely based on chemical structure rather than impact to human health and the environment
- Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) are persistent, bioaccumulative toxins (PBT) and included in all PFAS definitions
- The PBT properties of PFOA/PFOS are improperly extended to other chemicals including MP-CS&A
- MP-CS&A are not persistent, bioaccumulative toxins.
- Some MP-CS&A degrade to a variable degree to trifluoroacetic acid (TFA) salts
  - Persistent in surface waters; increasing concentrations are currently projected to remain below toxicity concern levels.
  - Knowledge gaps on relative contributions from other sources of TFA in the environment (e.g. pharmaceuticals, pesticides)

PFAS regulations: Potential impacts on Montreal Protocol

- Delaying commercial investment in transition
- Narrowing the availability of alternatives in some applications
- Slowing phasedown of HFCs due to slow uptake of lower GWP alternatives
- Decreasing Energy Efficiency in some applications

- **Examples of specific sector impacts**
  - **Fire suppression**: uncertainty for cargo compartment replacement (2-BTP); longer-term reliance for halon 1301 (i.e., EUN) for enduring uses
  - **pMDI propellants**: HFC-134a currently used; HFO-1234ze approved

Thank you