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COMITÉ EJECUTIVO DEL FONDO MULTILATERAL
PARA LA APLICACIÓN DEL
PROTOCOLO DE MONTREAL
Cuadragésima Primera Reunión
Montreal, 17 al 19 de diciembre de 2003

PROPUESTAS DE PROYECTOS: ARGENTINA

Este documento consta de los comentarios y las recomendaciones de la Secretaría del Fondo sobre las siguientes propuestas de proyectos:

Refrigeración

• Plan de eliminación de CFC en el sector de refrigeración (primer tramo)	ONUDI

Solventes

• Plan para la eliminación de las SAO en el sector de solventes	ONUDI

HOJA DE EVALUACIÓN DE PROYECTO
ARGENTINA

SECTOR: Refrigeración Uso de SAO en el sector (2002): 1 949,7 toneladas PAO

Umbrales de relación de costo a eficacia del subsector: Comercial 15,21 $EUA/kg
Doméstica 13,76 $EUA/kg

Títulos de los proyectos:

a) Plan de eliminación de CFC en el sector de refrigeración (primer tramo)

Datos del proyecto	**Comercial/Doméstica**
	Plan sectorial
Consumo de la empresa (toneladas PAO)	1 949,7
Impacto del proyecto (toneladas PAO)	1 737,0*
Duración del proyecto (meses)	72
Monto inicial solicitado ($EUA)	322 204
Costo final del proyecto ($EUA):	
Costo adicional de capital (a)	
Costo de imprevistos (b)	
Costo adicional de explotación (c)	
Costo total del proyecto (a+b+c)	9 348 125
Propiedad local (%)	
Componente de exportación (%)	
Monto solicitado para el primer tramo ($EUA)	322 204
Relación de costo a eficacia ($EUA/kg)	5,38**
¿Financiación de contraparte confirmada?	N/D
Organismo nacional de coordinación	OPROZ
Organismo de ejecución	ONUDI

Recomendaciones de la Secretaría	
Monto recomendado ($EUA) Impacto del proyecto (toneladas PAO) Relación de costo a eficacia ($EUA/kg) Costo de apoyo del organismo de ejecución ($EUA)	
Costo total al Fondo Multilateral ($EUA)	

* El impacto total del plan es de 1 737,0 toneladas PAO. El impacto del primer tramo es de 93,0 toneladas PAO.

** Relación de costo a eficacia del plan sectorial.

DESCRIPCIÓN DEL PROYECTO

Antecedentes del sector

Consumo de CFC (Grupo I del Anexo A) y perfil de eliminación gradual

Conforme a la Decisión 35/37, la Argentina ha seleccionado la Opción 1 como punto de partida, con una cantidad de:	**2 609,10 Toneladas PAO**
- Consumo remanente de CFC admisible para financiación a la 41ª Reunión (según la Decisión 35/57, condición B)	2 294,70 Toneladas PAO
- Consumo de CFC de 2002 notificado a la Secretaría del Ozono	2 139,00 Toneladas PAO
- Impacto de todos los proyectos de CFC presentados para su financiación a la 41ª Reunión	1 777,16 Toneladas PAO
- Consumo remanente de CFC admisible para financiación una vez aprobados los proyectos presentados a la 41ª Reunión	516,84 Toneladas PAO

Perfil del sector de refrigeración

- Consumo de CFC notificado para el sector de refrigeración en 2002	1 949,70 Toneladas PAO
- Cantidad de CFC a ser eliminada con los proyectos de refrigeración en curso	158,20 Toneladas PAO
- Impacto de los proyectos de refrigeración presentados para su financiación a la 41ª Reunión en el consumo remanente de CFC	1 737,00 Toneladas PAO

1. En nombre del Gobierno de Argentina, la ONUDI ha presentado un plan nacional de eliminación de CFC para eliminar el consumo remanente de 1 737 toneladas PAO de sustancias controladas del Grupo I del Anexo A en el sector de refrigeración de Argentina, en el transcurso del período 2003 - 2010 (el plan nacional de eliminación de CFC se adjunta a este documento). Para lograr este objetivo, se propone una serie de actividades de inversión, ajenas a la inversión y de asistencia técnica. El plan de eliminación de CFC permitirá al Gobierno de Argentina eliminar totalmente su consumo de CFC antes del 1º de enero de 2010.

2. Se realizaron estudios nacionales en los subsectores de fabricación y servicio y mantenimiento de refrigeración en el transcurso de la preparación del plan de eliminación de CFC en el sector de refrigeración para Argentina. El consumo de CFC en diferentes subsectores de refrigeración se calculó como sigue:

Aplicación	Consumo de CFC para el servicio en 2002 Toneladas PAO
Refrigeradores y congeladores domésticos	267
Congeladores comerciales	636
Refrigeración industrial	10
Refrigeración para el transporte	100
Equipos de aire acondicionado de vehículos:	
Automóviles de pasajeros	508
Camionetas y camiones	20
Autobuses	20
Otros, incluidos enfriadores	103
TOTAL	1 764

3. El Comité Ejecutivo ha aprobado 28 proyectos para el sector de refrigeración de Argentina, con fondos totales aprobados de 16,5 millones $EUA. De estos proyectos, 15 se han terminado, con una eliminación total de 410,5 toneladas PAO de CFC. Se cancelaron ocho proyectos, siete de ellos en el subsector de refrigeración doméstica.

4. Todos los principales fabricantes de equipos de refrigeración comercial y doméstica de la Argentina fueron convertidos o están en proceso de ser convertidos a tecnología sin CFC. Sin embargo, se han identificado más de 30 otras empresas que fabrican equipos de refrigeración comercial. Se considera que todas son empresas pequeñas, con un consumo de CFC anual de menos de 5 toneladas PAO. 30 de estas empresas adicionales han sido identificadas por la ONUDI como empresas admisibles para la financiación.

5. En el sector de equipos de aire acondicionado de vehículos, cuatro compañías que fabrican unidades equipos de aire acondicionado de vehículos y piezas para los mismos ya han recibido asistencia del Fondo Multilateral. Se calcula que hay aproximadamente 1 350 000 automóviles de pasajeros nuevos, 43 000 camionetas y camiones y 6 500 autobuses equipados con equipos de aire acondicionado de vehículos a base de CFC-12 en el país. Se calcula que la cantidad total de equipos de aire acondicionado de vehículos que usan CFC-12 en automóviles de pasajeros es de aproximadamente 2,5 millones de unidades. Se calcula que la cantidad de CFC-12 usado para el servicio y mantenimiento anual de los de equipos de aire acondicionado de vehículos es de alrededor de 550 toneladas PAO.

6. Actualmente, hay alrededor de 5 000 talleres de servicio y mantenimiento de refrigeración. Alrededor de 11% de éstos realizan operaciones de servicio y mantenimiento de equipos de aire acondicionado de vehículos. Se calcula que la cantidad total de técnicos de servicio y mantenimiento de refrigeración es de 13 600 técnicos. El taller de servicio y mantenimiento típico es pequeño, con un personal 2 - 3 personas.

7. El Comité Ejecutivo ha aprobado seis proyectos por un total de 990 000 $EUA para la capacitación de técnicos y funcionarios de aduanas, y para asistencia en el desarrollo de políticas.

8. El plan sectorial propone abordar el consumo de CFC remanente por medio de una variedad de programas y actividades coordinados:

- Ejecución de un programa de eliminación para el sector de fabricación para la conversión de 30 empresas, proporcionando los equipos de producción necesarios;
- Institución de un sistema nacional de recuperación y reciclaje, por medio de la creación de 3 instalaciones de regeneración, 25 centros de reciclaje en las principales ciudades, situados principalmente en los centros de capacitación y suministro de 3 000 juegos de equipos de recuperación y herramientas de servicio y mantenimiento a 3 000 talleres;
- Programa de incentivos para retroadaptación y sustitución;
- Asistencia técnica mediante la organización de talleres sobre las nuevas tecnologías;
- Gestión de proyecto, con inclusión de promoción de la concientización, coordinación, supervisión y presentación de informes.

9. El presupuesto propuesto para la ejecución del plan sectorial se reproduce a continuación:

Componente del proyecto y actividad	**Costo total $EUA**	**Tramo 2003**	**Tramo 2004**	**Tramo 2005**	**Tramo 2006**	**Tramo 2007**
Gestión del proyecto Coordinación del proyecto, promoción de concientización, desarrollo de sistema de otorgamiento de licencias Supervisión y evaluación	**937 400**	122 204	370 000	235 000	115 000	95 000
Componente de asistencia técnica Taller, concientización, otros	**300 000**	0	0	150 000	150 000	0
Programa de eliminación para el sector de fabricación:	**895 725**	200 000	400 000	295 725	0	0
Proyecto nacional de recuperación y reciclaje Creación de centros de reciclaje, suministro de equipos de servicio e instalaciones de recuperación	**6 215 000**	0	2 073 333	1 988 333	2 153 333	0
Programa de incentivos para la retroadaptación y la sustitución de equipos industriales	**1 000 000**	0	0	0	500 000	500 000
COSTO TOTAL DEL PROYECTO	**9 348 125**	322 204	2 843 333	2 669 058	2 918 333	595 000
Costo de apoyo del organismo de ejecución	**701 109**	24 165	213 250	200 179	218 875	44 625
DONACIÓN TOTAL	**10 049 234**	346 369	3 056 583	2 869 238	3 137 208	639 625
Plan administrativo 2003 – 2005		269 000	2 688 000	2 688 000	0	0

10. La gestión general de la ejecución del plan estará a cargo del Gobierno de Argentina con asistencia de la ONUDI. La ejecución se deberá alinear y coordinar con las diversas medidas de políticas, reglamentarias, fiscales, de concientización y fortalecimiento de la capacidad que está

adoptando el Gobierno de Argentina, a fin de asegurar que la ejecución guarde conformidad con las prioridades del gobierno.

COMENTARIOS Y RECOMENDACIONES DE LA SECRETARÍA

COMENTARIOS

11. La propuesta se presenta como un plan que "permitirá al Gobierno de Argentina eliminar por completo el consumo de CFC para el 1º de enero de 2010, con excepción del uso de CFC para los inhaladores de dosis medidas y el servicio y mantenimiento de enfriadores". El consumo total de CFC en el sector de inhaladores de dosis medidas es de 159 toneladas PAO. Alrededor de 85 toneladas son utilizadas por compañías argentinas, mientras que el resto lo consumen empresas multinacionales. La Secretaría indicó a la ONUDI que, dado que se trata de un plan nacional de eliminación de CFC, se debe enmendar la propuesta de proyecto a fin de abordar la eliminación completa de los CFC en todos los sectores. La ONUDI modificó la propuesta del modo correspondiente.

12. El plan tiene por objetivo eliminar el consumo de CFC remanente total de 1 737 toneladas PAO. El Gobierno de Argentina notificó a la Secretaría del Ozono un consumo de CFC en 2002 de 2 139 toneladas PAO. Según los registros disponibles en la Secretaría, el consumo total de los proyectos en curso en Argentina era de 649,3 toneladas PAO a mayo de 2003. La diferencia de 1 489,7 toneladas PAO representa el consumo de CFC máximo remanente a ser eliminado en Argentina. La Secretaría recomendó que la ONUDI modificara el plan sectorial correspondientemente.

13. El plan sectorial solicita financiación para eliminar 38,76 toneladas PAO en el sector de fabricación de refrigeración. La Secretaría señaló a la ONUDI que el Gobierno de Argentina notificó a la Secretaría del Fondo Multilateral 150 toneladas PAO y 165 toneladas PAO en 2001 y 2002, respectivamente, como consumo en el sector de fabricación de refrigeración. El consumo total de cinco proyectos de refrigeración en curso (Banco Mundial) es de 219,7 toneladas PAO, lo que indica que el sector de fabricación de refrigeración ya ha sido compensado completamente por la conversión.

14. La propuesta sugiere que se produjo un significativo aumento del consumo de CFC entre los años 2000 y 2002 en el sector de refrigeración de servicio y mantenimientos (de 1 134 toneladas PAO de CFC en 2000 a 1 701 toneladas PAO en 2001), a pesar de los proyectos de inversión aprobados hasta el presente para la conversión de refrigeración a tecnologías sin SAO y los diversos programas de capacitación en buenas prácticas de servicio y mantenimiento para 3 000 técnicos de servicio y mantenimiento. La Secretaría solicitó aclaraciones a la ONUDI respecto de esta cuestión. La ONUDI informó a la Secretaría que el aumento antedicho se debía a la crisis económica de Argentina en 2002, que ocasionó una caída en la adquisición de nuevos bienes y equipos, especialmente automóviles equipados con sistemas de aire acondicionado de vehículos de HFC-134a. Sin embargo, las estadísticas internacionales de que dispone la Secretaría muestran un aumento en la posesión de automóviles de pasajeros en 2002 en Argentina de 1,61%, cifra muy cercana al promedio de 1,5% para los últimos 10 años (las cifras para 2000 y 2001 son 1,47% y 1,20% respectivamente).

15. Actualmente no hay reglamentos para controlar la producción e importación de SAO en Argentina. En la 30ª Reunión, el Comité Ejecutivo aprobó un proyecto de asistencia para políticas destinado al diseño y la aplicación de un sistema de otorgamiento de licencias para la importación/exportación de SAO en Argentina, incluidos, entre otros, la creación de un registro de importadores de SAO y bienes a base de SAO, y supervisión y presentación de informes sobre las importaciones de SAO. La Secretaría observó en el plan sectorial que la dependencia del ozono está redactando actualmente un proyecto para establecer un sistema de otorgamiento de licencias. La ONUDI afirmó que el sistema de otorgamiento de licencias se encontrará vigente pronto para brindar asistencia en la ejecución del programa de recuperación y reciclaje.

16. La Secretaría solicitó la justificación y fundamentos para la institución de un sistema de recuperación/reciclaje/regeneración muy extenso, para el que se solicita un costo de 6,2 millones $EUA. Los pequeños talleres que consumen menos de 500 kg/año representan alrededor de 76% de la cantidad total de talleres de servicio y mantenimiento de refrigeración o 3 800 entidades. De éstas, alrededor de 2 500 talleres son muy pequeños y consumen menos de 200 kg de refrigerantes de CFC por año. La Secretaría llamó a la atención de la ONUDI el hecho de que la información recibida a través de los informes sobre la marcha de las actividades, los informes de terminación de proyecto, los informes y presentaciones de las dependencias nacionales del ozono en las reuniones de redes y de otras fuentes indican que las operaciones de recuperación y reciclaje ofrecen capacidades y resultados limitados. Las cantidades de CFC recuperado parecen ser uniformemente más bajas que las cantidades previstas en los documentos de proyecto pertinentes. La cantidad de CFC procesados por medio de los centros de reciclaje para su reutilización es muy pequeña, y la información preliminar que surge de las actividades de evaluación indica que se mantendrá esta tendencia. La ONUDI convino en reducir la cantidad de unidades de recuperación/reciclaje, pero sólo en 10%, lo que representa una reducción del costo del programa de recuperación y reciclaje de 4,2%.

17. La Secretaría propuso que la ONUDI debería considerar la utilización de un esquema de costos compartidos, que sería especialmente eficaz en el sector de equipos de aire acondicionado de vehículos, a fin de asegurar una participación más activa de los interesados en las operaciones de recuperación y reciclaje. Se informó a la ONUDI que esta conclusión surgió de la ejecución de un proyecto de demostración de recuperación y reciclaje ejecutado por el Gobierno de los Estados Unidos en la Argentina, en el que más de 200 talleres de servicio y mantenimiento de equipos de aire acondicionado de vehículos demostraron interés en obtener equipos con subsidios parciales. La ONUDI respondió que esta opción se podría considerar en el transcurso de la ejecución, si se demostraba que resultaba viable en las circunstancias locales. Sin embargo, la propuesta de la Secretaría no se ha reflejado en el presupuesto.

18. La Secretaría continúa deliberando con la ONUDI acerca de la creación de un esquema de recuperación/reciclaje en Argentina.

19. La Secretaría pidió información adicional acerca del programa de incentivos para la retroadaptación y sustitución de equipos de refrigeración industrial. La ONUDI presentó los resultados de un estudio realizado en el sector de usuarios finales, que están siendo actualmente examinados por la Secretaría.

20. La Secretaría señaló a la ONUDI que los costos de gestión, supervisión y presentación de informes del proyecto representan más de 10% de los costos adicionales totales solicitados. La ONUDI propuso reducir esta categoría de costos a fin de ponerlo a la par con planes sectoriales similares aprobados anteriormente por el Comité Ejecutivo.

21. La ONUDI y la Secretaría están analizando las cuestiones planteadas en los párrafos precedentes, incluido el nivel de costos adicionales admisibles para la financiación, así como un proyecto de acuerdo entre el Comité Ejecutivo y el Gobierno de Argentina. Se proporcionará información sobre los resultados de estas deliberaciones antes de la reunión del Subcomité sobre Examen de Proyectos, según corresponda.

RECOMENDACIONES

22. Pendiente.

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HOJA DE EVALUACIÓN DE PROYECTO
ARGENTINA

SECTOR: Solventes Uso de SAO en el sector (2002): 48,38 toneladas PAO

Umbrales de relación de costo a eficacia del subsector: N/D

Títulos de los proyectos:

a) Plan para la eliminación de las SAO en el sector de solventes

Datos del proyecto	**Múltiple**
	Plan sectorial
Consumo de la empresa (toneladas PAO)	72,74
Impacto del proyecto (toneladas PAO)	40,16*
Duración del proyecto (meses)	72
Monto inicial solicitado ($EUA)	871 597
Costo final del proyecto ($EUA):	1 264 835
Costo adicional de capital (a)	97 842
Costo de imprevistos (b)	93 842
Costo adicional de explotación (c)	
Costo total del proyecto (a+b+c)	1 456 011
Propiedad local (%)	
Componente de exportación (%)	
Monto solicitado para el primer tramo ($EUA)	871 597
Relación de costo a eficacia ($EUA/kg)	36,26
¿Financiación de contraparte confirmada?	
Organismo nacional de coordinación	Oficina del Programa Ozono (OPROZ)
Organismo de ejecución	ONUDI

Recomendaciones de la Secretaría	
Monto recomendado ($EUA)	
Impacto del proyecto (toneladas PAO)	
Relación de costo a eficacia ($EUA/kg)	
Costo de apoyo del organismo de ejecución ($EUA)	
Costo total al Fondo Multilateral ($EUA)	

* El impacto del plan para el sector de solventes es de 40,16 toneladas PAO; el impacto del tramo es de 17,36 toneladas PAO.

