INTERMEDIATE EVALUATION OF CFC PRODUCTION SECTOR PHASE-OUT AGREEMENTS

COUNTRY REPORT INDIA

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List of Acronyms and Abbreviations

CFC	ChloroFluoroCarbon
CPE	Chlorinated Polyethylene
CSPE	Chlorosulphonated Polyethylene
CTC	Carbon Tetrachloride
ExCom	Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol
HCFC	HydroChloroFluoroCarbon
HFC	HydroFluoroCarbon
ktpa	Thousand (metric) ton per year (generally used for annual capacity of chemical plants)
MP	Montreal Protocol
mt, ton	Metric ton (1000 kilogram)
NOU	National Ozone Unit
ODP	Ozone depletion potential
ODS	Ozone depleting substance
PMU	Project Management Unit
REGMA	Refrigerant Gas Manufacturers' Association
Rs.	Indian Rupee [1]
SME	Small and medium enterprise
TA	Technical Assistance
TCA	Trichloroethane (Methyl chloroform or T111)
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UR	Unit Ratio
WB	World Bank

[1] At the time of the evaluation 1 US $=45,26 Rs.

EVALUATION OF THE CFC PRODUCTION SECTOR IN INDIA

1 Purpose and Scope of the Evaluation

1. The terms of reference, methodology and scope of the evaluation and the proceedings of the mission are described in the synthesis report submitted to the 42nd meeting of the Executive Committee (Doc. UNEP/OzL.Pro/ExCom/42/12).

2 CFC Production Sector Phase-out Achieved so far

2. In India, the four CFC producers, working within their industry association REGMA, engaged, at the outset of the process, management consultants to guide them in making proposals for a controlled phase-down of CFCs. These proposals took into account the actual and realized capacity utilization of each of the producers, the split between domestic and export sales, the growth expectations of the market and the anticipated phase-down schedule of the CFCs. After Government consultations and the debate at the ExCom, the result is the present quota reduction scheme and disbursement schedule.

3. Quotas are reduced annually, and proportionately for each producer according to the initial scheme. Since 2002 US $ 6 million/annum is distributed to the CFC producers minus a few hundred thousand US $ for Technical Assistance (see section 9 below). In the period 2002-2005 this amounts to just under US $3.20/kg of phased-out CFC. The compensation per ton was higher in 1999-2001 because it was felt that the amount of preparation of the enterprises was higher then than afterwards. There is no separate allocation for CFC 11 and 12 since both are generally co-produced in the manufacturing plant reactors and are subsequently separated by condensation and distillation stages, which may involve quite large amounts of CFC-11 recycling to manufacture the larger product CFC-12.

4. The maximum allowable production of CFCs in India is 13,176 tons in 2004. In India, the main products are CFC-12 and CFC-11, with some limited production of CFC-113, mainly for conversion to the chemical intermediate CFC-113a.

Table 1: Overview of the CFC Production Sector Agreement with India

Year	Maximum Allowable Production as per Agreement (Metric Tonnes)	Verified Actual Gross Prod. (Metric Tonnes)	Production in Excess of Agreement (Metric Tonnes)	Verified Net Saleable Prod. (Metric Tonnes)	A7 Data – CFC Production (ODP Tonnes)	Annual Funding Tranches as per Agreement (US$)	Approved Funds (US$)	Funds Disbursed (US$)[1]
1999	22,588.0	22,411			22,498.6	12,000,000	12,000,000	12,000,000
2000	20,706.0	20,407			20,403.8	11,000,000	11,000,000	10,819,398
2001	18,824.0	18,939	115	18,691	18,689.2	11,000,000	11,000,000	9,657,000
2002	16,941.0	17,078	137	16,890	16,883.7	6,000,000	6,000,000	5,850,000
2003	15,058.0	15,104	46	15,015		6,000,000	6,000,000	
2004	13,176.0					6,000,000		
2005	11,294.0					6,000,000		
2006	7,342.0					6,000,000		
2007	3,389.0					6,000,000		
2008	2,259.0					6,000,000		
2009	1,130.0					6,000,000		
2010	0.0							
Total	**132,707**	**93,939**	**298**			**82,000,000**	**46,000,000**	**38,326,398**

[1] **According to 2002 Progress Report**

5. India stayed under the maximum allowable production level when counting net saleable production but slightly above in terms of gross production which includes handling losses of between 0.5% to 1% (see Table 1 above). This concept came up in January 2001 and was agreed between the association of CFC producers (REGMA), the ozone cell and the auditors and has since been applied but has no basis in the agreement nor in the sector plan nor had it been applied in the first two verification audits for 1999 and 2000. While from the viewpoint of the companies it is understandable that they do not want to be held accountable for more than what they actually can sell, from an environmental point of view every ton of CFC produced will at one point end up in the atmosphere and should therefore be counted and controlled.