DESCRIPCIÓN DEL PROYECTO

23. En nombre del Gobierno de Argentina, la ONUDI presentó un plan de eliminación para el sector de solventes a la consideración del Comité Ejecutivo en su 41ª Reunión. En el plan sectorial, se consideran cuatro solventes con SAO: tetracloruro de carbono (CTC), 1,1,1, tricloroetano (TCA) o metilcloroformo, CFC-113 y bromoclorometano (BCM). El plan de eliminación se ejecutará por medio de tres programas de ejecución anuales y, cuando esté terminado, habrá permitido la eliminación completa de TCA, tetracloruro de carbono, CFC-113 y bromoclorometano en el sector de solventes (excluido el sector de fumigantes) en la República Argentina para fines de 2009. La ONUDI indica que el plan de eliminación cubrirá la conversión de empresas admisibles del sector de solventes, y asegurará una eliminación oportuna y sostenible por medio de una combinación de componentes de inversión, apoyo técnico y apoyo de políticas y gestión.

24. El plan de eliminación para el sector de solventes es un plan basado en el desempeño y establece la base para un acuerdo entre el Gobierno de Argentina y el Comité Ejecutivo. Se eliminará un consumo total de 40,16 toneladas PAO de SAO (TCA, tetracloruro de carbono, CFC-113 y bromoclorometano), incluidos los proyectos de inversión individuales que ya se han ejecutado a iniciativa de las empresas que se proponen para la financiación en forma retroactiva. El plan de eliminación para el sector de solventes suministra información detallada sobre el consumo de TCA, tetracloruro de carbono, CFC-113 y bromoclorometano en el sector, incluido su desglose en los subsectores de solventes y agentes de proceso.

25. El plan usará una combinación de políticas, reglamentos y apoyo financiero para financiar los costos de eliminación en ambos subsectores. La propuesta también incluye los componentes de asistencia técnica necesarios para fortalecer la capacidad de la industria y los organismos interesados para desarrollar actividades de inversión y reglamentos, así como de sensibilización y participación del público. También propone una estrategia de gestión y ejecución, que incluye un programa de supervisón, para asegurar la ejecución exitosa y eficaz del programa.

26. En el plan sectorial se suministran datos conforme al Artículo 7, así como se indican los consumos básicos de referencia de tetracloruro de carbono y TCA como sigue:

SAO	1998, TM PAO	1999, TM PAO	2000, TM PAO	Consumo básico, TM PAO
CTC	134,5	13,8	413,3	187,2
TCA	90,2	52,7	54,3	65,7
CFC-113	Incluido con los CFC, no se da una cifra separada para el CFC-113			

27. El tetracloruro de carbono importado se usa principalmente como materia prima para la fabricación local de CFC-11 y CFC-12. El principal consumidor es Frío Industrias Argentinas S.A., una compañía local que fabrica CFC-11 y CFC-12 en Argentina, cuyo proyecto con el Banco Mundial para eliminar la producción de los CFC fue aprobado en la 38ª Reunión del Comité Ejecutivo. El tetracloruro de carbono restante se usa para la fabricación de aerosoles de limpieza textil, como solvente industrial, para usos en laboratorio y como agente de proceso en la refinación de petróleo.

28. El TCA es utilizado como solvente por numerosos pequeños consumidores. No hay consumo de TCA como agente de proceso. El CFC-113 se usa principalmente como solvente de limpieza para dispositivos electrónicos. También se usan pequeñas cantidades para usos en laboratorio. El plan incluye una lista de los principales usuarios finales de TCA y CFC-113, datos sobre su consumo anual y aplicación. Un usuario de bromoclorometano usa esta sustancia como agente de proceso en la producción de bromuro de 2-nitrobencilo intermedio.

29. El consumo de las cuatro sustancias controladas se indica en la tabla siguiente:

SAO	Subsector	Promedio PAO/año 2000-2002
CTC	Solventes	13,426
TCA	Solventes	19,86
CFC-113	Solventes	5,47
BCM	Agentes de proceso	1,405
TOTAL		**40,16**

30. Los costos adicionales para la eliminación del consumo total de estas sustancias se calcularon aplicando los valores de costo a eficacia prevalecientes en los subsectores de aplicaciones correspondientes. En el plan sectorial, se aplicó el umbral de costo a eficacia de 156 $EUA/kg PAO para el bromoclorometano. El bromoclorometano es una nueva sustancia controlada. El Comité Ejecutivo no ha establecido un umbral de costo a eficacia. Se agregaron costos imprevistos y costos adicionales de explotación calculados al 10% de los costos adicionales de capital a los costos totales, por un monto de 1 164 511 $EUA. El plan prevé la provisión de asistencia técnica a un costo de 93 500 $EUA.

31. La gestión general de la ejecución del plan estará a cargo de la ONUDI con la asistencia del Gobierno de la Argentina. El costo del apoyo para políticas y gestión se calcula en 198 000 $EUA. El plan sectorial se adjunta a este documento.

COMENTARIOS Y RECOMENDACIONES DE LA SECRETARÍA

COMENTARIOS

32. La Secretaría formuló comentarios acerca de los datos conforme al Artículo 7 incluidos en el plan en relación con los consumos básicos de referencia para el tetracloruro de carbono y el TCA. La Secretaría señaló que hay disponibles otros datos notificados oficialmente. Los informes a la Secretaría sobre el progreso de la ejecución del programa de país de Argentina contienen los siguientes datos de consumo para el sector de solventes en forma anual:

	1998 Toneladas PAO	1999 Toneladas PAO	2000 Toneladas PAO	2001 Toneladas PAO	2002 Toneladas PAO
CTC	134,7	n.d.	33	55	22
TCA	90,2	52,7	54,3	30,8	12,78
CFC-113	34,6	15,76	64,1	16,4	13,6

33. La Secretaría destacó que los datos más recientes notificados oficialmente deben constituir la base para el plan de eliminación y el cálculo de los costos adicionales. El promedio de cuatro años para el consumo de tetracloruro de carbono y TCA no representa el consumo actual real y no tiene una situación específica conforme a las reglas del Fondo. La Secretaría suministró un estudio comparativo de datos de tetracloruro de carbono y TCA y pidió a la ONUDI que modificara las secciones pertinentes del plan.

34. En relación con las reducciones de consumo indicadas en el proyecto de acuerdo propuesto, la Secretaría pidió a la ONUDI que presentara las reducciones y los límites de consumo en forma separada para cada SAO, y que indicara claramente que Argentina cumplirá con las medidas de control intermedias para el tetracloruro de carbono y el TCA estipuladas por el Protocolo de Montreal (reducciones de 85 por ciento y 30 por ciento de los consumos básicos respectivamente para 2005).

35. En relación con el consumo de bromoclorometano, se indica que la Argentina no ha ratificado la Enmienda de Beijing. Por lo tanto, el bromoclorometano no es una sustancia controlada en la Argentina. Se pidió a la ONUDI que informara a la Secretaría acerca de la situación de ratificación de la Enmienda de Beijing de parte del Gobierno de Argentina.

36. Respecto del cálculo de los costos adicionales, la Secretaría propuso a la ONUDI que considerara un programa de asistencia técnica para la conversión de mezcladores/proveedores de solventes que usan tetracloruro de carbono y TCA, así como también de microusuarios de CFC-113. Este requisito tiene por objetivo que los mezcladores/proveedores pertinentes cambien las fórmulas de sus productos con solventes sin SAO, y la asistencia técnica proporcionaría un medio para hacerlo. Los microusuarios no tienen equipos básicos y frecuentemente usan técnicas manuales. Los métodos de conversión basados en el suministro de equipos nuevos no son apropiados para las necesidades de dichas empresas.

37. La Secretaría observó que el arancel para políticas y gestión se había calculado a 16,4% de los costos adicionales totales, lo que no guarda conformidad con otros planes sectoriales aprobados anteriormente. Se pidió a la ONUDI que modificara este rubro del presupuesto.

38. Se observó que el plan sectorial se ocupa de la eliminación del consumo de sólo 40 toneladas PAO. Una propuesta de esta envergadura no requiere las medidas de aprobación anual relacionadas con los planes sectoriales o nacionales de eliminación más amplios. La Secretaría propuso a la ONUDI que considerara un arreglo financiero modificado, con pagos en dos cuotas, pero con el requisito de presentación de informes anuales sobre la ejecución, incluidos los límite de consumo cumplidos.

39. Se destacó que la relación de costo a eficacia general del plan, de 36,26 $EUA/kg, no guarda conformidad con otros planes de solventes. Se pidió a la ONUDI que considerara medidas para mejorar la relación de costo a eficacia de la propuesta.

40. En el plan se indica que actualmente no hay restricciones a la producción y la importación de CFC, y la ONUDI confirmó que la misma situación se aplica al TCA y el tetracloruro de carbono. Se ha observado que, mientras que las empresas más grandes pueden eliminar las SAO después de recibir financiación para proyectos de inversión, la eliminación sostenible en las empresas más pequeñas sólo tiende a producirse con apoyo para controlar y eventualmente prohibir la importación (es decir, la oferta). Se pidió a la ONUDI que examinara este asunto con el Gobierno de Argentina e incluyera compromisos específicos con el apoyo reglamentario apropiado a las circunstancias del país, a fin de asegurar la sostenibilidad de los objetivos de desempeño estipulados en el plan.

41. La ONUDI y la Secretaría están analizando las cuestiones planteadas en los párrafos precedentes, incluido el nivel de costos adicionales admisibles para la financiación, así como un proyecto de acuerdo entre el Comité Ejecutivo y el Gobierno de Argentina. Se proporcionará información sobre los resultados de estas deliberaciones antes de la reunión del Subcomité sobre Examen de Proyectos, según corresponda.

RECOMENDACIONES

42. Pendiente.

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PROJECT EVALUATION SHEET
ARGENTINA

SECTOR: Solvent ODS use in sector (2002): 48.38 ODP tonnes

Sub-sector cost-effectiveness thresholds: N/A

Project Titles:

(a) Plan for phase-out of ODS in the solvent sector

Project Data	**Multiple**
	Sector Plan
Enterprise consumption (ODP tonnes)	72.74
Project impact (ODP tonnes)	40.16*
Project duration (months)	72
Initial amount requested (US $)	871,597
Final project cost (US $):	1,264,835
Incremental capital cost (a)	97,842
Contingency cost (b)	93,842
Incremental operating cost (c)	
Total project cost (a+b+c)	1,456,011
Local ownership (%)	
Export component (%)	
Amount requested for first tranche (US $)	871,597
Cost effectiveness (US $/kg.)	36.26
Counterpart funding confirmed?	
National coordinating agency	Ozone Programme Office (OPROZ)
Implementing agency	UNIDO

Secretariat's Recommendations	
Amount recommended (US $)	
Project impact (ODP tonnes)	
Cost effectiveness (US $/kg)	
Implementing agency support cost (US $)	
Total cost to Multilateral Fund (US $)	

* Impact of the solvent sector plan 40.16 ODP tonnes, the impact of the tranche is 17.36 ODP tonnes.

PROJECT DESCRIPTION

23. On behalf of the government of Argentina UNIDO submitted a Solvent Sector Phase-out Plan for consideration of the Executive Committee at its 41st Meeting. Four ODS solvents are considered in the Sector Plan: Carbon tetrachloride (CTC), 1,1,1 Trichloroethane (TCA) or methyl chloroform, CFC-113 and Bromochloromethane or BCM. The Phase-out Plan will be implemented through three annual implementation programmes and upon completion will result in the complete phase-out TCA, CTC, CFC-113 and BCM in the Solvent Sector (excluding the Fumigant sector) in the Republic of Argentina by the end of 2009. UNIDO indicates that the Phase-out Plan will cover conversion of the eligible enterprises in the Solvent Sector and ensure a timely and sustainable phase-out through a combination of investment, technical support, and policy and management support components.

24. The Solvent Sector Phase-out Plan is a performance-based and provides the basis for an agreement between the Government of Argentina and the Executive Committee. A total consumption of 40.16 ODP tonnes of ODS (TCA, CTC, CFC-113 and BCM) will be phased-out, including individual investment projects already implemented on the initiative of the enterprises which are proposed to be funded on a retroactive basis. The Solvent Sector Phase-out Plan provides detailed information on TCA, CTC, CFC-113 and BCM consumption in the Sector, including its breakdown into the solvent and process agent sub-sectors.

25. The Plan will use a combination of policies, regulations and financial support to fund phase-out costs in the two sub-sectors. The proposal also includes necessary technical assistance components to strengthen the capacity of the industry and concerned agencies to carry out investment, regulations, as well as public awareness and participation activities. It also proposes a management and implementation strategy, including a monitoring programme, to ensure the successful and effective implementation of the programme.

26. Article 7 data is provided in the sector plan and shows the baselines for CTC and TCA as follows:

ODS	1998, ODP MT	1999, ODP MT	2000, ODP MT	Baseline, ODP MT
CTC	134.5	13.8	413.3	187.2
TCA	90.2	52.7	54.3	65.7
CFC-113	Included with CFCs, no separate figure for CFC-113			

27. Imported CTC is primarily used as raw material for the local manufacture of CFC-11 and CFC-12. The main consumer is Frio Industrias Argentinas S.A., a local company manufacturing CFC-11 and CFC-12 in Argentina, whose project with the World Bank to phase-out the production of CFCs was approved at the 38th Executive Committee Meeting. The remaining CTC is used for the manufacture of aerosols for textile cleaning, as an industrial solvent, for laboratory purposes and as process agent for oil refining.

28. TCA is used as a solvent by numerous small consumers. There is no consumption of TCA as process agent. CFC-113 is mainly used as cleaning solvent for electronic devices. Small quantities were also used for laboratory purposes. The Plan provides the list of major end-users of TCA and CFC-113, data on their annual consumption and application. There is one

user of BCM applying this substance as process agent in production of the intermediate 2-nitrobenxyl bromide.

29. The consumption of the four controlled substances is shown in the table below.

ODS	Sub-Sector	ODP/year Average 2000-2002
CTC	Solvent	13.426
TCA	Solvent	19.86
CFC-113	Solvent	5.47
BCM	Process Agent	1.405
TOTAL		**40.16**

30. The incremental costs for the phase-out of the total consumption of the above substances were calculated applying cost-effectiveness values prevailing in application sub-sectors. The cost-effectiveness threshold of US $156/kg ODP was applied for BCM in the Plan. BCM is a new control substance. No cost-effectiveness threshold was established by the Executive Committee. Contingencies and incremental operating costs calculated at 10% of the capital incremental cost were added to the total costs amounting to US $1,164,511. The plan envisages provision of technical assistance at US $93,500.

31. The overall management of the Plan will be carried out by UNIDO with the assistance of the government of Argentina. The cost of policy and management support is estimated at US $198,000. The Sector Plan is attached to this document.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

32. The Secretariat commented on the Article 7 data as provided in the Plan in relation to the baselines for CTC and TCA. The Secretariat pointed out that other officially reported data is available. Reports to the Secretariat on progress of implementation of Argentina's country programme contain the following consumption data for the solvent sector on an annual basis:

	1998 ODP tonnes	1999 ODP tonnes	2000 ODP tonnes	2001 ODP tonnes	2002 ODP tonnes
CTC	134.7	n.a.	33	55	22
TCA	90.2	52.7	54.3	30.8	12.78
CFC-113	34.6	15.76	64.1	16.4	13.6

33. The Secretariat emphasized that the latest data officially reported must form the basis for the phase-out plan and the calculation of incremental costs. The proposed four-year average for consumption for CTC and TCA does not represent actual current consumption and has no status

under Fund rules. The Secretariat provided comparative analysis of CTC and TCA data and requested UNIDO to revise the relevant sections of the Plan.

34. In relation to the consumption reductions indicated in the proposed draft Agreement, the Secretariat requested UNIDO to present the reductions and the consumption limits separately for each ODS and to indicate clearly that Argentina will meet the intermediate control measures for CTC and TCA mandated by the Montreal Protocol (reductions to the baselines of 85 per cent and 30 per cent respectively by 2005).

35. In relation to the consumption of BCM, it is indicated that Argentina has not ratified the Beijing Amendment. BCM is therefore not a controlled substance in Argentina. UNIDO was requested to advise the Secretariat on the status of ratification of the Beijing Amendment by the Government of Argentina.

36. Under the calculation of incremental costs, the Secretariat proposed to UNIDO to consider a technical assistance programme for conversion of solvent blender/suppliers using CTC and TCA, and also to micro-users of CFC-113. The requirement is for relevant blender/supplier to reformulate their products with non-ODS solvents and technical assistance would provide the means of doing this. Micro-users do not have equipment baselines and frequently use manual techniques. Conversion methods based on provision of new equipment are not appropriate to the needs of such enterprises.

37. The Secretariat noted that the policy and management fee was calculated at 16.4% of the total incremental cost which is inconsistent with previously approved sector plans. UNIDO was requested to revise this budget item.

38. It was noted that the sector plan deals with the phase-out of consumption of only 40 ODP tonnes. A proposal of this size does not warrant annual approval measures that are associated with larger sectoral or national phase-out plans. The Secretariat proposed to UNIDO to consider a revised financial arrangement with payment in two installments but with a requirement for annual reporting on implementation, including meeting consumption limits.

39. It was emphasized that the overall cost-effectiveness of the Plan of US $36.26/kg is not consistent with other solvent plans. UNIDO was requested to consider measures improving the cost-effectiveness of the proposal.

40. It is indicated in the Plan that there are presently no restrictions for production and import of CFCs, UNIDO confirmed that the same situation also applies to TCA and CTC. It has been observed that with larger enterprises may phase-out ODSs after receiving funding for investment projects, sustainable phase-out in smaller enterprises is only likely to occur with support to control and eventually prohibit imports (that is, supply). UNIDO was requested to discuss this issue with the Government of Argentina and include specific commitments to regulatory support appropriate to the circumstances in the country, in order to ensure sustainability of the performance undertakings provided in the plan.

41. The issues raised above, including the level of incremental cost eligible for funding as well as a the draft agreement between the Executive Committee and the Government of Argentina are being discussed between UNIDO and the Secretariat. Advice on the outcomes of these discussions will be provided prior to the meeting of the Sub-Committee on Project Review as appropriate.

RECOMMENDATIONS

42. Pending.

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PROJECT COVER SHEET

COUNTRY	:	**Argentina**	
IMPLEMENTING AGENCY	:	**UNIDO**	
PROJECT TITLE	:	**Refrigeration sector CFC phase-out plan**	
PROJECT IN CURRENT BUSINESS PLAN	:	**Yes**	
SECTOR	:	**Refrigeration**	
ODS USE IN THE SECTOR (2002) :	:	**1,846 ODP tonnes**	
PROJECT IMPACT	:	**1,737 ODP tonnes**	
PROJECT DURATION	:	**2003 - 2010**	
PROJECT COST	:	**USD 9,348,125**	
LOCAL OWNERSHIP	:	**100%**	
EXPORT COMPONENT	:	**Nil**	
REQUESTED GRANT	:	**USD 9,348,125**	
COST-EFFECTIVENESS	:	**USD 5.38 per kg ODP**	
IMPLEMENTING AGENCY SUPPORT COST	:	**USD 701,109**	
TOTAL COST OF PROJECT TO MULTILATERAL FUND	:	**USD 10,049,234**	
FINANCING ARRANGEMENT	:	**Project cost**	**Grant with support cost**
2003 tranche	:	USD 322,204	USD 346,369
2004 tranche	:	USD 2,843,333	USD 3,056,583
2005 tranche	:	USD 2,669,058	USD 2,869,238
2006 tranche	:	USD 2,918,333	USD 3,137,208
2007 tranche	:	USD 595,000	USD 639,625
STATUS OF COUNTERPART FUNDING	:	**N/A**	
PROJECT MONITORING MILESTONES INCLUDED	:	**Yes**	
NATIONAL COORDINATING AGENCY	:	**OPROZ**	

PROJECT SUMMARY

The present CFC Phase-out Plan aims at phasing-out the remaining consumption of 1,737 ODP tons of Annex A, Group I CFCs in the refrigeration sector in Argentina over the period of 2003 – 2010. A series of investment, non-investment, and technical assistance activities are proposed to achieve this target. The present CFC Phase-out Plan will enable the Government of Argentina to totally phase-out the CFC consumption by January 01, 2010 except the CFC usage for MDI and chiller servicing. Considering this multi-faceted approach it is crucial that flexibility be given to the Government of Argentina to adapt or modify its strategies during implementation of this plan as the need arises.

The Government of Argentina requests about US$ 10.05 million as the total funding from the Multilateral Fund for the total elimination of all Annex A Group 1 substances (CFCs) in the refrigeration sector. The funding will be paid out in installments as specified in the Agreement attached. Being a performance based Agreement, future payments will be conditioned to meeting the targets and conditions specified in the Agreement.

The approval of this project will result in the elimination of CFCs consumption in the refrigeration sector of Argentina and will substantially contribute to the ability of the country to meet its Montreal Protocol obligations.

Prepared by: UNIDO/OPROZ Date: 4 September 2003
Reviewed by: P. Appleyard Date: 4 September 2003

CONTENTS

1. General information

The present project proposal consists of a refrigeration sector CFC phase-out plan. The proposal aims at reduction of the consumption of Annex A, Group I substances, CFCs in the refrigeration sector in Argentina[1] in compliance with the Montreal Protocol obligation. The plan has duration of 7 years.

Ratification status of Argentina is as below,

Vienna Convention, ratification on 1 January 1900
Montreal Protocol, ratification on 18 September 1990
London Amendments, ratification on 4 December 1992
Copenhagen Amendment, accession on 20 April 1995
Montreal Amendment, ratification on 15 February 2001
Beijing Amendment, under study

2. Impact of the proposal

2.1 Basic data on the country consumption of CFCs

Argentina has a CFC production factory. Table 1 shows production and consumption of CFCs from 1986 to 2002. Besides the data of consumption of CFC reported to the Montreal Protocol Secretariat as defined by the scheme of Production + Import – Export, there is data available on actual demand or usage of CFCs in Argentina for 1999 – 2002, which are also shown in Table 1 below.

Table 1 - Actual demand or usage of CFCs in Argentina for 1999 – 2002

Year	1995	1996	1997	1998	1999	2000	2001	2002	Average '00 – '02
Max. allowed consumption	-	-	-	-	4,697.2	4,697.2	4,697.2	4,697.2	-
Consumption reported to MP Secretariat	6,366	4,202	3,524	3,546	4,316	2,397	3,293	2,139	2,610
Actual demand		-	-	-	4,320	2,840	2,620	2,442	2,495
Production		2,800	2,804	2,954	3,101	3,027	2,899	3,015	-

Argentina's baseline average consumption of Annex A – Group I substances for the period from 1995 to 1997 amounted to 4,697 ODS tonnes. The country has always been in compliance with the Montreal Protocol control measures for the CFC consumption from 1999.

Relevant data for Multilateral Fund assistant scheme are given below:

Baseline consumption, 4,697.2 ODP tonnes;
Starting point established by Decision 35/57, 2,609.1 ODP tonnes;
Consumption funded since the starting point, 314.4 ODP tonnes;
Impact of the project cancelled at the 40th Executive Committee meeting, 17 ODP tonnes;
Remaining eligible consumption un-funded as of submission of the proposal, 2,311.7 ODP tonnes.

[1] The Country Program calls for a total ODS phase out in year 2006 and for reductions in advance to the scheduled due date established by the Montreal Protocol and their amendments. Reasons for such a policy are the environmental impact and the future international restrictions for products containing these substances. The Country Program was approved at the 13th Meeting of the Executive Committee, in July 1994. The project for the Country Program Update was also approved at the 39th Meeting of the Executive Committee in 2003. It is being updated.

2.2 Assessment of the consumption reduction schedule

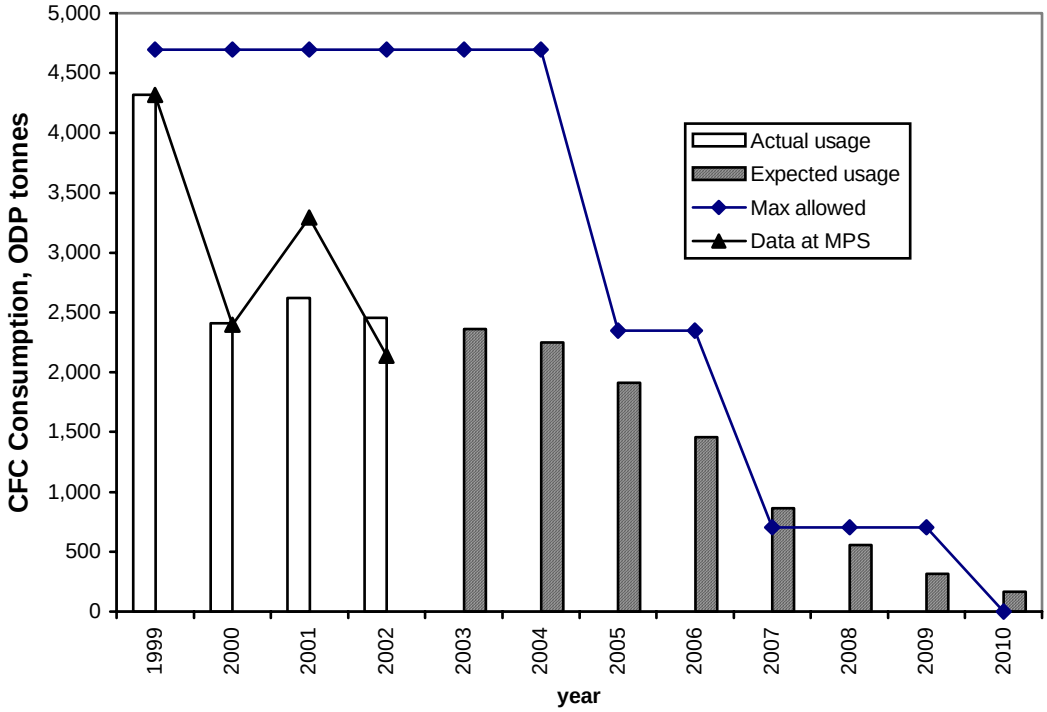
As seen in Table 1, the consumption data of CFC in recent three years reported to the Montreal Protocol Secretariat are slightly different from the actual usage, presumably due to the stock of CFC. However, the averages of these data are similar. In the present project proposal for the strategy of phasing out of CFC consumption in the refrigeration sector, the target consumption or the project impact was determined based on the actual whole demand of 2,442 ODP tonnes and the demand in the refrigeration sector of 1,846 ODP tones. The eligible CFC usage in the refrigeration sectors is 1,737 in 2002. This value is the impact of the present project proposal.

The projection of the CFC consumption trend as the result of the implementation of the present phase out plan is given in Table 2 and illustrated in Fig. 1. With the CFC usage reduction through implementation of on-going projects as well as that due to new activities under the present strategy and the new activities proposed by IBRD for the aerosol sector, the country will achieve the 50% reduction target in 2005. The consumption of CFC in the chiller (service) and MDI sectors will remain, as no counter measures are considered at the moment. Therefore, the slight over consumption in 2007 and after 2010 is expected to exceed the obligation unless these two sectors are duly addressed in a timely fashion. Except these sectors, Argentina will achieve the 85% reduction target in 2007 and the total phase out in 2010 under the present strategy.

Table 2. Phase-out of the consumption of CFCs in Argentina, ODP tonnes

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
1. Max allowable total consumption of CFC	4,697	4,697	4,697	2,349	2,349	705	705	705	0
2. Reduction from ongoing projects as per business plan		93	114	288					
3. New reduction under the present plan including reduction in the aerosol sector by IBRD, 52 ODP tonnes		0	0	50	488	550	300	250	150
4. Total annual reduction of CFC		93	114	338	488	550	300	250	150
5. Expected total consumption of CFC	2,456	2,363	2,249	1,911	1,423	873	573	323	173
NB; New reduction as per business plan)				50	452	600			

Fig. 1. CFC consumption reduction in Argentina



3. Data collection and validation

3.1 Methodology for data collection

Data of CFC consumption

CFC Consumption data are reported to the Montreal Protocol Secretariat according to the definition of the Montreal Protocol; i.e., Consumption = Production + Import – Export. Information related to the actual usage of CFC for 1999 - 2002 was collected from the CFC producer and distributors and verified by OPROZ. Similarly, the split of the CFC usage in respective consumption sectors and sub-sectors was determined based on the data collected above and verified by OPROZ.

Data of manufacturing sector

With a view to address the CFC phase-out in the refrigeration sector through a sector-wide approach, the Government of Argentina, through the National Ozone Unit, requested UNIDO to assist them in conducting surveys of the refrigeration manufacturing sector. A local consultancy firm was assigned to conduct the survey. The firm and the Government of Argentina jointly conducted the survey during the first quarter of 2003. The survey and identification work covering enterprises in the refrigeration manufacturing sector was completed in May 2003 and the remaining CFC consuming enterprises in the sector are now identified and their baseline information was obtained.

The survey methodology comprised of the following steps, i.e., contacts with upstream suppliers of compressors, refrigerants, components, etc., and diret contacts with relevant enterprises.

Interaction with upstream suppliers was carried out through meetings and visits. Through these interactions, lists of enterprises were obtained. Additional inputs were obtained also through the lists maintained by the consultancy firm and by the National Ozone Unit. Based on the lists obtained, direct contact with enterprises was carried out. Most of the enterprises that were surveyed were visited by the consultancy firm, and accompanied by representatives from the National Ozone Unit. For the purpose of obtaining baseline information on the enterprises, a questionnaire developed by UNIDO and the Ozone Unit was used. The CFC consumption figures obtained through the survey were verified at the enterprise levels through procurement records and were then correlated with the records of sales from distributors and traders and with the relevant government departments through the National Ozone Unit to the extent available.

Data of service sector

At the 36th Meeting of the Executive Committee of the Multilateral Fund, the preparatory assistant fund ($ 100,000) was approved for the preparation of the Refrigerant Management Plan, Argentina. The Government of Argentina, in close collaboration with UNIDO, started the preparatory work for the RMP. During this process, in line with the expectation of the Executive Committee and in view of the small size of the remaining refrigeration manufacturing sector, it was decided to prepare a sector phase out plan for the refrigeration sector, instead of RMP. No additional funds were requested to carry out the increased scope of the work.

In order to conduct the extensive survey of the situation of the refrigeration service sub-sector in Argentina, UNIDO representatives assigned UBAJAY S.A. Argentina as a survey consulting firm. UNIDO contracted with this company for the survey of information required for preparation of the sector phase out plan, including:

- District wide distribution of service workshops,
- Estimation of total number of workshops,
- Current service practices,
- Potential service providers,
- Market of CFCs in 1999 – 2002
- CFCs commercial supply routes,
- CFCs and alternatives trends,
- Pricing and taxation of CFCs,
- Trade agreement with neighboring countries,
- Industrial statistics of production and import of refrigeration and air conditioning equipment,
- Technical institutions and vocational training centers,
- Industrial associations,
- List of Governmental Agencies,
- Amount of CFCs in installed units at December 2002.

The survey was done for service workshops spread in Argentina and information was collected from about 2,100 shops in 154 cities. All data are stored in the database in CD-ROM. Data were analyzed by UBAJAY S.A. Argentina and UNIDO. Survey questionnaires are in OPROZ office.

Various Government authorities, original equipment manufacturers, industrial associations, service workshops, importers and consumers of ODS and other relevant stakeholders[2] were consulted in the

preparation of the present strategy through either individual meetings or workshops held in Autonomous city of Buenos Aires, Buenos Aires city Suburbs, Rosario city and Suburbs, Cordoba city and Suburbs, Mendoza city and Suburbs, Mar del Plata city and Suburbs, totaling 154 cities.

In addition to the direct survey of the usage of CFC at service workshops, the consumption of CFCs in the service sub-sector was also doubly checked based on the available industrial statistics of production and import of appliances and automobiles, which use CFCs, and traditional service practices.

3.2 Sector distribution of the remaining eligible CFC consumption

Distribution of the consumption of CFCs in Argentina is given in Table 3. below.

Table 3. Distribution of CFC consumption, ODP tonnes

Sector	2000	2001	2002
Aerosol	116	105	178
Foam	1,189	1,110	355
Refrigeration manufacturing	271	150	145
Refrigeration service	1,134	1,192	1,701
Chiller, service use	45	40	63
Solvents	80	20	-
Sterilants	5	3	-
TOTAL	**2,840**	**2,620**	**2,442**

The implementation of MFMP projects in the foam and refrigeration manufacturing sectors has been satisfactory, resulting in gradual reduction of CFC consumption in these sectors. Foam sector phase-out plan approved at the 38th meeting of the Executive Committee will phase out the remaining consumption by 2006. It is expected that there will be little consumption of CFCs in these two sub-sectors by year 2005 - 2006.

In the aerosol sector, a project for the replacement of CFC-11, CFC-12, CFC-113 and MCF used as propellant and solvent for technical aerosols by HCFCs and HFCs at SERVEX was approved at the 38th

[2] Government OPROZ - Secretaria de Ambiente y Desarrollo Sustentables (Ozone Office – Environment and Sustainable Development Secretariat); INTI - Instituto Nacional de Tecnología Industrial (National Institute for Industrial Technology) ; Secretaría de Industria - Ministerio de Economía (Industry Secretariat – Ministry of Economy); Dirección General de Aduanas - Ministerio de Economía (Customs General Managing Office – Ministry of Economy); CNRT - Comisión Nacional de Regulación del Transporte - Ministerio de Economía (National Commission for Transport Regulation – Ministry of Economy); INDEC - Instituto Nacional de Estadística y Censos - Ministerio de Economía (Statistics and Census National Institute – Ministry of Economy); SENASA - Servicio Nacional de Sanidad y Calidad Agroalimentaria (National Service for Sanitation and Agro-food Quality) Industrial Associations Cámara Argentina de Calefacción, Aire Acondicionado y Ventilación (Argentine Chamber of Heating, Air conditioning and Ventilation); Cámara Argentina de la Industria de Refrigeración y Aire Acondicionado (Argentine Chamber of Refrigeration and Air Conditioning Industry); Ansal Refrigeración - Venta de gases refrigerantes y Repuestos (Ansal Refrigeration – Refrigerant gases and spare parts sale); ADEFA - Asociación de fabricantes de Automóviles (Automobile Manufacturers Association) ; Asociación Argentina del Frío (Argentine Cold Association).

meeting of the Executive Committee meeting. This project will accomplish the phase out of 40 ODP Tons of CFC-11, CFC-12, CFC-113 and MCF in the production of technical aerosols by 2005. The other project for the conversion from CFC-11, CFC-12, CFC-113 and MCF into HCFC for technical aerosols at Electroquimica Delta was approved at the 36th meeting of the Executive Committee, which will accomplish the phase-out of 60 ODP tons. IBRD is also identifying potential remaining SMEs, which have not been included in an individual project in order to submit a project at the 41st meeting of the Executive Committee.

The refrigeration service sub-sector is a dominant user sector of CFC in 2002 in Argentina. A decline in the commercial activity rate was experienced in the year 2000. It caused a CFC-12 usage reduction both in manufacturing of new equipment and servicing compared to 1999.

A solvent sector phase-out plan is being prepared by UNIDO separately. There is only limited amount of CFC consumption in this sector.

4. Strategy and plan of implementation

4.1 General strategy of reduction of CFC consumption

Annual reduction of CFC consumption

The CFC consumption in Argentina is expected to be reduced by 92.5 ODP MT through the completion of ongoing projects under the Multilateral Fund in 2003.

In 2004 additional 96 MT will be reduced through completion of on-going projects as projected in the 2003 – 2005 rolling business plans of implementing agencies. Further 288.4 MT will be phased out in 2005 through completion on-going projects.

New activities were planned in the 2003 – 2005 business plan by IBRD and UNIDO. Based on the scenario in this business plan, totally 1,102 ODP MT will be reduced in Argentina by 2007. However, according to the analysis made after the intensive investigation of the remaining CFC consumption along with the extensive survey of the remaining user sectors, it is expected that the CFC consumption in 2007 would exceed the maximum amount allowed for the country if only the activities in the business plan would be executed. Therefore, the activities necessary to achieve the compliance target particularly in 2007 are proposed in the present phase out strategy.

In the present proposal, the total CFC consumption will be phased out in the refrigeration-manufacturing sector by 2006. In the refrigeration service-sector, a certain amount of CFC usage is expected to be reduced by implementation of technicians training program, which is being executed under UNEP, since intentional or non-intentional leakage of CFC refrigerants from equipment will be reduced during service or maintenance work as well as during operation of the equipment due to better service practices.

It is aimed to gradually reduce the CFC consumption in the service sector from 2005 till 2010 by introducing the national recovery and recycling scheme. Thereby, service workshops will be able to rely on recovered or recycled refrigerants for their service job to greater extent.

Management of the supply and demand of CFC

There is a local manufacturer of CFC-11 and CFC-12 in Argentina, FIASA. FIASA supplies CFCs to the local market. CFCs local demand was also satisfied by imports through seven major importers. The ratio of sources of CFCs in Argentina in 2002 was, -

Domestic production at FIASA, 65%
Import from Mexico, 12%
Import from Venezuela, 5%
Import from Italy, 8%
Import from France, 3%
Import from Spain, 3%
Import from Netherlands, 3%

Table 4. shows the comparison between the local CFC demand expected in the present strategy and the local production. According to the Agreement between the Government of Argentina and the Executive Committee of the Multilateral Fund, the maximum allowed production has been determined from 2002.

Table 4. Production and consumption of CFCs, Argentina

	1995	1996	1997	1998	1999	2000	2001	2002
Consumption								
Obligation	-	-	-	-	4,697	4,697	4,697	4,697
Reported to MPS	6,366	4,202	3,524	3,546	4,316	2,397	3,293	2,139
Production								
Actual	2,800	2,632	2,804	2,954	3,101	3,027	2,899	3,015
Max production as per the Agreement								3,020
	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Consumption								
Obligation	4,697	4,697	2,348	2,348	704	704	704	0.0
Expected	2,363	2,249	1,911	1,416	866	566	316	223
Production								
Max production as per the Agreement	3,020	3,020	1,647	1,647	686	686	686	0.0

It is seen that the local production under the Agreement will satisfy the demand under the present consumption phase out strategy except 2007 and after 2010, when certain measures would be required to balance the CFC supply and demand situation either by more aggressive demand reduction exercises (including those for chillers and MDI sectors) or by supply-side consideration (e.g., CFC stock and recycling activity).