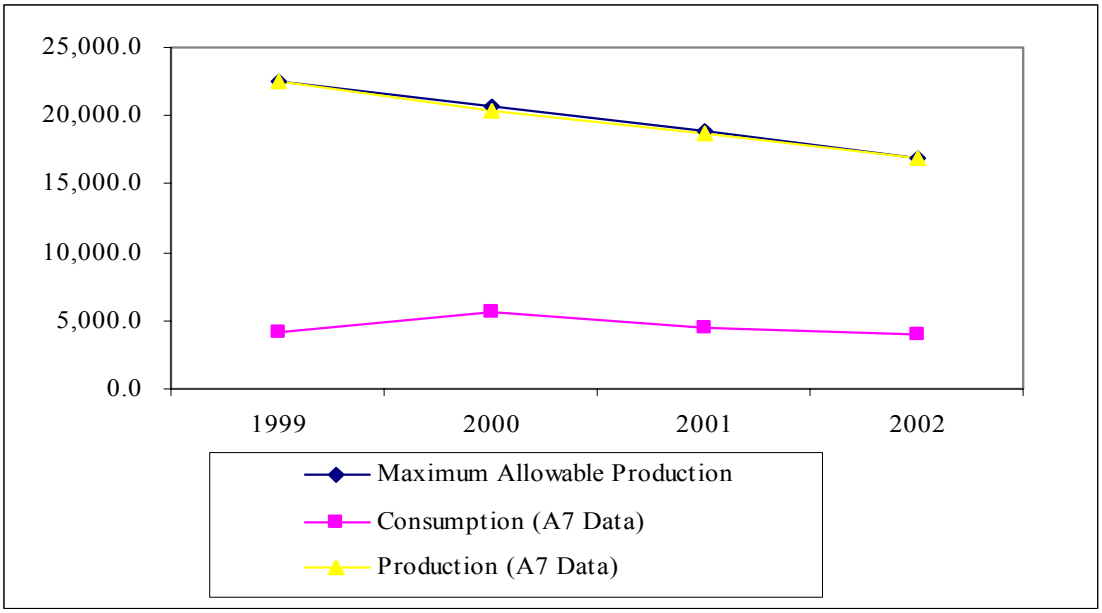
6. In India, the four CFC producers, working within their industry association REGMA, engaged at the outset of the process management consultants to guide them in making proposals for a controlled phase-down of CFCs. After consultations with the Government and debates in the ExCom, the present quota reduction scheme and disbursement schedule was established. Quotas are reduced annually, maintaining a fixed share for each producer. The compensation amounts to just under US $3.20/kg of phased-out CFC. As in PR China, there is no separate allocation for CFC 11 and 12 since both are generally co-produced.

7. Most of the CFC-11 and CFC-12 is exported: some 25% of the production is consumed locally. Both production and exports are coming down and imports are no more allowed in order to protect the local CFC producers.

Figure 1: Basic CFC Production Sector Data

	1999	2000	2001	2002
Maximum Allowable Production	22,588.0	20,706.0	18,824.0	16,941.0
Consumption (A7 Data)	4,142.9	5,614.3	4,514.3	3,917.7
Production (A7 Data)	22,498.6	20,403.8	18,689.2	16,883.7
Import (CP Data)	4,090.4	n/a	n/a	0.0
Export (CP Data)	18,371.1	n/a	n/a	12,970.0

n/a: Not Available



8. All four producers of CFCs also manufacture HCFC-22 to a greater or lesser extent on these CFC "swing" plants. With one exception, CFCs and HCFC-22 cannot be produced at the same time. In general, it has been established that the capacity to produce HCFC-22 on these plants is some 50-60% of the rated CFC-11/12 capacity.

9. The companies have differing degrees of upstream integration: to chloromethanes, giving internal supply of CTC and chloroform (two), to AHF (three) and to containment cylinders (one). One company also manufactures CFC-113 in a small way, mainly for captive CFC-113a chemical intermediate demand but also for domestic sales. This quantity is included in its CFC quota. Only one producer has committed, and that in a small way, to manufacture and commercialize new fluorocarbons such as HFC-134a and HFC-32.

3 Policy instruments and institutions involved.

10. The central institutional arrangement to oversee the policy aspects of implementation of all projects financed by the Fund is an Apex Committee headed by the Permanent Secretary of Environment and Forestry. All line ministries are there represented. To assist this Apex Committee, there are four standing committees as follows:

(a) Technology and finance. Headed by a national eminent scientist, it recommends projects for approval by the Apex Committee.