Policy instruments

OPROZ is drafting a project to establish regulations for controlling production and importation in order to achieve the objectives of the Country Program. Up to the present, there are no restrictions for CFCs importation.

The design of the licensing system is actually being executed. It is foreseen that by the end of 2003 a normative proposal will be finished.

Draft policy guidelines to ensure compliance:

- Licensing system for import/export of ODS;

- Production quotas within a production phase out strategy as per Agreement with the Executive Committee;
- Promulgation of a ban on CFC use in the foam sector following the completion of the phase out project;
- Making the use of ODS in enterprises that have already been technically and/or financially assisted to convert to ozone friendly substances illegal;
- Refrigeration technicians certification;
- Reduction steps, as per Agreement with Executive Committee, to reduce consumption of Methyl Bromide according to control measures (average of 1995-98) in 2002 and following control steps;
- Regulation for National Halon Banking Programme operation is underway;
- Framework regulation to control halon imports.

The public awareness activities include:

- Ozone Protection Awareness campaigns in Radio, Newspaper and Television, are planned regularly to keep the phase-out momentum of the different ODS consuming sectors, as well as to identify the remaining ODS users in the country.

- Release of brochures, organization of meetings with NGOs, seminars at schools, painting competitions for children and other awareness materials is foreseen.

Steps to be taken to gradually curtail CFC demand

CFC Production phase-out strategy**,** a project aiming at the phase-out of CFC production in Argentina has been approved at the 38th meeting of the Executive Committee. Based on the Agreement for gradual cessation program of CFC production, the CFC production will be gradually reduced and totally phased out by 1 January 2010. Along with production cessation programs in other CFC producing Article 5 countries in the Latin American region (Mexico and Venezuela) and other regions (China, India) and possible reduction of CFC production in non-Article 5 countries in Europe, the supply of CFC will become short compared with the demand in Argentina. It may result in further CFC price increase, encouraging the conversion to non-CFC technology and curtailing the CFC demand.

Completion of on-going projects supported by the Multilateral Fund will reduce the consumption of CFCs in aerosol, foam and refrigeration manufacturing sectors according to the 2003 – 2005 rolling business plans approved at the 39th meeting of the Executive Committee. This will be followed by the new activities proposed by IBRD in the aerosol sector and those proposed here in the refrigeration manufacturing sector.

Customs officials and technicians training projects are being implemented with the assistance of UNEP. The progress of these projects provides adequate circumstance where the CFC phase out strategy in the service sub-sector is going to be effectively executed. Linkage between these two projects and activities proposed in the present strategy for the service sub-sector would be necessary to maximize the effectiveness of fund utilization. A recovery and recycling program proposed in this strategy would give rise to dependence on recycled refrigerant by service workshops for their job, and would contribute to reduce the amount of production and imports of CFCs. As a result of these activities, the CFC demand in the refrigeration service sub-sector will reduced.

At the late stage of the present plan, an incentive program will be introduced to encourage retrofitting and replacement of existing relatively large equipment working with CFCs. It will phase out final CFC

consumption for servicing these units. Chillers are not subject to the incentive program, however.

Except the usage of CFCs for servicing chillers and that for the MDI sector, the CFC demand in the refrigeration sector and other sectors will be gradually reduced to zero consumption by 2010.

4.2 Implementation program for the refrigeration manufacturing sector

Current situation of the sub-sector

The range of products manufactured in the sector includes, household refrigerating appliances such as domestic refrigerators and freezers, commercial refrigeration equipment such as display cabinets, bottle coolers, chest freezers, hot and cold water dispensers, visi-coolers, reach-in refrigerators, walk-in coolers and freezers, industrial refrigeration equipment such as cold storage and transport refrigeration units and commercial appliances such as mobile air conditioning units.

The refrigeration sector in Argentina has experienced significant growth in the past decade due to the consistent growth in the per capita incomes, the predominance of the service industry and CFCs are consumed as blowing agents (CFC-11) and refrigerants (CFC-12, R-502, R-22, etc) in the manufacture of refrigeration and air-conditioning products.

There are no indigenous manufacturers of hermetic or semi-hermetic refrigeration compressors in Argentina; hence the entire domestic demand of compressors for the domestic and commercial refrigeration sub-sectors is met through imports mainly from Europe and U.S.A., and others. Refrigerants and the blowing agents are manufactured in Argentina. The chemicals required for producing the polyurethane foam insulation are also imported from developed countries and supplied through distributors, indenting agents and systems houses. The other refrigeration system components are partly produced indigenously and partly imported. Considering the geography and size of the country, the availability of upstream supplies in general is satisfactory, however the quality and level of customer service and technical support is quite limited, mainly due to inadequate infrastructure and due to insufficient availability of trained and qualified staff.

Domestic refrigeration

This is the sector which shows the major proportion of already converted manufacturers or manufacturers in the process of converting their production from CFC-12 to HFC-134a. Some of the small manufactures, which are accustomed to utilize CFC-12 have closed their facilities or are producing it at very low rate.

Conversion already accomplished allowed the production of approximately 40% of new domestic refrigerators with HFC-134a during 2001. Some manufacturers have converted from CFC-12 to Isobutane such as AUTOSAL S.A. and FRIMETAL S.A. These companies have difficulty in their services operation, since service workers are not sufficiently qualified to use Isobutane and necessary materials for servicing is hardly available in the retailer's market. Table 5 summarizes the enterprises in this category that are or have been assisted by MFMP for the conversion.

Based on the production and import statistics[3], it is revealed that there are 7.8 million units of household refrigerators, water coolers and freezers in Argentina. About 75% of these units are working with CFC-12 and the rest with HFC-134a. The limited amount of units are with Isobutane refrigerant. Therefore there are approx. 5,600,000 refrigerators furnished with CFC-12 in Argentina.

Table 5. Refrigeration manufacturers under the Multilateral Fund assistance, domestic appliance manufacturers

[3] Source: CAIRAA, Camara Argentina de Industrias de refrigeracion y aire acondicionado (Air conditioning and refrigeration industries Argentina chamber).

Enterprise, Domestic appliances	Impact ODP MT	CFC-11 MT	CFC-12 MT	alternative technology	Status	IA
Whirlpool Argentina S.A.	90.6	67.2	19.6	CP HFC-134a	Completed	IBRD
Frimetal, Rosario	89.7	61	28	CP Isobutane	On-going	IBRD
McLean	74	54	20	CP HFC-134a	Completed	IBRD
Helametal S.A., and Helametal Catamarca S.A.	62	42	20	CP HFC-134a	On-going	IBRD
Frare S.A., Buenos Aires	32	27	5	CP HFC-134a	Completed	UNIDO
Bambi S.A., Santa Fe	30.6	24.8	5.8	CP HFC-134a	Completed	UNIDO
Briket, S.A.	30	24	6	CP Isobutane	Completed	IBRD
Neba, S.A.	29	24	5	CP Isobutane	On-going	IBRD
Autosal, S.A.	22	17.5	4.5	CP Isobutane	Completed	IBRD
El Dorado, S.A.	12.8	10.6	2.2	HCFC-141b HFC-134a	Completed	IBRD
MTH S.R.L.	8	8	0	HCFC-141b	On-going	IBRD
Fribe La Rioja Plant, Fribe, S.A. plant, Aurora S.A., Piragua S.A., and Piragua San Luis, Lobato San Luis S.A., Gepasa S.A. and Gesal S.R.L., Adzen S.A. C.I.F.	Cancelled					IBRD
Radio Victoria, Catamarca, S.A.	Cancelled					UNIDO

Commercial and Industrial Refrigeration

The commercial refrigeration sub-sector is widely developed in Argentina. It provides auto-transportable refrigerated display cabinets and freezers, and even complete installations for supermarkets, restaurants and small businesses.

The CFC consumption in this sub-sector has increased considerably, far greater than other sub-sectors' average increase, in the last ten (10) years, owing to the settlement of new superstores chains. In addition, those already established in the country were driven to opening new branches, which consequently resulted in increment of demand for this type of devices. There are several categories of companies within the commercial refrigeration sub-Sector, namely:

- Companies which produce small units and also provide for the domestic refrigerators market.
- Companies (medium sized or large) which produce auto-transportable display cabinets and larger installations. They usually provide complete installations.
- A number of relatively small companies, that began their activity as service workshops, are gradually turning to the production of a small quantity of refrigeration units.

After extensive discussion with the industrial association (CAAIRA) and direct survey of 65 representative manufacturers, it has been concluded that there are approximately 2.2 million commercial refrigeration equipment which use CFC-12 in the country.

Commercial equipment manufacturers under the MFMP assistance for technology conversion are listed in Table 6.

Table 6. Manufacturers under the Multilateral Fund assistance, Commercial equipment

Enterprise manufacturing commercial equipment	Impact ODP MT	CFC-11 MT	CFC-12 MT	Alternative technology	Status	IA
Perito Moreno Ref	31.1	25.8	5.3	HCFC-141b HFC-134a	Completed	UNDP
Eurofrio,	26	23.8	2.2	CP HFC-134a	On-going	UNDP
Disthel,	10	7.1	2.9	HCFC-141b HFC-134a	Completed	UNDP
Trevi	3.5	-	-	-	Completed	UNDP
Market Costan S.A.	Cancelled					UNDP

In addition to manufacturers listed above, this sub-sector comprises of a number of predominantly small enterprises, which are geographically scattered and have relatively little access to sophisticated technology and production practices. These enterprises are characterized by low levels of investments in plant and machinery and resulting in labor-intensive operation. Although general awareness about quality assurance, training, environment and safety-related issues exists, it does not receive much emphasis in practice, due to low levels of operating capital, because of the low scale of operation and the pressures on profitability exerted by the very competitive domestic market as well as cheap imports. In general, the knowledge of the latest alternative substances and technologies is limited in these enterprises.

More than 30 enterprises, engaged in manufacturing refrigeration equipment, were identified. Most of these enterprises were located in and around major industrial and commercial centers, such as Great Buenos Aires, Còrdoba, Rosario Santa Fe, etc. All companies should be considered under the category of small-sized enterprises, with a CFC consumption of less than 5 MT/y. All enterprises are 100% indigenously owned and reported no exports to non-Article-5 countries. The average total CFC consumption in the identified enterprises for years 1999/2001 is estimated to be about 40 MT/year.

The eligibility of the surveyed enterprises was determined in accordance with the relevant Executive Committee decisions. Some enterprises were established after 1995 and would therefore not be eligible for funding by MLF.

The enterprises in the commercial and industrial refrigeration sub-sectors typically manufacture equipment such as chest freezers, display cabinets, bottle coolers, visi-coolers, reach-in refrigerators, hot/cold water dispensers, etc, serving the users in the hospitality and food service industry. The enterprises also manufacture process refrigeration systems, supermarket refrigeration systems and equipment, walk-in coolers/freezers, cold rooms, etc

Baseline Equipment

Based on the responses to the questionnaires, as well as the inputs received from plant visits, the baseline equipment for the foam and refrigeration operations in the enterprises can be summarized as below:

Foaming: Small-sized enterprises mostly use locally made (or in some cases imported) foam machines. Some enterprises use manual mixing of chemicals.

Refrigeration: Small-sized enterprises typically have semi-automatic charging units, vacuum pumps and leak detectors suited for CFC-12.

Baseline Resources

While the owners/management of the enterprises surveyed, are more or less conversant with the need to eliminate CFCs under the Montreal Protocol, most enterprises do not have the financial or technical resources to undertake conversions at their own cost. Most of the small-sized enterprises have less than 10 employees. While the technicians have basic skills in refrigeration charging and evacuation, there is a lack of good housekeeping and related practices and lack of adequate knowledge or training on CFC-free technologies or applications. Most of the small-sized enterprises do not have well-equipped factories or workshops and lack organizational and infrastructure facilities.

A list of all the remaining enterprises in the refrigeration manufacturing sector, with their brief baseline information is presented in Table 7.

Table 7. Remaining enterprises in the refrigeration (manufacturing) sector

No.	Name	CFC-11 (MT/yr.)	CFC-12 (MT/yr.)	CFC consumption Total
1	Bacope	0	0.53	**0.53**
2	Bercomar	2.1	0.3	**2.4**
3	CGA S.A.	0	0.24	**0.24**
4	Farpa S.A.	0.15	0	**0.15**
5	Fimet	1.4	0	**1.4**
6	Frascona	0	0.8	**0.8**
7	Fricalven	1.93	0.62	**2.55**
8	Friotex	0	0.1	**0.1**
9	Gastroquil	1.6	1.9	**3.5**
10	Gatic	1	1.1	**2.1**
11	Hidrofrio	0	0.1	**0.1**
12	Hugo Mazzetti S.A.	0	0.11	**0.11**
13	Igar	0.6	0	**0.6**
14	Lanin	2.1	1.33	**3.43**
15	Lareu	0	0.61	**0.61**
16	Lauge	1.1	0	**1.1**
17	Libra	0.1	0.8	**0.9**
18	Milfrigo	0	1.1	**1.1**
19	Modulterm	0.4	2.2	**2.6**
20	Motocom	0	0.11	**0.11**
21	Polair	2.5	0.33	**2.83**
22	Refrimet	3.5	0.9	**4.4**
23	Righi	0.4	0.2	**0.6**
24	Santelmo	3.6	0	**3.6**
25	Simar	0.1	0.2	**0.3**
26	Tecnofred	1.6	0	**1.6**
27	Tecnologia en Refrig.	0.1	0.3	**0.4**
28	Vica	0	0.1	**0.1**
29	Vincer	0	0.2	**0.2**
30	Walter Grosso	0.3	0	**0.3**
Total(30 enterprises)		**24.58**	**14.18**	**38.76**

SUME…… 38.76 MT

Refrigerated transport sector

For transport refrigerators, refrigerating units are supplied by small plants, which are dedicated to refrigeration equipment assembly. These plants will continue utilizing CFC-12 to assemble their equipment with the exception of the International Transport (MERCOSUR).

There are 110,000 big and medium size refrigerated trucks using CFC-12 in the country.

Refrigerated containers (reefer containers) sector

This sector can be divided into two groups:

1) Containers used as mobile refrigerating chambers; there are 1,200 containers that use CFC-12 in the country.
2) Containers used by shipping companies; there are 6,500 containers that still use CFC-12 in the country, representing 5% of total containers.

Mobile air conditioning (MAC)

This sub-sector was the one presenting the fastest evolution towards CFC-12 substitution by HFC-134a for air conditioning systems. During 1997, 70% passenger transport vehicles production was furnished with HFC-134a. As of year 2000, all cars produced in the country bear HFC-134a. Enterprises that received assistance of MFMP are listed in Table 7. They are producers of parts of mobile air conditioners and MAC units.

Based on the industrial statistic of sales of automobiles with MAC for 1993 –2002 provided by Automobile Manufacturing Association (ADEFA), it is estimated that there are approximately 1,350,000 new passenger cars, 43,000 vans and trucks, and 6,500 buses, which are equipped with CFC-12 based MAC in the country. There are also automobiles equipped with CFC MAC assembled after market. The total number of MAC installed in passenger cars with CFC-12 is about 2.5 millions.

Table 8. Manufacturers of MAC under the Multilateral Fund Assistance

Enterprise manufacturing, MAC and parts of MAC	Alternative technology	IA
Interclima, S.A. (heat exchangers)	HFC-134a	IBRD
Mirgor, S.A.	HFC-134a	IBRD
Sistemaire, S.A.	HFC-134a	IBRD
Simon Cachan, S.A.	HFC-134a	IBRD

Commercial and industrial air conditioning production

In this sub-sector, during year 2002, there were 63 MT of CFC-11 and CFC-12 used for chillers. Other ACs use normally HCFC-22 and HFC-134a.

Refrigeration manufacturing sector phase-out plan

As seen in Table 7., there are 3o identified, eligible small-size enterprises that are manufacturing commercial refrigeration equipment. Some of them have facilities of foaming and refrigerant charging, and some have only refrigerant charging facility. They are still manufacturing products with CFC-11 and CFC-12. Alternative technology selected was HCFC-141b as foam blowing agent and HFC-134a as refrigerant. These substitutes are accepted and recommended by TEAP as alternatives to CFC-11 and CFC-12. Depending on the current baseline equipment, necessary equipment modification will be provided.

The investment component of the plan will focus on enabling the participant enterprises to eliminate CFCs from their production activities and would comprise of the following elements:

- Assessment of the technical requirements of conversion
- Determining the scope of international and local procurement
- Development of technical specifications and terms of reference for procurement
- Pre-qualification and short-listing of vendors
- International/local competitive bidding
- Techno-commercial evaluation of bids and vendor selection
- Procurement contracts
- Site preparation
- Customs clearance and delivery
- Installation and start-up
- Product and process trials
- Operator training
- Commissioning of CFC-free production
- Destruction of baseline equipment

The approach for implementing the investment component in the remaining eligible and not funded enterprises in the sector is executed as below:

This approach draws on previous implementation experience and has been designed based on the size, level of organization, location and customer base of enterprises concerned and also based on ease and convenience for execution and management. Given the generally small size of the remaining enterprises in the sector, with inadequate in-house technical capabilities, the need for adequate investments for plant and process changes, supported by investments on adequate technical assistance, trials and training, is critical.

CFC Phase-out in ineligible enterprises will not be funded under the sector phase-out plan and is expected to take place through the control, which the Government will have through policy and regulatory actions. Any unaccounted or unidentified eligible enterprises will be identified and accommodated within the resources approved for this sector phase-out plan.

Foam Operations

a) Chemicals suitable for the selected HCFC-141b foam blowing technology will be required. There are available existing chemical suppliers.

b) The use of new formulations will lead to a marginal change in mixing ratios and increased viscosity leading to reduced flow ability of the PU material. In case of rigid foam conversions, the HCFC-141b based foam will have an increased thermal conductivity in relation to that produced with CFC-11, which is being replaced. The existing manual mixing process or low-pressure foam dispensers will not be able to handle the new formulations without adversely affecting the cell structure and thereby the

thermal conductivity of the foam. Hand mixing is also not recommended from occupational health and safety standpoints. Therefore, new high or medium-pressure foam dispensers as applicable, of equivalent effective capacity will be needed to replace the existing dispenser/hand-mixing process. They will provide a finer cell structure and help minimize the deterioration of thermal conductivity of the foam, and also minimize the occupational health and safety risks,

c) HCFC-141b based foam will have an increased molded density with respect to the CFC-11 based foam, resulting in increased requirement of chemicals.

Refrigerant Operation

a) Compressors suitable and optimized for HFC-134a/R-404a will be required. These will be available from existing suppliers;

b) The chemical stability of the synthetic lubricants compatible with HFC-134a/R-404a is highly sensitive to moisture and impurities in the system, as compared to that with CFC-12. The evacuation/charging process for HFC-134a/R-404a and polyolester lubricant will need to ensure the required level of cleanliness and dryness in the system. To ensure this the following is proposed:

- The vacuum pumps will need to be suitable for use with HFC134a/R-404a. Retrofitting of vacuum pumps has not proven feasible or cost-effective in the past due to several factors (unsatisfactory condition, inaccessible suppliers, unavailability of parts, production downtime, etc) therefore appropriate quantities of new vacuum pumps suitable for the conversion, consistent with the baseline capacities, will need to be provided.