(b) Monitoring of article 7 data. Headed by the Chairman of the Pollution Control Board of India.

(c) Committee for small and medium scale enterprises. To study the role of such enterprises in the implementation of the Montreal Protocol. Headed by the Development Commissioner for small and medium enterprises, this committee does not seem to be very active.

(d) Monitoring and evaluation committee. Headed by the Additional Secretary of Environment and Forests, it reviews the implementation of all projects financed by the UNMF. It meets 2-3 times a year. The Chief of the Ozone Cell is the member secretary for this committee.

11. The Ozone Cell in the Ministry of Environment and Forestry (MoEF) coordinates all matters related to the Montreal Protocol in India. Within the Ozone Cell there is a Project Management Unit (PMU), set up in December 2001 as a society, initially to implement the project for phasing out production of CFCs in India but presently covering all ODS projects. It has staff strength of four and a governing body of nine members, from the Ministry of Environment and Forests (MOEF), REGMA, Confederation of Indian Industries, Ministry of Commerce and Industry and the Ozone Cell. The Additional Secretary of MOEF is the President, the Director of the Ozone Cell operates as its member secretary. The PMU was established as a solution to manage funds, which the Ozone Cell, as a government department would not be able to do. The Industrial Development Bank of India is the financial intermediary for projects implemented by the World Bank. The staff of the Ozone cell (except the director) and of the PMU is financed by the TA component of the project.

12. Inspections regarding illegal production of ODS are the responsibility of the Pollution Control Boards at State level. The evaluation team was not informed of any illegal production in India.

4 Mechanisms to audit and verify production.

13. The implementation of the CFC production sector in India follows the agreement approved by the 29th ExCom meeting in November 1999 and published in the Gazette of India of 19 July 2000.

14. 11. The checking of compliance with quotas is made through conciliation with data supplied by the enterprises quarterly on-line, national and verification audits. All this information is entered into a data system in the PMU connected on line to the enterprises, which was built up with TA funds.

15. Since 2002, the national audit is carried by the National Chemical Laboratory, Pune and the international audit (verification) by Deloitte Touche Tohmatsu India. There have been no discrepancies between the two audits. Auditors verify also internal transfers in integrated producers.

16. Production quotas can be traded among eligible enterprises after approval by the Ozone Cell. Trading can be made for a given year or on a permanent basis. A limited amount of trading has taken place in the first two years but has dried up.

17. Violations of the quota system could be:

(a) Producing CFC without a license

(b) Exceeding the quota

(c) False or inaccurate data reporting

(d) Delayed or absent data reporting.

(e) Illegal quota trading

18. If the production exceeds the quota, the penalty is US $1,000.- per ton produced in excess and exclusion from the quota allocation for the following year. So far no violations have occurred.

19. The WB auditors informed the evaluation team that from 2004 the fine counting of the production numbers will be abandoned in favor of rounded numbers. They would be happier if HCFC-22 had to be formally reported by the companies so they could do a mass AHF balance. There was a comment that the format of the questionnaire in the verification guidelines suits the China model of single product CFC reactors and is less well adapted to the Indian model of co-production reactors. In the audit, there is no systematic upstream (e.g. CTC supplier) or downstream (e.g. customer, especially new customer) audit.

20. There are also reports that the auditors have been asking for brand-name identification. It can be speculated that there is an interest in brand names as a possible link to illegal trade. UNEP is planning to establish a database of brand names for that purpose.

21. In India, where the production units co-produce CFC-11 and CFC-12, it may be necessary to review the practice of counting unit ratios of CTC and AHF and reporting these as a comparison with others, and with previous years. Since two products are co-produced there are two variables. One company simply assigns the unit ratios according to the standard yield of each product (so it is a calculation). Another assumes a perfect unit ratio to one product (usually CFC-11, the smaller product) and takes the variances to the other product. (Note: if the losses were attributable to CFC-12 then CFC-11 would show high variances). Another practice, on recycling CFC-11 to CFC-12 and which has a high percentage of vented CFC-13 to the atmosphere, takes the loss of the CFC-13 back to CFC-12.

22. The number of audits in India seems excessive. There are two national audits and one international audit per year. The first national audit is a mid-term verification which can give only preliminary figures and might not be needed; and the companies must in any case provide equivalent data on-line on a quarterly basis to the NOU. The second national audit coincides with the International (WB) audit, which is the sole basis on which the disbursements of the grants are made.