- The existing refrigerant charging units/kits are not suitable for use with HFC-134a/R-404a, and will therefore be replaced with automatic charging units or portable semi-automatic charging units suitable for HFC-134a/R-404a duty.

c) The design/sizing of the refrigeration cycles need to be optimized to ensure the viability of the process and to maintain the product standards for performance and reliability, such as:

- Reengineering evaporators and condensers, so as to ensure the levels of cleanliness and contamination that can be tolerated with HFC-134a/R-404a (< 5 ppm).
- Lengthening of the capillaries or changing the thermostatic expansion valve models.
- Use of filter-dryers with finer pores, suitable for use with HFC-134a/R-404a.

The existing leak detection is unsuitable for detecting HFC-134a/R-404a leakages; therefore suitable hand-held leak detectors will need to be provided.

The planned project duration is 30 months, and the CFC consumption in the sub-sector will be phased out by 2006.

4.3 Implementation program for the refrigeration service sector

Current situation of the sub-sector

Approved MFMP projects related to the refrigeration service sub-sector are listed below, in Table 9.

Table 9. MFMP Projects for the refrigeration service sub-sector

Title	Description	Date of completion	ODP	Approved cost	IA
Training of customs officers	Establishment of an ODS import/export licensing system and training to customs officers (inspectors, controllers and customs policemen) to enable them to identify ODSs and ODS-based equipment. CFC-detection equipment will be provided.	On-going	N/A	175,000	UNEP
Provision of training in leak reduction, emission control and recycling and management of non-CFC refrigerants in domestic and commercial refrigeration and air conditioning	Development of a programme of training in emission control and recycling for the domestic, commercial and industrial refrigeration and air-conditioning sub-sectors excluding MACs. It includes identification of current knowledge of ODS replacement technology.	Feb-96	N/A	40,000	Australia
MAC servicing demonstration	Collection and analysis of information about the MAC sector, demonstration of MAC recycling equipment and workshop and installation of recycling machines for the participating repair shops, training on HFC-134a equipment and a follow-up report on the performance	Jun-97	20.4	170,000	USA
National train the trainer programme on good practices in refrigeration	To conduct pilot instruction workshops for a core group of industries/organizations (240 trainees); provide recycling and leak detection equipment to core group; adjust existent training materials; monitor and report on experience of core group for design	Dec-99	44.8	215,000	UNEP
Training programme for the refrigeration servicing sector (Phase III)	Training in good service practices of approximately 3,000 technicians (working in over 120 workshops) servicing different types of refrigeration equipment (domestic, commercial - including supermarkets, industrial units for the food and agricultural sector	On-going	N/A	300,000	UNEP
Policy assistance for the design and implementation of an ODS import/export licensing system		On-going	N/A	90,000	UNEP

Training of Refrigeration Service Sub-sector Strategy was prepared by UNEP and was approved at the 30th meeting of the Executive Committee. Execution is progressing. It is foreseen that 3,000 technicians will be trained.

Training of Customs officers programme was prepared by UNEP and approved at the 30th meeting of the Executive Committee, as well. Execution is being progressing.

Number of service workshops and regional distribution

From the perspective of refrigeration, air conditioning Industry and their service workshops, the following geographical areas can be identified:

- Autonomous city of Buenos Aires
- Buenos Aires city Suburbs
- Rosario city and Suburbs
- Cordoba city and Suburbs
- Mendoza city and Suburbs
- Mar del Plata city and Suburbs

In ANNEX VI., the geographical distribution of surveyed Service Workshops is shown.

The estimated total number of service workshops in the main regions is listed in Table 10. The estimation was done by extrapolation on the population per shop in each region, which has derived from about 2,000 surveyed service workshops, carried out in 154 cities all over the country.

The conclusion drawn is that there are about 5,000 service workshops operational in the country. There are approximately 13,600 technicians in the country.

Table 10. Refrigeration and air conditioning service workshops in Argentina

Region	Number of service workshop	Population / Shop
Buenos Aires city	819	3,380
Great Buenos Aires	1,263	7,215
Center of Bs As Province (15 cities)	327	7,388
Córdoba City with Suburbs & Province	266	10,060
Rosario City & Suburbs	179	6,715
Mendoza City & Suburbs and San Juan Province	241	7,340
La Plata & Mar del Plata cities and Atlantic Coast (13 cities)	277	6,325
Northern Provinces (10 cities)	484	12,886
Paraná, Santa Fe and Other cities (4 cities)	289	8,380
Rest of the country	314	7,068
Concessionaries (countrywide)	279	N/A
TOTAL	4,738	6,875

Type of servicing job and size of service shops

A typical Service Workshop is small with staff that usually consists of 2 to 3 technicians; one of them with some sort of academic background. It generally has a minimum of service equipment: vacuum pumps, manifold service valve with pressurized gases. Most of the service workshops are managed by their owners.

Nationwide, the number of vehicle conditioning service workshops reaches 11 % of the general refrigeration service workshops total quantity. The percentage of Service Workshops according to their skill is the following: Refrigeration 18%, stationary air conditioning 11%, Mobile Air Conditioning 13% and Multi Skill 58%.

As CFC-12 is the most popular refrigerants for service workshops in Argentina, it was attempted to collect information on annual usage of CFC-12 and CFC-11 from surveyed service workshops but difficulties arose that hindered the accomplishment of such task. The seasonal nature of MAC and Air-conditioners use in the country made it difficult to estimate the CFC-12 usage.

50% of the Service Workshops consume less than 100 Kg of CFC-12 and 20 Kg of CFC-11 per year. A 10% of Service Workshops use more than 1 MT of CFC-12 per year. In Table 11, the proportion of annual CFC-12 and CFC-11 usage is given in terms of application and workshop size. Table 11 indicates that 90% of CFC-12 was used at “small” and “medium” service workshops.

Table 11. Service workshop distribution on application and annual CFC-12 and CFC-11 usage

S.W. size	CFC-12 & CFC-11	%				S.W. size %
	Kg/year	Ref.	MAC	Stationary AC	Multi Skill	
Very Small	0-200	9	7	5	28	49
Small	201-500	5	3	3	16	27
Medium	501-1000	3	2	2	7	14
Large	> than 1000	2	1	1	6	10
TOTAL		**19**	**13**	**11**	**57**	**100**

Current practice and facility

Table 12 shows the facilities available at workshops surveyed. 20% of service workshops are using compressors for evacuation of the system, due to the fact that the price difference between a compressor and a vacuum pump is significant and they cannot afford to buy vacuum pumps at the magnitude of their business, 18% has old vacuum pumps without brand and/or manual charge type. Evacuation by a compressor gives more possibilities for refrigerant leakage from installations, as a good maintenance cannot be achieved only with compressor evacuation. A recovery unit is rarely seen in workshops, and only 3% of them have a recycling and recovery machine.

Table 12. Facilities at workshops, availability in %

Facility	Nationwide	Service workshops for			
		MAC	Refrigeration	Stationary AC	Multi Skill
Branded vacuum pump	62	51	70	59	62
Adapted compressor	20	21	20	15	21
No Branded vacuum manual charge	12	14	12	9	13
Recovery unit	3	3	4	2	3
Nitrógeno	33	26	37	31	32
Alcohol and others	10	10	11	7	11
Leak Detector *	N/A	N/A	N/A	N/A	N/A

* Most Service workshops use soap foam.

Awareness

The awareness of ozone issues and service technology by service workshops is summarized in Table 13. Relatively high awareness on the ozone issue, obligation of emission prevention and knowledge on alternative refrigerants is realized, which may be attributed to the fact that service workshops with no awareness were reluctant to provide answers to the questionnaire. It is noted that recovery and recycling concept is unknown to many workshops. There is little business practice to use recovered refrigerants, except for a limited number of cases.

Table 13. Awareness of relevant matters by workshop in Argentina

Item	Awareness (in %)
Ozone depletion	90
Ozone depleting CFCs	46
High knowledge about ODS	10
Emission due to carelessness	100
Recovery, recycling and reclaiming	3
Alternative refrigerants and technology	90

Education, training and certification

In Argentina, there is not yet official institution granting technical certificates in refrigeration and/or air conditioning maintenance services qualification. The Argentine Chamber of Heating, Air Conditioning and Ventilation is a private institute, with certain institutional prestige, which provides training to its associates but the degree granted by this institution is not official.

The level of instruction of technicians belonging to surveyed service workshops is the following: 10% university, 38% high school and 52% primary school.

CFC service usage by application

Table 14 summarizes the refrigeration and air-conditioning equipment that exists in Argentina. The amount of CFC used for the service jobs for respective refrigeration and air-conditioning units has been determined through the analysis of the surveyed information and industrial data.

Table 14. Estimated CFC usage for servicing respective refrigeration and air-conditioning units in 2002

Type of Equipment	Stock, units	CFC consumption for service in 2002, MT*	
		Based on survey of CFC distributors	Based on statistics of stocked equipment in use**
CFC-12			
Domestic refrigeration and freezers	5,600,000	267	251
Commercial freezers	2,200,000	636	650
Industrial refrigeration		10	10
Transport refrigeration	110,000	100	150
Mobile A.C.:			
Passenger cars	2,500,000	508	490
Vans & trucks	43,000	20	18
Buses	7,000	20	32
Others***		40	
CFC-11			
Flushing		100	-
TOTAL		1,701	1,601

* Service usage for chillers (63 MT CFCs in 2002) is not included.
** Service usage was determined on frequency of servicing and average amount of service use of CFC for each type of equipment.
*** Fishing vessels (16 MT), reefer containers (11 MT), boats (4 MT), trains (2 MT), agriculture machinery (7 MT).

CFC Supply and prices

Refrigerants are bought from distributors, which normally also sell spare parts. Some service workshops buy full cylinders (13.6 Kg) but most of them have their small home-made cylinders refilled (3/5 Kg) and distributors also sell refrigerants packaged in even smaller amounts.

The current price of CFC-12 in a 13.6 Kg disposable cylinder, which normally service shops use, is US$ 6 to 7 per kg, and for CFC-11, US$ 3 to 4 per kg.

Refrigeration service sector phase-out plan

It is inevitable to take necessary measures for the reduction of the service use of CFC, in order for Argentina to be in compliance with the 50% reduction obligation for the year 2005, followed by the 85% reduction obligation in 2007. The sector phase-out plan (SPP) framework is, therefore, of essential importance for Argentina's compliance with the Montreal Protocol. As Argentina is a big country with about 5,000 workshops, the SPP implementation would need several years. It should be started as soon as possible, to enable the country to meet its obligation for the years 2005, 2007, and 2010.

The conditions and constraints for SPP in Argentina are described below.

- There will be little demand of CFCs for new equipment in refrigeration and foam sectors by 2006;
- Employment must be kept in all related industries, particularly in small and medium sized enterprises (SMEs), which play a major role in the refrigeration service sector. Even more employment may be created as a result of successful implementation;
- Availability of virgin CFC may be limited in the near future;
- The requirements of CFC refrigerants for servicing and maintenance of existing CFC refrigeration and air-conditioning equipment must be satisfied and must be supplied by the National recovery and recycling project;
- The service sector in Argentina is not well coordinated due to the significant number of SMEs involved;
- Legislation framework in Argentina is to be fine-tuned.

External constraints include the availability of CFCs at low prices and the disposal of CFC. These issues are under the consideration of Task Forces of the Multilateral Fund.

Under the above circumstances, the present SPP must serve as a seed to initiate a sustainable national system for refrigerant recovery and recycling and the responsible use of CFC refrigerant in the refrigeration industry and the consumer sector.

Specific activities or actions, objectives and modalities of implementation in each project component are elaborated below.

Linkage with the national project for training service technicians and activities in the present plan

It is essential to have a close link with on-going technicians training program assisted by UNEP, which aims at training 3,000 technicians through 120 training workshops.

National recovery and recycling project

Establishment of recycling centers: Twenty five (25) recycling centers will be established at major cities, principally at the training centers. Each recycling center will receive fundamental equipment required for refrigerant recycling. They also need a cylinder to keep un-recyclable refrigerants until further treatment will be done. Equipment to be provided includes a recovery machine, a recycling machine, several small recovery cylinders, vacuum pumps, a refrigerant identifier (infrared type), a storage cylinder, and service tools (piercing valve, gauge manifold etc.).

Three reclamation facilities will be set-up in Argentina. A part of the cost for these reclamation facilities is included in the present proposal. These facilities will provide the user industries, which require high quality refrigerants for servicing, with reclaimed CFCs.

Service equipment and recovery machines: Essential service equipment for good servicing practice and refrigerant recovery will be provided to 3,000 selected service workshops. It includes vacuum pumps, recovery machines, recovery bags, piercing valves and other service tools. In order to facilitate the reduction of use of CFC-11 for flushing refrigeration systems, flushing units with non-ODS flushing agents (alcohols, glycol, ethers etc.) are going to be provided to selected service workshops, where amount of CFC-11 usage is high.

4.4 Incentive program for retrofitting and/or replacement of industrial equipment

An incentive program for encouraging retrofitting or replacement of existing CFC based relatively big installation is planned. Chiller conversion assistance is not considered, however. Target en-users of this scheme are as follows.

Industrial refrigeration: Repsol YPF (CFC-12 unit with 3.5 T capacity), Petroquimica Rio (CFC-114 unit with 4 T capacity), Solvay Indupa SAIC (CFC-12 unit with 15 T capacity)
Hospitals:
Hotels:
Supermarket chains:
Cold storage rooms:

A part of financial assistance is included in the present strategy to encourage the conversion to non-CFC equipment in 2006 and 2007. The detail of the program including eligibility of end-users of CFC equipment and effectiveness of funding will be defined during the implementation of the present strategy in 2004 – 2005. Through this activity, the final consumption of CFC in the service sub-sector will be phased out.

4.5 Technical support component

Since the sector phase-out plan will address the entire refrigeration sector, the industry as a whole will need to be supported through provision of a technical support component to ensure that phase-out actions and initiatives are not only technically sound but also sustainable, and consistent with the important priorities of the Government, which are to ensure industrial sustainability and, *inter alia*, prevent its obsolescence. The technical support component will assist the refrigeration sector as a whole, on the following:

a) Ensuring and/or establishment of quality and performance standards for the CFC-free products and applications within the sector;
b) Interaction with the user industry to provide technology assistance for sustainability of CFC-free refrigeration applications through technical workshops and meetings;
c) Ensuring possibility for refrigeration system production equipment operators and technicians for sustaining to participate in a training program on CFC-free technologies.

This component includes possible supplementary activities for service technicians training program, which is being executed with the assistance of UNEP, by providing additional training for certified trainees.

This would also provide the Government of Argentina with flexibility for project implementation. Thereby, the strategy is able to cope with specific situation occurring during the execution of the program.

4.6 Timetable for implementation of the sector phase out plan

Table 15. shows the timeframe for the implementation of each activity in each project component. The total duration of the project is 7 years.

Table 15. Timetable for implementation of the SPP, Argentina

Year	'03	2004		2005		2006		2007		2008		2009		2010	
Reduction in manufacturing sector						36									
Reduction in service sector	0	0		50		400		550		530		250		150	
Approval of SPP	*														
Project management															
Coordination group set up															
Training of national experts															
Awareness promotion															
Monitoring															
Reports		*		*		*		*		*		*		*	
Discussion with UNEP for linkage with technician training program															
Manufacturing sector program															
Customs training (UNEP)															
Technician training (UNEP)															
Technical support component															
Recovery and recycling scheme															
Establishment of recycling centre															
Equipment delivery to centres															
Training of centre staff															
Procurement and delivery of equipment to workshops															
Incentive program for retrofitting and replacement															
Recovery & recycling operation															

5. Incremental costs

5.1 Manufacturing sector

Incremental costs for the manufacturing sector plan is composed of equipment costs for modification of existing foaming machines and refrigerant charging units depending on the baseline equipment of enterprises. Incremental operating cost for 24 months operation will be provided to assist enterprises included in the present SPP for conversion. The detail is elaborated in ANNEX I.

5.2 Service sector

Financial assistance required for each activity is summarized in Table 16. for the consideration by the Multilateral Fund. The grant is requested in five tranches from 2003 to 2007, so that an effective use of the allocated fund is ensured. The administration costs of the implementing agency are 7.5 % of the project cost.

Table 16. Costs of the SPP, Argentina

Project component and activity	Total cost, US$	2003 Tranche	2004 Tranche	2005 Tranche	2006 Tranche	2007 Tranche
Project management Project coordination, awareness promotion, development of licensing system Monitoring and evaluation	**937,400**	122,204	370,000	235,000	115,000	95,000
Technical assistance component workshop, awareness, others	**300,000**	0	0	150,000	150,000	0
Manufacturing sector phase out program	**895,725**	200,000	400,000	295,725	0	0
National recovery and recycling project Establishment of recycling centres Provision of service equipment and recovery facilities	**6,215,000**	0	2,073,333	1,988,333	2,153,333	0
Incentive program for retrofitting and replacement of industrial equipment	**1,000,000**	0	0	0	500,000	500,000
TOTAL PROEJCT COST	**9,348,125**	322,204	2,843,333	2,669,058	2,918,333	595,000
IA Support cost	**701,109**	24,165	213,250	200,179	218,875	44,625
TOTAL GRANT	**10,049,234**	346,369	3,056,583	2,869,238	3,137,208	639,625
Business plan 2003 - 2005		269,000	2,688,000	2,688,000	0	0

The cost breakdown of activities in the project components is given in ANNEX VIII.

6. Management

The overall management of the plan will be carried out by the Government of Argentina with the assistance of UNIDO.

The Ozone Office will be responsible for monitoring the implementation of the phase-out plan. The Ozone Cell will be responsible for tracking the promulgation and enforcement of policy and legislation and will assist UNIDO with the preparation of annual implementation plans and progress report to the Executive Committee.

The implementation of the phase-out plan will need to be closely aligned and coordinated with the various policy, regulatory, fiscal, awareness and capacity-building actions, which the Government of Argentina is taking, to ensure that the implementation is consistent with the Government priorities.

The phase-out plan for the whole refrigeration sector will be managed by a dedicated team, consisting of a coordinator to be designated by the Government and supported by the implementing agency. The policy and management support component of the phase-out plan will include the following activities for the duration of the plan:

a) Management and co-ordination of the implementation with the various Government policy actions pertaining to the refrigeration sector;
b) Establishment of a policy development and enforcement program, covering various legislative, regulatory, incentive, disincentive and punitive actions to enable the Government to exercise the required mandates in order to ensure compliance by the industry with the phase-out obligations;
c) Development and implementation of training, awareness and capacity-building activities for key government departments, legislators, decision-makers and other institutional stakeholders, to ensure a high-level commitment to the objectives and obligations;
d) Awareness creation of the phase-out plan and the Government initiatives in the Sector among consumers and public, through workshops, media publicity and other information dissemination measures;
e) Preparation of annual implementation plans including determining the sequence of enterprise participation in planned sub-projects;
f) Verification of ODS phase-out in completed sub-projects within the plan through plant visits and performance auditing;
g) Establishment and operation of a reporting system of usage of ODS/substitutes by users;
h) Reporting of implementation progress of the plan for the annual performance-based disbursement;
i) Establishment and operation of a decentralized mechanism for monitoring and evaluation of outputs, in association with provincial regulatory environmental bodies to ensure sustainability.

For the implementation of service sector activities, OPROZ will be responsible for the national coordination of the whole program.

In terms of regional coordination, the executive teams in the Autonomous city of Buenos Aires, Buenos Aires city Suburbs, Rosario city and Suburbs, Cordoba city and Suburbs, Mendoza city and Suburbs, Mar del Plata city and Suburbs will lead the project implementation for each responsible region.

In each region, the executive team consists of representatives of the provincial governments (environmental departments and industry departments), customs offices, education and training institutions and industries.

The activities envisaged in the following are required for the coordination:

- Reassessment and analysis of the sector after the approval of the SPP;
- Determination of the specification of equipment to be provided by the SPP;
- Selection of trainers for training of technicians (with the help of INTI);
- Selection of service workshops to be trained;
- Awareness promotion at the regional level;
- A list of service workshops should be updated in terms of their CFC consumption, necessary equipment for recovery, their readiness to recover CFC, commitment to CFC phase out activity, capability and other factors relevant to the recovery and recycling scheme project.
- Possible institutes and/or enterprises for centers for training and recycling should be surveyed. The business criteria of refrigerant recycling center should be developed.
- Recipient service workshops for recovery machine should be determined.
- Un-recyclable refrigerants should be kept for further treatment at the proper site.

Further, local distribution of service equipment and refrigerant recovery and recycle machines, which will be procured through UNIDO bidding procedure and delivered to the country, should be executed.

7. Monitoring and evaluation

OPROZ monitors the consumption data of all ODS through regional teams. Inspections at reconverted companies are foreseen to ensure the non uses of CFCs after project completion. The licensing System will be a tool to monitor and ensure compliance of control measures.

The Government has offered and intends to offer continuity of activities and endorsement for the projects through the institutional support over the next years. This will guarantee the success of any activity approved for Argentina.

After the establishment of the countrywide scheme of refrigerant recovery and recycling, the monitoring activity will be initiated to know whether the project is successfully implemented and the target CFC phase out is achieved.

Monitoring activity by the authority to be assigned (e.g. Ozone Office, government agency, local environment institute) will be done by:

(1) Establishing a system to ensure with the counterpart institute, that every recycling center and service workshop is encouraged or obliged to report data and give information to the recovery and recycling scheme. This may be enabled through forms to be filled by recycling centers and service workshops.
(2) Setting up adequate office facilities including a computer system to collect and analyze the data.
(3) Regular communication with the counterpart institute.
(4) Occasional visits to workshops and recycling centers.
(5) Regular communication with customs offices.

Following information will be collected from recycling centers and workshops.

CFC quantity

- Number of appliances subjected to refrigerant recovery and type of these appliances at every service workshop;
- Amount of recovered CFC refrigerants at every workshop;
- Amount of recovered CFC refrigerants sent to the recycling centers at every workshop;
- Amount of recovered CFC refrigerants stored at every workshop;
- Amount of recovered CFC refrigerants received from service workshops at every recycling center;
- Amount of recycled CFC refrigerants at recycling centers;
- Amount of recycled CFC refrigerants returned (sold) to workshops;
- Amount of recycled CFC refrigerants used in workshops and its application;
- Amount of CFC refrigerants, which can not be recycled and are subject to further treatment (e.g., sent to reclaiming plants, or decomposition plants abroad);
- Other data relevant for monitoring the scheme (amount of imported CFC refrigerants etc.).

Cost information

- Cost of recovery at every service workshop and parties who bear the cost;
- Cost of recycling at every recycling center and parties who bear the cost;
- Price of recycled CFC refrigerants;
- Other financial information relevant to monitoring the recovery and recycling scheme.

Data and information collected will be analyzed to check the adequate operations of the scheme.

8. Performance targets and disbursement schedule

Table 17 gives an overview of the annual performance targets.

Table 17. Performance targets

Tranche	Performance target			CFC Reduction, MT
	Management	**Manufacturing sector**	**Service sector**	
2003	Project approval			-
2004	Establishment of operational mechanism for management and monitoring of the phase-out plan	Working agreement with enterprises in the manufacturing sector	Agreement with UNEP for linkage with on-going training project	-
	Coordination groups set up	Bidding of foaming equipment	Selection of recycling centres	-
	Training of national experts		Bidding of recycling centre equipment	-
	Start of awareness promotion		Training of centre staff	-
2005	Monitoring and evaluation	Provision of foaming and charging units to manufacturing enterprises	Bidding of service equipment (phase 1)	50
			Start of recovery and recycling operation	-
2006	Monitoring and evaluation	Commissioning of foaming equipment and charging units	Delivery of service equipment (phase 1)	436
	Workshops		Bidding of reclamation facilities	-
2007	Monitoring and evaluation		Delivery of service equipment (phase 2)	550
	Workshops		Installation of reclamation facilities	-
2008	Monitoring and evaluation		Execution of retrofitting and replacement	300
	Workshops		Delivery of service equipment (phase 3)	-
2009	Monitoring and evaluation		Execution of retrofitting and replacement	250
2010	Monitoring and evaluation			150

Upon approval of the present phase-out plan by the MLF, the Government of Argentina, will start implementation of preparatory activities, including:

a) Establishment of operational mechanism for management and monitoring of the phase-out plan;
b) Formulation of detailed terms of reference and work plans for various activities under the technical support and policy & management support components;
c) Establishment of an operational mechanism for participation in the phase-out plan and for obtaining phase-out commitments from enterprises;
d) Initiating CFC phase-out activities for the medium-sized enterprises through individual sub-projects;
e) Selection of the small-sized enterprises for group projects;

The Government of Argentina through UNIDO, will request the disbursement of the 2004 funding at the last Meeting of the Executive Committee in 2003. The funds for 2005 and 2006 will be transferred to UNIDO at the first meeting of the Executive Committee in these years, for the amounts listed in the table above, upon approval of the annual implementation plan and upon confirmation by the Government and UNIDO, that the agreed reduction targets and relevant performance milestones of the respective preceding years have been achieved.

The further detail must be agreed with the Executive Committee and stated in the Agreement.

ANNEX I

Argentina. Indicative list of Remaining enterprises in the Refrigeration (Mfg) Sector
Small size enterprises

No.	Name	CFC-11 (MT/yr.)	CFC-12 (MT/yr.)	CFC consumption Total	Location
1	Bacope	0	0.53	**0.53**	Buenos Aires
2	Bercomar	2.1	0.3	**2.4**	Buenos Aires
3	CGA S.A.	0	0.24	**0.24**	Santa Fe
4	Farpa S.A.	0.15	0	**0.15**	Buenos Aires
5	Fimet	1.4	0	**1.4**	Santa Fe
6	Frascona	0	0.8	**0.8**	Mar del Plata
7	Fricalven	1.93	0.62	**2.55**	Cordoba
8	Friotex	0	0.1	**0.1**	Santa Fe
9	Gastroquil	1.6	1.9	**3.5**	Buenos Aires
10	Gatic	1	1.1	**2.1**	Santa Fe
11	Hidrofrio	0	0.1	**0.1**	Buenos Aires
12	Hugo Mazzetti S.A.	0	0.11	**0.11**	Buenos Aires
13	Igar	0.6	0	**0.6**	Cordoba
14	Lanin	2.1	1.33	**3.43**	Neuquen
15	Lareu	0	0.61	**0.61**	Buenos Aires
16	Lauge	1.1	0	**1.1**	Rosario
17	Libra	0.1	0.8	**0.9**	Cordoba
18	Milfrigo	0	1.1	**1.1**	Rosario
19	Modulterm	0.4	2.2	**2.6**	Avellaneda
20	Motocom	0	0.11	**0.11**	Mar del Plata
21	Polair	2.5	0.33	**2.83**	Rosario
22	Refrimet	3.5	0.9	**4.4**	Caseros
23	Righi	0.4	0.2	**0.6**	Berazategui
24	Santelmo	3.6	0	**3.6**	Loma Hermosa
25	Simar	0.1	0.2	**0.3**	Buenos Aires
26	Tecnofred	1.6	0	**1.6**	Buenos Aires
27	Tecnologia en Refrig.	0.1	0.3	**0.4**	Rosario
28	Vica	0	0.1	**0.1**	Rosario
29	Vincer	0	0.2	**0.2**	Rosario
30	Walter Grosso	0.3	0	**0.3**	Santa Fe
Total(30 enterprises)		**24.58**	**14.18**	**38.76**	

SUM…… 38.76 MT

ODS to be phased-out

CFC-11	21.88	
CFC-12	14.18	
Total	**36.06**	**ODP tons**

ANNEX I *(cont.)*

Enterprises with foaming baseline

No.	Name	Foaming	CFC consumption	Refrigeration
4	Farpa S.A.	Hand-mixing equipment		Manual operation
5	Fimet	Hand-mixing equipment		1 VP& 1 CB & 1 LD
10	Gatic	Hand-mixing equipment		1 VP& 1 CB & 1 LD
16	Lauge	Hand-mixing equipment		Manual operation
23	Righi	Hand-mixing equipment	Aistec	1 VP& 1 CB & 1 LD
30	Walter Grosso	Hand-mixing equipment		Manual operation
1	Bacope	Low-pressure equipment	Cema F2F1H	1 VP& 1 CB & 1 LD
2	Bercomar	Low-pressure equipment	No brand	1 VP& 1 CB & 1 LD
7	Fricalven	Low-pressure equipment	Glass Craft	2 VP& 2 CB & 1 LD
9	Gastroquil	Low-pressure equipment	Aistec-K 100	1 VP& 1 CB & 1 LD
13	Igar	Low-pressure equipment	Aistec	Manual operation
15	Lanin	Low-pressure equipment	ICR 2000	1 VP& 1 CB & 1 LD
18	Milfrigo	Low-pressure equipment		1 VP & 1 CB & 1 LD
19	Modulterm	Low-pressure equipment	No brand	2 VP& 1 CB & 1 LD
21	Polair	Low-pressure equipment		2 VP& 1 CB & 1 LD
22	Refrimet	Low-pressure equipment		Manual operation
24	Santelmo	Low-pressure equipment	Cannon HC-100	Manual operation
26	Tecnofred	Low-pressure equipment	Aistec	1 VP& 1 CB & 1 LD
	Subtotal		**18** enterprises	
	Hand mixing equip.		6 enterprises	
	Low pressure		12 enterprises	

Enterprises with foaming part already reconverted with Montreal Protocol Funds

No.	Name	Foaming	CFC consumption	Refrigeration
8	Friotex	Foam operation reconverted		1 VP& 1 CB & 1 LD
29	Vincer	Foam operation reconverted		1 VP& 1 LD
	Subtotal		**2** enterprises	

ANNEX I *(cont.)*

Enterprises without foaming baseline

No.	Name	Foaming	CFC consumption	Refrigeration
3	CGA S.A.	No foam operation		Manual operation
6	Frascona	No foam operation		2 VP& 1 CB & 1 LD
11	Hidrofrio	No foam operation		Manual operation
12	Hugo Mazzetti S.A.	No foam operation		Manual operation
15	Lareu	No foam operation		1 VP& 1 CB & 1 LD
17	Libra	No foam operation		1 VP& 1 LD
20	Motocom	No foam operation		1 VP & 1 LD
25	Simar	No foam operation		1 VP& 1 CB & 1 LD
27	Tecnologia en Ref.	No foam operation		1 VP& 1 CB & 1 LD
28	Vica	No foam operation		1 VP& 1 CB & 1 LD
	Subtotal		**10** enterprises	

Total (30 enterprises)

VP= Vacuum pump 25 units
CB= Charging board 19 units
LD= Leak detector 21 units

Summary of existing enterprises and equipment

Without foaming operation (no baseline)	**10** enterprises
With hand mixing equip.	**6** enterprises
With low pressure machines	**12** enterprises
Companies (foam) reconverted with Montreal Protocol Funds	**2** enterprises
Vacuum Pumps (VP)	**25** units
Charging Boards (CB)	**19** units
Leak detectors (LD)	**21** units

Summary of refrigeration enterprises by size and consumption
Enterprise Size/Category

Eligible enterprises

Small-size enterprises	Number of enterprises	CFC 11&12 consumption (MT/yr.)
Without foaming baseline operation	10	4.65
Manual operation	6	4.55
Automatic operation	12	29.56
Note: Already partially reconverted	2	

Note: These 2 companies already reconverted its foam operation with the assistance of the MLFS

Sub-total	30	38.76
Gran total	**30**	**38.76**

ANNEX II

A. INCREMENTAL CAPITAL COSTS

Investment component

Foaming operation

	No. foaming base-line	Hand mixing base-line	Dispenser base-line	Subtotal
Foam dispenser	0	15,000	25,000	
Trials	0	2,000	2,000	
Technical assistance	0	1,500	1,500	
Training	0	1,000	1,000	
Subtotal	**0**	**19,500**	**29,500**	
Number of enterprises		**6**	**12**	
Sub-total foaming (all enterprises)		**117,000**	**354,000**	**471,000**

Refrigerant operation

Equipment		Number of related items in all companies			
Vacuum pumps	2,500	25	62,500		
Charging units	2,000	19	38,000		
Leak detectors	1,000	21	21,000		
Subtotal refrigeration equipment				131,000	
Services					
Trials	1,000				
Technical assistance	1,000				
Training	500				
Subtotal	2,500				
Number of enterprises	30				
Subtotal refrigeration equipment & services (all enterprises)					**196,500**
Sub-total foaming & refrigeration (all enterprises)					**667,500**
Contingencies (10%)					**66,750**
Grand total					**734,250**

ANNEX III

B. INCREMENTAL OPERATING COSTS

Foam operation

	Before conversion	After conversion	in US$
Foam chemicals	189,077 kg	198,531 kg	
Rate	2.5 US$/kg	2.67 US$/kg	
Amount	472,692 US$	530,077 US$	
Net incremental Costs			57,385
(5%) Savings due to more efficient operation			2,869
Incremental Operating costs			54,516
One year (10% discount factor)		49,609	
Second year (10% discount factor)		45,248	
I.O.C. Two years			94,857
Incremental Operating costs for foaming operation			**94,857**

Refrigerant operation

Item Unit	Refrigerant (in kg)	
Quantity	14,180	
Price differential (pre and post conversion)	3	
Modifying factor	0.9	
Net incremental cost (US$/year)	38,286	
One year (10% discount factor) (.91)	34,840	
Second year (10% discount factor) (.83)	31,777	
Incremental operating cost for refrigerant operation		**66,618**
Total Incremental Operating costs (foam & refrig.)		**161,475**

ANNEX IV.

C. TOTAL COSTS

Incremental Capital Costs including contingencies	734,250
Incremental Operating Costs	161,475
GRAND TOTAL INCREMENTAL COSTS (US$)	**895,725**

ANNEX V. Environmental assessment

Foaming

The implementing agency experts prior to the preparation of this proposal appraised the prospective recipient participating enterprises and had detailed discussions with the technical and managerial personnel of the enterprises, regarding the choice of technology for replacing the existing CFC-based technology, under the project. The enterprises were briefed in detail about the following:

1. An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.
2. The techno-economic impact of each technology on the products manufactured, and the processes and practices employed by them.
4. The possible implication of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, fire and explosion hazards.
5. It was further explained that HCFCs use may become restricted under present or future international conventions and may also need to be phased-out at a future date, and any investments required for their phase-out and for conversion to safer technologies, may have to be born by them.

The enterprises indicated their preference for selection of HCFC-141b based technology, in their rigid foam operation. The specific justifications offered by them are: Water-based systems were considered, but are unsuitable due to the unsatisfactory insulation values, density and other end-product properties, which will affect their competitiveness. They considered hydrocarbon-based systems unsuitable due to the following:

a) The fire, explosion and security hazard and compliance with local safety regulations involved in the storage and handling of hydrocarbons, in view of their flammability. In the present premises of these enterprises such compliance is not possible. At the present time, it would not be cost-effective or viable for them to relocate their manufacturing facilities to ensure such compliance.
b) Since hydrocarbons cannot be pre-mixed in polyols due to the safety hazard they present in transportation, additional investments on in-house premixing equipment will be required. Considering their low volume of production, such investments are not economically viable.
c) In view of the above, the enterprises selected HCFC-141b (+partial water) based systems for their rigid foam operations as the conversion technology, which ensure quick phase-out of most of the ODP, while maintaining products competitive and the properties at acceptable levels.

Refrigeration

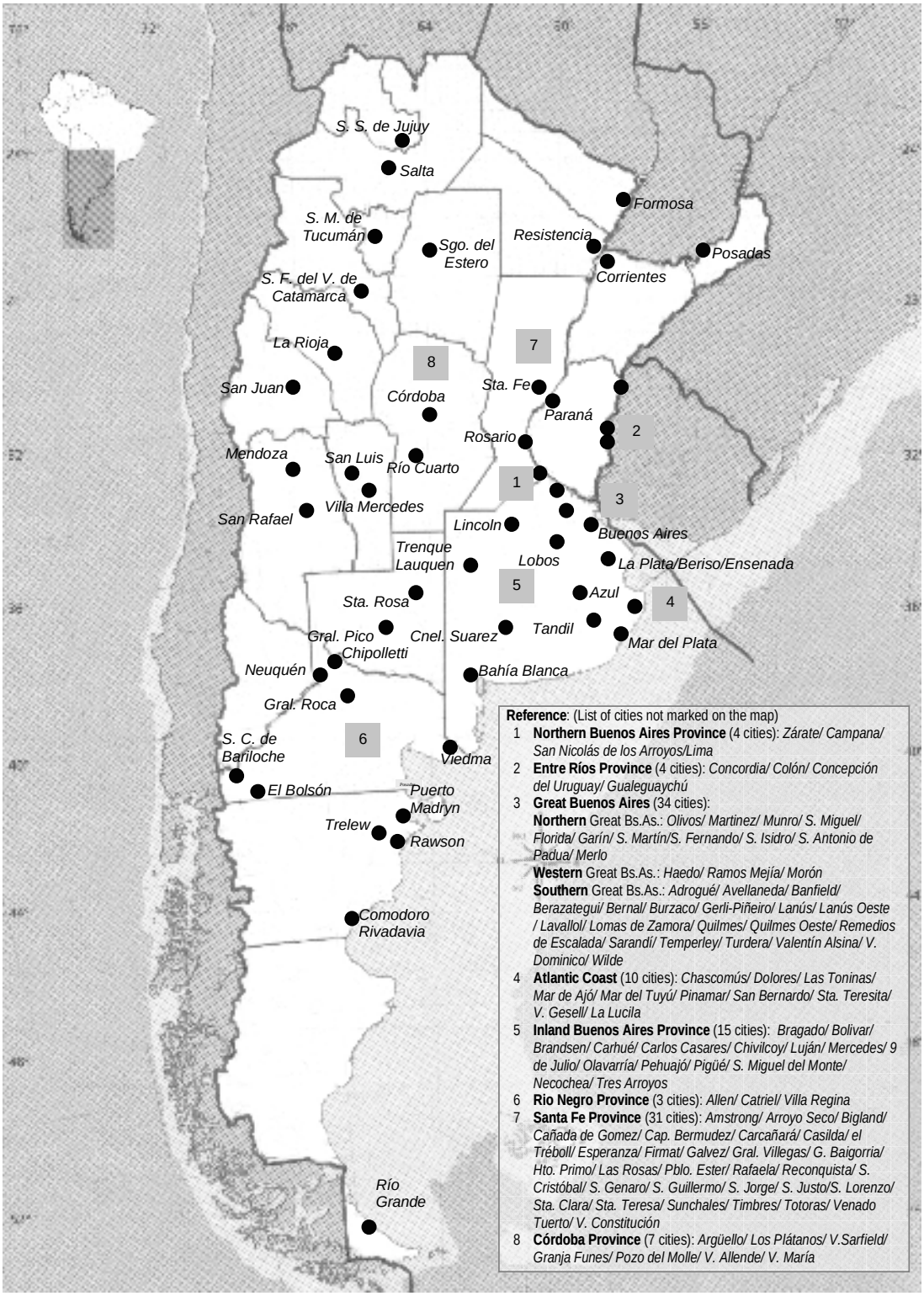
HFC-134a has zero ODP and GWP of 1,300. For this application, this is considered acceptable. HFC-134a is non-flammable, and has been extensively tested for toxicity, and is considered safe in applications where the exposure level is less than 1000 ppm on an eight hour time weighted average basis, which is the same as that for CFC-12, the existing technology. Therefore no changes in the current occupational safety practices are envisaged in this project.