23. 20. Furthermore, the contents of the national and international audits are very similar. Rationalization of the auditing is possible in India at least by combining the national and international audits in January and possibly by cutting out the July national audit. However, this would imply a delayed disbursement schedule so as to have some funds held back in case of over-production discovered in January of the following year.

24. The NOU has as yet no formal scenario for financing an early closure of any of the plants. It seems that this could be an interesting option for one of them. Despite the possibility to trade quotas, there is no benefit to the closing company since there is no process to allocate grants for earlier phase-outs. There should be a system in place to deal with this issue, which will arise well before 2009.

25. Few discrepancies to the audits were noted by the evaluators as follows:

(a) The capacity for CFCs and HCFCs as stated by one company is more than twice as large as that hitherto reported.

(b) The cylinder-filling facility at another company seems to display variable weights according to where the object is placed on the scale.

(c) Verification reports carried out by the national auditing team in India and issued after the return of the Evaluation Mission have identified that two of the producers appear to report gross manufactured levels of CFCs for 2003 which are in excess of their individual quotas, whilst losses in manufacturing and packaging bring their net production within the quota. The overall losses amount to 1% or slightly more of gross production, levels which are high in absolute terms; however, given the nature of the operations conducted in India they may not be abnormally high as a percentage.

(d) Based on discussions with the Indian enterprises a loss factor of around 0.4% of the total output seems typical for filling losses. In constant operations the compressors might be seen as the most vulnerable part of the plant in terms of fugitive losses. However, these are not continuous operations: CFC manufacturing is stopped and restarted a number of times to enable the production of HCFC-22 to begin and to ensure compliance with the overall production quotas. When the plant is purged post manufacturing, and at periods of start-up, there may be blocks of CFC so dilute that recovery would not be feasible, and a degree of venting would then take place. The greater the number of production start-ups and stops, the more the losses are likely to be, and in such cases it is not unlikely that they may be in the region of 1%. There may of course, be other reasons for the apparently high losses, but without on-site evaluation it is not possible to speculate further.

(e) This may serve to explain the losses. Solutions might be found in restating the quota as relating to gross and not net production; and/or in enabling an accelerated phase-down of CFC production by one or two producers such that fewer of them have the opportunity for more continuous operations.

5 Sustainability

26. The evaluators are of the opinion that the perspective for continued compliance with phase-down in India is positive. Mechanisms to control illegal production are in place. All the reviews of production made by the evaluators indicate that there is practically no chance that CFC production can be resumed/increased if the plant was destroyed or production reduced, also because of the potential fines if the company transgresses. Further, all market signs indicate that demand of CFCs is simply decreasing also because of the availability of substitutes.

6 Evolution of Prices for CFCs and Substitutes

27. In India there has not been the significant upward movement in CFC prices that some observers had expected. This is undoubtedly due to the fact that domestic markets, which have been kept well informed, have moved away from CFCs to alternatives broadly at the pace at which CFCs were withdrawn. The competitive pricing of alternatives such as HCFC-22 and HCFC-141b is an additional factor. This has a positive bearing on the sustainability of the phase-down and -out process.

28. In India present pricing for CFC-11 is said to be in the range of US $2,500-3,500/ton, and for CFC-12 US $3,500-4,250/ton. The fact that 75% of the production of CFCs is exported at close to variable cost means that pricing in the domestic market is unlikely to increase, since any sale is going to represent better value than an equivalent exported volume.

29. In India mixed prices are reported for HCFC-22 domestic, from around USD3250/ton down to USD1200/ton bulk. Imported HCFC-141b is reported at USD1400-1600/ton.

7 Foreign Trade with CFCs

30. The Ministry of Commerce issues an import/export policy document every year. Import and export of ODS is subject to licensing after clearance by the Ozone Cell.

31. The Ozone Cell is informed of seizures by customs. In the last two years, when more accurate checks have been undertaken, there have been about three or four seizures by year said to total 40 to 50 tons per year. This has been auctioned off to members of REGMA for subsequent re-export. It should be borne in mind that more accurate checks at borders have only started to be undertaken since two years ago and the necessary detecting equipment is still being purchased. Furthermore, certain borders, like the ones with Bangladesh and Nepal are porous and difficult to control.

8 Substitutes and Recycling

32. In India, apart from the HCFC-22 that all four CFC producers are already manufacturing, there has been less obvious development activity than in China. One producer has announced that it has technology for, and Board approval to construct a manufacturing unit for HFC-32, but that this will be delayed pending proper market conditions.

33. The same producer has elected to construct a semi-works plant of 500tpa capacity for HFC-134a. The technology is Indian, from Hyderabad university, and was confounded with another of the Indian fluorocarbon producers, who has however decided that present market conditions do not justify entry.