Thus, this project uses environmentally safe and acceptable technology.

The enterprises participating in this project have obtained the necessary statutory environmental clearances for their present operations. Additional clearances, if any, for implementing this project, will be obtained as and when required from the relevant competent authorities.

ANNEX VI.

Geographical distribution of service workshops surveyed



ANNEX VII. - Cost breakdown of project components of SPP, Argentina (in US$)

Items	Description	Unit cost	Q'ty	Sub-total	2003 Tranche	2004 Tranche	2005 Tranche	2006 Tranche	2007 Tranche
PROJECT MANAGEMENT									
Internatinal consultant		6,000	10	60,000	10,000	20,000	10,000	10,000	10000
Training of national experts		2,000	20	40,000		40,000			
Awareness promotion				40,000		10,000	10,000	10,000	10000
Coordination, monitoring, report									
	Coordination office personnel fee			200,000	10,000	40,000	40,000	40,000	70,000
	Coordination office set up	15,000	4	60,000		60,000			
	Coordination and regional office equipment	2,500	10	25,000		25,000			
	Local services including selection of recipient, service providers, distribution of equipment			150,000		50,000	50,000	50,000	
	Personnel fee for regional offices	33,600	9	302,400	102,204	100,000	100,000		
	Travel, sundries, reports			60,000		25,000	25,000	5,000	5,000
Element Total				**937,400**	**122,204**	**370,000**	**235,000**	**115,000**	**95,000**
TECHNICAL ASSISTANCE									
	Workshops on new technologies			300,000	0	0	150,000	150,000	
MANUFACTURING SECTOR PROGRAM									
Equipment	*see detail in ANNEX*			667,500	200,000	400,000	67,500		
Contingency				66,750			66,750		
Incremental operating cost				161,475			161,475		
Element total				**895,725**	**200,000**	**400,000**	**295,725**	**0**	
NATIONAL RECOVERY AND RECYCLING PROJECT									
Establishment of 25 recycling centre	Training of recovery centre staff	500	25	12,500		12,500			
	Recycling machine with air purge function	8,000	25	200,000		200,000			
	Recovery cylinders	50	250	12,500		12,500			
	Storage cylinders	200	25	5,000		5,000			
	Service tools (piercing valve, Gauge manifold etc.)	300	100	30,000		30,000			
	Refrigerant identifier as analyzer	1000	25	25,000		25,000			
	Sub total			**285,000**					
Reclamation facilities		200,000	3	600,000		200,000	400,000		
Equipment for service shops	Recovery unit with filters	1,000	1,000	1,000,000		333,333	333,333	333,333	
	Recovery unit	700	2,000	1,400,000		466,667	466,667	466,667	
	recovery bag	30	1,000	30,000		10,000	10,000	10,000	
	Vacuum pump	200	3,000	600,000		200,000	200,000	200,000	
	Recovery cylinder	30	4,500	135,000		45,000	45,000	45,000	
	Flushing unit with non-CFC	500	500	250,000		83,333	83,333	83,333	
	Service tools (piercing valve, gauge manifold etc.)	300	4,500	1,350,000		450,000	450,000	450,000	
	Sub total			**4,765,000**					

ANNEX VII. (*cont.*)

Items	Description	Unit cost	Q'ty	Sub-total	2003 Tranche	2004 Tranche	2005 Tranche	2006 Tranche	2007 Tranche
	Sub total *(cont.)*			**4,765,000**					
Contingency				565,000				565,000	
Element Total				6,215,000	0	2,073,333	1,988,333	2,153,333	0
INCENTIVE PROGRAM FOR RETROFITTING, REPLACEMENT									
				1,000,000				500,000	500,000
Element total				**1,000,000**	**0**	**0**	**0**	**500,000**	**500,000**
Total funding				**9,348,125**	**322,204**	**2,843,333**	**2,669,058**	**2,918,333**	**595,000**
IA Cost				**701,109**	**24,165**	**213,250**	**200,179**	**218,875**	**44,625**
Total Grant by MFMP				**10,049,234**	**346,369**	**3,056,583**	**2,869,238**	**3,137,208**	**639,625**
BP 2003 -2005					**269,000**	**2,688,000**	**2,688,000**		

MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEPLETE THE OZONE LAYER

PROJECT COVER SHEET

COUNTRY:	**Republic of Argentina**	**IMPLEMENTING AGENCY:**	**UNIDO**
PROJECT TITLE	Plan for Phase-out of ODS in the Solvent Sector in the Republic of Argentina		

PROJECT IN CURRENT BUSINESS PLAN:	Yes		
SECTOR:	Solvent		
SUB-SECTORS:	Solvent; Process Agent		
ODS USE IN SECTOR:	Baseline (Average of 1998-2000, CTC + TCA; excluding CFC-113)	252.9	MT ODP
	Current (Average of 2000-2002)	72.74	MT ODP
	From approved ongoing World Bank projects	28.46	MT ODP
	From remaining non-eligible enterprises	4.12	MT ODP
	From remaining Solvent Sub-Sector eligible enterprises	38.75	MT ODP
	From remaining Process Agent Sub-Sector eligible enterprises	1.41	MT ODP
PROJECT IMPACT:	Reflecting the net ODP value	40.16	MT ODP
PROJECT DURATION:		6 years	
PROJECT COSTS:			
	Incremental Capital Costs	US$	973,335
	Contingencies	US$	97,334
	Incremental Operating Costs	US$	93,842
	Policy & Management Support	US$	198,000
	Technical Support Component	US$	93,500
	Total Project Costs	US$	1,456,011
LOCAL OWNERSHIP:		100%	
EXPORT COMPONENT:		0%	
REQUESTED GRANT:		US$	1,456,011
COST EFFECTIVENESS:		US$/kg	36.26
IMPLEMENTING AGENCY SUPPORT COSTS:		US$	109,201
TOTAL COST OF PROJECT TO MULTILATERAL FUND:		US$	1,565,212
STATUS OF COUNTERPART FUNDING	No required beneficiary funding		
PROJECT MONITORING MILESTONES	Included		
NATIONAL COORDINATING BODY	Ozone Program Office (OPROZ)		

PROJECT SUMMARY

UNIDO will submit a Solvent Sector Overall Phase-Out Plan to the December 2003 ExCom meeting. The Phase-out Plan will be implemented through three annual implementation programmes and upon completion will result in the complete phase-out TCA, CTC, CFC-113 and BCM in the Solvent Sector (excluding the Fumigation Sub-Sector) in the Republic of Argentina by the end of 2009. The Phase-out Plan will cover the technology conversions in the eligible enterprises in the Solvent Sector and ensure timely, sustainable and cost-effective phase-out through a combination of investment, technical support and policy/management support components. The total eligible incremental costs and the requested grant for the Solvent Sector Phase-out Plan in the Republic of Argentina amount to US$ 1,456,011. A total consumption of 40.16 ODP tons of ODS (TCA, CTC, CFC-113 and BCM) will be phased-out under this programme

Impact of the project on the country's Montreal Protocol obligations

The approval of this project will help the Republic of Argentina to meet its Montreal Protocol obligations, such as the phased reductions in ODS consumption according to the agreed schedules.

PREPARED BY:	UNIDO	**DATE:**	August 2003
REVIEWED BY:	Dr. Clinton. Norris	**DATE:**	August 2003

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ANNEXES **Page**

1. PROJECT SUMMARY

The Solvent Sector Phase-out Plan will enable the Republic of Argentina to eliminate the remaining consumption of 40.16 ODP tonnes of ODS solvents (TCA, CTC, CFC-113 and BCM) in the Solvent Sector (excluding the Fumigation Sub-Sector with Methyl Bromide) by 1 January 2010. Investment, non-investment, technical assistance and capacity building activities are proposed to achieve this target. A total consumption of 40.16 ODP tons of ODS (TCA, CTC, CFC-113 and BCM) will be phased-out under this programme.

The Argentinian Government is seeking financial support of US$ 1,641,911 from the Multilateral Fund for this Solvent Sector Phase-out Plan in order to achieve its goal. The funding is sought in three allocations, to be approved at the December 2003 ExCom meeting and to be paid at the beginning of the years 2004, 2005 and 2006. This procedure is requested because of the need to implement 85% of the CTC part and 30% of the TCA part of the ODS Solvent Sector Phase-out Plan during 2004.

The overall cost-effectiveness of this Solvent Sector Phase-out Plan is US$ 29.00 / ODP kg of ODS (TCA, CTC, CFC-113 and BCM).

2. INTRODUCTION

2.1. Programme Objective

The Solvent Sector Phase-out Plan (excluding the Fumigation Sub-Sector with Methyl Bromide) will lead to the final phase out of TCA, CTC, CFC-113 and BCM in this Sector by the end of 2006 and enable the Government of the Republic of Argentina to meet its compliance targets.

The Solvent Sector Phase-out Plan provides a performance-based ODS phase-out proposal, which will provide the basis for an agreement between the Government of Argentina and the Executive Committee of the MF and legally formalize the commitments of both sides.

A total consumption of 40.16 ODP tons of ODS (TCA, CTC, CFC-113 and BCM) will be phased-out under this programme, including individual investment projects already implemented on the initiative of the enterprises, which are to be funded on a retroactive basis.

The requested funding is based on the existing ExCom rules and Guidelines, primarily, Decision 35/56 on terminal phase out plans.

The Solvent Sector Phase-out Plan will clarify the status of TCA, CTC, CFC-113 and BCM consumption in the Sector, including its breakdown into the sub sectors Solvent and Process Agent.

The Plan will use a combination of policies, regulations and financial support to fund phase-out costs in the two sectors. The proposal also includes necessary technical assistance components to strengthen the capacity of the industry and concerned agencies to carry out investment, regulations, as well as public awareness and participation activities. It also proposes a management and implementation strategy, including a monitoring programme, to ensure the successful and effective implementation of this TCA, CTC, CFC-113 and BCM phase-out programme.

The monitoring programme is a crucial element for the overall objective of the Solvent Sector Phase-out Plan, since disbursements will be linked to confirmation of achievement of ODS reduction targets.

2.2. Institutional Framework

Argentina became a party to the Vienna Convention on September 23rd, 1989 and signed the Montreal Protocol on Substances which deplete the Ozone Layer on May 10th, 1990.

Since its annual calculated level of consumption of controlled substances listed in Annex A of the Protocol was less than 0.3 kg per capita, Argentina falls under paragraph 1 of Article 5 of the Protocol. Argentina therefore qualifies for financial and technical assistance - including technology transfer - through the Protocol Financial Mechanism, to enable compliance with the Protocol control measures.

The Country Program reflects the objectives of both government and industry to reduce and phase out the consumption of substances that deplete the Ozone Layer. The Country Program was approved at the 13th Meeting of the Executive Committee, in July 1994.

The Country Program calls for a total ODS phase out in year 2006 and for reductions in advance to the scheduled due date established by the Montreal Protocol and their amendments. Reasons for such a policy are the environmental impact and the future international restrictions for products containing these substances.

The project for the Country Program Update was approved at the 39th Meeting of the Executive Committee in 2003 and is in progress.

The national ozone unit is OPROZ (Ozone Program Office), which is under the Secretaría de Ambiente y Desarrollo Sustentable (Secretariat for the Environment and Sustainable Development) and is in charge of co-ordinating with governmental institutions and industries all the activities relating to the Montreal Protocol in Argentina.

OPROZ is composed of representatives of the Ministry of Foreign Affairs, International Commerce and Culture, of the Secretariat of Natural Resources and of the Secretariat of Industry.

OPROZ has established the Consultative Group for Ozone, GRUCO, which covers the Halon, Refrigeration, Foam and Solvent Sectors. GRUCO is composed of representatives of the National Government, the Federal Council for the Environment (COFEMA), trade associations, industrial producers, consumer organisations, professional associations, NGOs and other organisations concerned with the environment.

GRUCO as consultative body advises on the establishment of strategies for the reduction of consumption and analyses the options relating to the technologies and substitutes intended to implement the programme.

2.3. Overall Consumption of ODS in Argentina

As reported by OPROZ to the Multilateral Secretariat in 1998, Argentina's baseline average consumption of Annex A – Group I substances for the period comprising from 1995 to 1997 amounted to 4,697 Tons of ODS. For Annex B – Group II (CTC) and Group III (TCA) baseline 1998/2000 amounted to 827 Tons of products and 251 Tons of ODP.

Consumption decreased during the year 2000 down to 2,453 Tons. Some 1,193 Tons of this amount are estimated to correspond to the Refrigeration and Air Conditioning Sectors.

2.4. Imports - General figures

Exhibit 1: shows imports of the solvents CTC, TCA and CFC-113 for the 10 year period, from 1993 to 2002.

Exhibit 1: Imports in Metric Tons (1993 – 2002)

Imports in Metric Tons (1993 - 2002)			
Year	**CTC**	**TCA**	**CFC 113**
1993	1,772	2,232	
1994	1,556	1,717	
1995	2,595	991	
1996	3,001	1,057	53
1997	3,656	905	25
1998	3,906	902	43
1999	3,908	527	39
2000	5,703	560	80
2001	4,060	308	20
2002	1,430	128	0

Source: Ministry of Economy, Customs General Managing Office.

2.5. Legal Aspects

The Republic of Argentina has been among the most active Article 5 countries in ratifying and enforcing the Vienna Convention, the Montreal Protocol and its amendments. Exhibit 2 illustrates the ratification and acceptance dates as of 9 July 2003.

Exhibit 2: Ratification and Acceptance Dates.

Convention/Protocol/Amendment	Ratification	Acceptance
Vienna Convention	**18 January 1990**	
Montreal Protocol	**18 September 1990**	
London Amendment	**4 December 1992**	
Copenhagen Amendment		**20 April 1995**
Montreal Amendment	**15 February 2001**	
Beijing Amendment		

2.6. Relevant Regulations

OPROZ is drafting a project to establish regulations for controlling production and importation in order to achieve the objectives of the Country Program. At present, there are no restrictions for production or import of CFCs.

3. COUNTRY PROGRAM UPDATE

ExCom approved a project for updating of the CP at the 39th meeting and OPROZ is currently working on the Country Program Update (CPU).

This CPU foresees individual sector strategies combined with grant requests for the different sectors. Due to the current economic situation in the country, it is difficult to estimate accurately the uses of ODPs by sector, since the situation in industry is quite fluid. The CPU will provide the necessary data to set a national phase out strategy.

The following is based on the draft CPU and is an outline of the major proposed actions.

3.1. Ongoing Conversion Projects

There are ongoing 12 projects in the foam, refrigeration, solvents and aerosols sectors, which comprise a total of 28 companies.

3.2. Import/Export Licensing System

The design of the licensing system is being prepared and a draft proposal will be ready by September 2003. The implementing agency is UNEP.

3.3. CFCs

3.3.1. CFC Production Phaseout Strategy.

A project aimed at the phaseout of CFC production in Argentina by 2010 has been approved at the 38° ExCom meeting.

3.3.2. Foam Sector Phase-out Plan.

A project was approved at the 38th ExCom. This project will phase out the consumption of 192.3 ODP tons. Implementation of project started in 2003, with phase out of CFC use in foams by 2006.

3.3.3. Refrigeration Manufacturing Sub-Sector Phase-Out Plan

Prepared by UNIDO, to be presented at the 41st ExCom Meeting. The consumption in the manufacturing sub-sector is approximately 30/40 ODP tons.

3.3.4. Refrigeration Service Sub-sector Strategy

Being prepared by UNIDO, to be presented at 41st. ExCom meeting for approval as part of a National Phase out Plan, for Recovery and Recycling Project. The servicing sector uses currently around 1600 ODP tons, including the servicing in chillers.

3.3.5. Training of Refrigeration Service Sub-sector Strategy

Prepared by UNEP and already approved (30th. ExCom meeting). Execution will start in 2003. It is foreseen that 3.000 technicians will be trained.

3.3.6. Training of Customs Officers

Prepared by UNEP and approved at the 30th ExCom meeting. Execution will start in 2003.

3.3.7. Sterilant

Although most of these uses have already shifted to ODS free technologies, a remaining use of 3 ODP tons needs to be explored by World Bank.

3.3.8. MDI Sub-sector

There is currently one eligible company that consumed about 85 ODP tons of CFCs in 2002 in this application. OPROZ requested funds to elaborate a transition strategy to MDI with alternatives at the 39th. ExCom, which was not approved.

3.3.9. Chillers

This sub-sector has yet to be studied in depth.

3.4. CFCs and TCA in Aerosols

Aerosol Sector Phase-out Plan

A project for the replacement of CFC-11, CFC-12, CFC-113 and TCA used as propellant and solvent for technical aerosols by HCFCs and HFCs at SERVEX was approved at the 38th ExCom meeting. This project will accomplish the phase out of 40 ODP Tons of CFC-11, CFC-12, CFC-113 and TCA in the production of technical aerosols by 2005.

A second project for the conversion from CFC-11, CFC-12, CFC-113 and TCA into HCFC for technical aerosols at Electroquimica Delta was approved at the 36th ExCom meeting which will accomplish the phase out 60 ODP tons.