34. The government has plans to recover and recycle CFCs in the context of the RMP under preparation. Out of 1.5 ktpa used in servicing, 1.0 ktpa could come from recycling. There are also plans to destroy CFCs but nothing is concrete yet.

9 Technical Assistance.

35. TA in India was subcontracted by the World Bank to UNEP. TA is subject to annual plans and reports; information provided has been limited to lists of activities planned and implemented. Bids are requested for each intervention, except in the case of training and awareness workshops where a flat contribution was provided to the organizers.

36. Financial information regarding individual TA projects was not provided. Financial details for 2002 to 2003 are only shown by objects of expenditure (rent, travel, professional fees, etc) totalling US $444,000. The evaluation team could not obtain details on the outcomes of the TA. Annual verification reports do not cover TA and annual work programmes record only the status of implementation of individual projects. Decision 36/48 of the ExCom regarding the 2002 Production Report requests the World Bank to "…provide information on the financial oversight exercised over the technical assistance programme…". The answer of the World Bank has not addressed the request of the Decision.

37. Details, by objects of expenditure, in US $1,000s and rounded to this amount, for 2002 and 2003 are as follows:

Consultants including staff of PMU and audits	265
Travel	24
Training. workshops	34
Expendable equipment	6
Computers and other non-expendable equipment	12
Rental of premises	74
Printing costs	30
Communications and sundry	2

38. The budgets for TA have been regularly under-spent: e.g. in 2002, there was an expenditure of US $197,405 against a budget of US $469,000, and in 2003, expenditures of US $246,813 against a budget of US $406,000. The work programme for 2004 estimates expenditures of around US $350,000, mostly for the continuation of recurrent activities: awareness and capacity building at local levels, audits, operation of PMU and its MIS. The remainder consists of projects postponed from previous years.

39. The CFC project was the first sector phase-out plan in India to be approved under the MLF. Therefore, most of the TA interventions charged to this project cover ODS as a whole and not only CFC.

40. Technical Assistance activities undertaken or planned so far can be grouped as follows:

(a) Awareness building by means of:

(i) Print and TV media, schools, exhibitions and trade fairs campaign

(ii) Workshops

(iii) Issuance of a bi-monthly technical information bulletin (VATIS) distributed to 2000 targeted users.

(b) Establishment and maintenance of a Management Information System in the PMU;

(c) Training of PMU staff and CFC producers on implementation issues;

(d) National and International audits;

(e) Preparation of a draft CFC import-export policy paper;

(f) Studies on:

(i) Market based instruments, to provide direction to the Ozone Cell. (Done);

(ii) Demand/supply assessment of ODS. (Draft completed);

(iii) Preparedness of refrigeration in food processing industry. (Done);

(iv) Development of low cost technology and equipment for non-ODS servicing. (Postponed);

(v) Demand/Supply of substitutes and impact on conversion activity. (Postponed).

(g) Staffing and operation of the PMU.

41. Enterprises are quite aware of the ODS problematic, so the awareness campaigns undertaken by the Ozone Cell are essentially directed to the general public, to schoolchildren and to custom officers. In the first case, around 20 awareness workshops were undertaken by various State Pollution Control Boards. The Cell contributed with a flat fee of 10,000.- Rs per workshop. In the second , a colorful booklet was prepared and in the third case, 10 workshops were undertaken by the National Academy for Customs, Excise and Narcotics. The cell contributed 100,000.- Rs per workshop. A training of trainers approach was followed by the latter workshop.

42. To support the awareness campaign a 32-page booklet was issued by the Ozone Cell entitled " The Montreal Protocol- India's Success Story". It describes the problems affecting the ozone layer, the ozone depleting substances, India's commitments to the Montreal Protocol, and mode of implementation of regulatory measures. Another simpler booklet entitled "Defenders of the Planet Earth" also produced by the Ozone Cell was widely distributed in the Indian primary schools. A 50 sec video clip on the Ozone layer was produced and distributed to TV chains across the country.

43. The Ozone Cell is planning to undertake a study on the effectiveness of the awareness campaign.

44. The evaluators are of the opinion that the funding of activities to establish and maintain the relevant national infrastructure to manage and monitor the implementation of the agreements and for awareness building, does not constitute, in strict sense, technical assistance.

45. However, technical assistance does not seem to be of interest to the four enterprises visited. They view it essentially as management and monitoring support to the project. They consider that technological know-how is the individual realm of each enterprise and that the TA component is "government business". Furthermore they did not like to see increased TA financing at the expense of their compensations, and therefore Technical Assistance in the agreement was limited to US $2 million.