World Bank is also identifying potential remaining SMEs which have not been included in an individual project in order to submit a project at the 41st. ExCom. This is foreseen to be prepared by World Bank and covers the additional remaining consumption of CFCs of about 8 ODP tons.

3.5. Halon

Halon Sector Plan

A project for the National Halon Banking Program is under execution and implemented by the World Bank.

3.6. CFC-113, TCA, BCM and CTC

Solvent Sector Phase-Out Plan

Being prepared by UNIDO and to be submitted to 41st ExCom meeting. The consumption of CTC in this sector is estimated to be 9 tons and about 100 tons of TCA are used as solvent. About 20 tons of BCM are used as Process Agent. CFC-113 solvent uses are concentrated in the Aerosol Sector and are being phased out under the Aerosol Sector Phase-out Plan.

3.7. MeBr

3.7.1. MeBr Sector Phase-Out Plan

An agreement for the complete phase out of Methyl Bromide as soil fumigant, was agreed with ExCom for the year 2007 at the 36° ExCom meeting. There are two projects approved by ExCom, one with UNIDO (strawberries, cut flowers and greenhouse vegetables) and the other with UNDP (tobacco and open field vegetables).

3.7.2. Demonstration Project

This project for testing Methyl Bromide alternatives in post-harvest disinfestations for cotton and citrus is with the World Bank.

3.8. Draft Policy Guidelines to Ensure Compliance

The draft CPU foresees:

- Import/Export quotas for ODS according to the Licensing System and ODS containing equipment
- Permit System for ODS and ODS-containing equipment
- Production quotas for CFCs within a production phase out strategy
- Reduction steps, as per Agreement with ExCom, to reduce consumption of Methyl Bromide according to control measures (average of 1995-98) in 2002 and following control steps.
- Promulgation of a ban on CFC use in the foam sector following the completion of the phase out project.
- Prohibition of the use of CFCs in manufacturing processes by Refrigeration Manufacturers will be established following the completion of the phase out project.
- Regulation for National Halon Banking Program operation is underway
- Framework regulation to control halon imports.
- Making illegal the use of ODS in enterprises that have already been technically and/or financially assisted to convert to substitute technologies.
- Enterprises which have converted with the aid of MLF will not use CFCs after completion of projects.
- Beijing Amendment ratification under study
- Refrigeration technicians certification

Public Awareness

- Regular Ozone Protection Awareness campaigns in Radio, Newspaper and Television are planned to keep the phase-out momentum of the different ODS consuming sectors, as well as to identify the remaining ODS users in the country.

- Release of brochures, organization of meetings with NGOs, seminars at schools, painting competitions for children and other awareness materials are foreseen.

Monitoring

- OPROZ monitors the consumption data for all ODS

- Inspections at converted companies are foreseen to ensure that CFCs are not used after project completion.

- The Licensing System will be a tool to monitor and ensure compliance of control measures.

The Government has offered and intends continuing to offer continuity of activities and endorsement for the projects through the institutional support (OPROZ) over the next years. This will guarantee the success of any activity approved for Argentina.

4. THE SOLVENT SECTOR

The July 1994 Country Programme reported the consumption of 63.4 MT (50.7 ODP MT) CFC-113 (electronics) and of 2,040 MT (204 ODP MT) TCA in the Solvent Sector.

CTC was used in the production of CFCs. There was no mention of CTC use in the Solvent Sector.

The TCA consumption was broken down into:

- Electronics, 80 MT
- Electrical maintenance, 400 MT
- Metal cleaning, 1,210 MT
- Paints, 200 MT
- Leather, textiles, etc., 150 MT.

OPROZ has subsequently identified one user of Bromochloromethane (BCM) as Process Agent, with a consumption of 20 MT/y; there are unlikely to be others. BCM is listed as a controlled substance in the Beijing Amendment to the Montreal Protocol, which has yet to be ratified by Argentina. It is defined as a substance to be phased out as soon as possible.

4.1. Structure of the Solvent Sector

4.1.1. Production of ODS and Production Phase-Out

A project with the aim of phase-out of CFC production in Argentina by 2010 has been approved at the 38th ExCom meeting. CFC-113 is the only CFC in the Solvent Sector and it is not produced in Argentina.

4.1.2. Base-line for the Solvent Sector

Exhibit 3 gives the quantities (ODP MT, all Sectors) as reported by Argentina to the Ozone Secretariat and published in UNEP/Ozl.Pro/ExCom/38/58, Annex II.

Exhibit 3: Quantities (ODP MT, all Sectors) as Reported by Argentina to the Ozone Secretariat.

ODS	1998, ODP MT	1999, ODP MT	2000, ODP MT	Baseline, ODP MT
CTC	134.5	13.8	413.3	187.2
TCA	90.2	52.7	54.3	65.7
CFC-113	Included with CFCs, no separate figure for CFC-113			

4.2. Survey of the Solvent Sector

4.2.1. Background and Methodology

The Republic of Argentina has a market economy. The ODS users are in the private sector.

OPROZ, and UNIDO worked closely with the responsible Ministries, importers, distributors and identified users to quantify the applications for ODS in the Solvent Sector.

The objective was to obtain an accurate picture of the ODP solvents consumed during the last 4 years (1999 / 2002 period), including the identification of consumers and their annual consumption of ODP solvents and their use patterns.

The four ODP solvents to be considered in the Sector are:

- Carbon tetrachloride (CTC)
- 1,1,1 Trichloroethane (TCA) or methyl chloroform
- Trichlorotrifluorethane or CFC-113
- Bromochloromethane or BCM

The following steps were carried out to obtain and validate the required information:

1- **Imports**: Information about imports, importers, volumes, prices, dates, etc., was cross checked from different sources such as Ministry of Economy - Customs Office, Argentine Petrochemical Institute, private companies.
This information provided the total volume of solvents to be investigated.
2- **Industrial associations**: Around 40 industrial chambers and industrial institutes were contacted and many of them were visited. They were asked to let their associated companies know that the above-mentioned 4 solvents must be replaced and that financial help could be available for Argentine companies to carry out the replacement of ODS.
3- **Importers**: All the importers (18) have been contacted; some are brokers / distributors and others are final users. The distributors supplied very good general information as well as lists of their customers.
4- **Final users**: More than 120 companies were visited to obtain information on ODS solvent uses and consumption figures.

This phase of the survey and identification work of ODS users in the Solvent Sector was completed in April 2003.

4.2.2. Survey Results

4.2.2.1. Apparent Consumption

Since solvents are not manufactured in the country, and there are not industrial level exports, volumes of apparent consumption are the same of those of importation.

So:	***Apparent Consumption = Imports + Local Production - Exports***
Taking into account that in Argentina:	***Local production = 0*** ***Exports = 0***
Then:	***Apparent Consumption = Imports***

4.2.2.2. Real Consumption

Real consumption for the period 1999 / 2002 depends on the initial and final stocks of the mentioned period:

Real Consumption = Apparent Consumption + Initial Stock 1999 - Final Stock 2002

Since Apparent Consumption = Imports

Real Consumption = Imports + Initial Stock 1999 - Final Stock 2002

4.3. Results by Solvent

4.3.1. Use of CTC in the Solvent Sector

The imported volume of CTC is primarily used as raw material for the local manufacture of CFC-11 and CFC-12. The main consumer is Frio Industrias Argentinas S.A., a local company manufacturing CFC-11 and CFC-12 in Argentina, whose Project with the World Bank to phase-out the production of CFCs was approved at the 38th Executive Committee Meeting.
The remaining CTC is used for the manufacture of aerosols for textile cleaning, as industrial solvent, for laboratory purposes and as process agent for oil refining.

The 1999-2002 cumulated real consumption was:

1999/2002 = 14,911 Tons = 3,728 Tons/year

Exhibit 4 shows the breakdown by application for the period 1999-2002.

Exhibit 4: Breakdown by Application for the Period 1999-2000

Use	Consumers	Percentage of total
CFC manufacture	1	99.3
Aerosols for textiles cleaning	1	0.3
Industrial solvent	1	
Oil refining	1	0.4
Laboratory	4	
TOTAL	**8**	**100**

The average landed cost of CTC for industrial retail users (non-CFC) was US$ 340/MT. For laboratory applications (high quality) it was US$ 24/litre, or US$ 15,000/MT.

The users (excluding CFC producers) are listed in Exhibit 5.

Exhibit 5: CTC Consumption (kg), 1999-2002, and Applications

Company	1999	2000	2001	2002	Application
Dorwil	1,800	2,400	600	3,900	laboratories
FV	6	6	6	6	laboratories
Melvil	13,200	5,400	6,000	11,100	cleaning products
Merck Quimica Argentina	800	800	800	800	laboratories
Petrobras / Eg3	14,000	17,400	17,700	12,600	catalyst regeneration (process agent)
Química Industrial Bahiense	500	500	500	500	industrial solvent
Sintorgan	900	900	1,500	900	laboratories
TOTAL	**31,206**	**27,406**	**27,106**	**29,806**	

Analysis

Solvent Sub-Sector

The total quantity for 2000-2002 is 36,618 kg, making an average of 12,206 kg/year. This is 13,426 ODP kg/year.

Since several small or very small users are involved, a C/E of US$ 11/ODP kg is applied, i.e.10% higher than the limit often used elsewhere.

Therefore US$ 147,693 (ICC + IOC) are proposed to eliminate CTC in the Solvent Sub-Sector.

Process Agent Sub-Sector

The total quantity for 2000-2002 is 47,700 kg, making an average of 15,900 kg/year. This is 17,490 ODP kg/year.

Since one medium size user is involved, a C/E of US$ 10/ODP kg is applied, in line with the limit often used elsewhere.

Therefore US$ 174,900 (ICC + IOC) are proposed to eliminate CTC in the Process Agent Sub-Sector.

4.3.2. Use of Methyl Chloroform (TCA) in the Solvent Sector

TCA has a variety of uses and numerous small consumers, supplied through many different brokers and distributors.

The four years real consumption, 1999-2002, amounted to:

1,492 tons/4years = 387 tons/year

Consumption is diversified, the main uses being:

- Production of dielectric solvents
- Formulation of solvents for cleaning
- Textile cleaning
- Metal cleaning
- Polyurethane parts cleaning
- Epoxy pieces cleaning
- Cleaning of process equipment
- Paint manufacture/formulation

Exhibit 6 shows the breakdown of the accumulated figures for the period 1999-2002.

Exhibit 6: Breakdown of the Accumulated Figures for the Period 1999-2000

Use	Consumers	% of total
Metal cleaning	20	28
Solvents formulation	18	24
Cleaning of process equipment	7	2
PU parts cleaning	6	16
Textile cleaning	4	3
Paints & lubricants	3	4
Laboratories	2	
Epoxy parts cleaning	1	1
Miscellaneous	30	22
TOTAL	**91**	**100**

The average landed cost of TCA for industrial retail users was US$ 1,300/MT. For laboratory applications (high quality) it was US$ 22.5/litre, or US$ 15,000/MT.
The identified users are listed in Exhibit 7.

Exhibit 7: TCA Consumption (kg), 1999-2002, and Applications

Company	1999	2000	2001	2002	Uses	Comments
Acerbrag	520	520	520	520	dielectric solvent	
AGA	0	0	0	75	cleaning	
Alba	25,270	22,450	0	0	industrial paints	Non-Argentinian
Alcesa	0	0	0	2,000	solvents formulation	
Aluar	1,936	816	2,176	1,896	electric engines cleaning	
Anaeróbicos	800	3,580	2,200	3,220	solvents & adhesives	
Aprol	600	600	600	600	solvents formulation	
Argelite - La Rioja	1,600	1,500	1,500	1,500	car parts	ARG/SOL/INV/91, project cancelled
Atucha	1,542	843	1,177	595	electronics cleaning	
Bardahl	4,030	3,900	3,640	3,250	solvents formulation	
Company	**1999**	**2000**	**2001**	**2002**	**Uses**	**Comments**
Broderie Suizo	100	100	100	100	textile cleaning	
Buffalo	9,000	10,000	7,000	4,000	car parts	ARG/SOL/INV/91, project approved
Bunker Oil	260	260	260	0	solvents formulation	
Canadian Chemical Systems	16,275	14,868	5,136	1,550	solvents formulation	Argentine owned
Carla	272	544	272	280	solvents formulation	
Ciaquim	23,945	29,506	22,307	3,356	solvents formulation	
Cincam	2,100	2,100	2,100	2,100	metal cleaning	ARG/SOL/INV/91,

Company	1999	2000	2001	2002	Uses	Comments
						project cancelled
CNEA	1,542	843	1,177	595	nuclear power plants	
Colores especiales	780	780	780	780	solvents formulation	
Daimler Chrysler	2,586	5,755	4,080	2,432	car manufacturer	Non-Argentinian
Derben	800	600	500	500	solvents formulation	
Dorwil	1,300	1,560	780	2,104	laboratories	
Edesur	9,073	8,732	7,675	7,267	transformers cleaning	Non-Argentinian
Electroquímica Delta	4,040	3,650	3,980	2,230	cleaning aerosols	ARG/ARS/36/INV/128, project approved
F. H. Pinelli	260	260	260	260	electric devices cleaning	
Ford	1,677	991	0	0	car manufacturer	Non-Argentinian
FV	120	156	1,320	1,716	metal cleaning	
Galfione	624	624	624	624	metal cleaning	
Gatic Addidas	24,000	7,800	7,800	7,800	shoes & textile cleaning	
Grimoldi	12,240	18,590	18,590	18,590	shoes	67% Argentine owned, ARG/SOL/INV/91, status uncertain
Heliodino	3,550	2,240	1,360	3,680	car parts	ARG/SOL/INV/91, status uncertain
Hutchinson	7,888	7,757	9,904	5,473	car parts	Non-Argentinian
Indura	105	120	135	180	industrial gases	
Inta	3,120	3,120	3,120	3,120	textile cleaning	
Integral Metalúrgica	10,000	10,000	10,000	10,000	metal cleaning	ARG/SOL/INV/91, status uncertain
La Nación	100	100	100	0	newspaper	
Lentini	10,500	11,200	7,000	6,000	shoes	
Limindar	780	260	520	260	solvents formulation	
Merck Quimica	50	50	50	50	laboratories	
National Starch	520	520	520	520	solvent	Non-Argentinian
Orbis Mertig	12,775	7,344	3,264	0	white line products	ARG/SOL/INV/91, project approved
Peugeot Citroen (Emeca)	13,056	9,792	6,528	540	car parts	Non-Argentinian
PPG	0	0	4,680	0	paints	Non-Argentinian
Praxair	600	600	600	624	industrial gases	Non-Argentinian
Propulsora Patagonica	7,200	7,200	7,200	7,200	textile cleaning	
Quimica True	43,938	43,390	27,000	2,545	solvents formulation	
Renault	9,500	3,200	0	0	car manufacturer	Non-Argentinian
REPSA	1,200	1,600	2,000	2,400	epoxy pieces	
Servex	2,176	2,176	2,362	2,400	cleaning aerosols	ARG/ARS/38/INV/131, project approved
Shell	2,400	2,946	4,336	544	oil & lubricants manufacturer	Non-Argentinian
Company	**1999**	**2000**	**2001**	**2002**	**Uses**	**Comments**
Siderar	67,000	35,000	0	0	metal cleaning	ARG/SOL/28/INV/90, project approved
Siderca	9,000	9,000	9,000	9,000	steel tubes	
Silvestrin	600	600	600	600	solvent	
Sniafa	780	780	780	780	cleaning in fiber manufacture	
Suelas Leal	15,600	15,600	0	0	shoes	
Toyota	399	978	632	86	car manufacturer	Non-Argentinian
Trosh	16,344	8,054	8,528	1,538	shoes	ARG/SOL/INV/91,

Company	1999	2000	2001	2002	Uses	Comments
						status uncertain
Unaxel	1,040	1,040	1,040	1,040	solvents formulation	Non-Argentinian
Unisol	10,700	0	0	0	shoes	ARG/SOL/INV/91, status uncertain
Uranga	936	312	312	312	cleaning of metal tools	
Vadex	0	3,676	9,248	6,800	solvents formulation	
Wassington	390	854	3,412	2,697	solvents formulation	
Others (*)	78,000	78,000	78,000	78,000		
TOTAL	**477,539**	**409,437**	**298,785**	**216,329**		

(*) According to distributors' information

Two companies have individual World Bank projects, approved and being implemented, covering both CFC-113 and TCA, namely Electroquímica Delta, ARG/ARS/36/INV/128 and Servex, ARG/ARS/38/INV/131.

Siderar had a World Bank project, ARG/SOL/28/INV/90, but has closed down and no longer uses TCA.

Nine companies are or were in the World Bank Umbrella project ARG/SOL/INV/91. So far two of these projects, Orbis Mertig and Buffalo, have been approved and are being implemented.

Thirteen enterprises have majority non-Article 5 ownership and are deleted from the Solvent Sector Plan as non-eligible: Alba, Daimler Chrysler, Edesur, Ford, Hutchinson, National Starch, Peugeot Citroen (Emeca), PPG, Praxair, Renault, Shell, Toyota and Unaxel.

Analysis

Process Agent Sub-Sector

There is no TCA in this Sub-Sector.

Solvent Sub-Sector

The total for 2000-2002 is 924,551 kg. After subtracting the companies covered by the World Bank projects, individual and umbrella, and the majority non-Argentinian enterprises, the quantity for eligible enterprises is 595,893 for 2000-2002, or 198,631 kg TCA (19,863 ODP kg) per year.

Since numerous small or very small users are involved, a C/E of US$ 36/ODP kg is applied, i.e. still below the usual C/E threshold value for TCA.

Therefore US$ 715,068 (ICC + IOC) are proposed to eliminate TCA in the Solvent Sector.

The remaining identified eligible users of TCA are listed in Annex 2.

4.3.3. Use of CFC-113 in the Solvent Sector

CFC-113 is mainly used as cleaning solvent for electronic devices. Small quantities were also used for laboratory purposes. There has also been some use as refrigerant working fluid, in mixtures for low temperature equipment (lab freezers with temperature ranges from -40 to -80 °C).
The four years real cumulative consumption, 1999-2002 is 149.00 MT. The average annual consumption is then 37,250 kg.

4.3.3.1. Consumers and Main Uses

The main consumers are two companies, manufacturers of special cleaning products for electronics, who buy 79.9% of the total volume:

Electroquímica Delta S.A.: In conversion. - World Bank Project N° ARG/ARS/36/INV/128
Servex Argentina S.R.L.: In conversion. - World Bank Project N° ARG/ARS/38/INV/131

Also identified are 6 customers for refrigeration, 5 for laboratory uses and, according to estimations of the importers, there is a group of 5 companies each using 4 drums per year, (each drum 300 kg), for various purposes.

Exhibit 8 shows the accumulated figures for the period 1999-2002.

Exhibit 8: Accumulated Figures for the Period 1999-2002

Use	Consumers	Percentage
Cleaning	2	79.9
Refrigeration	6	3.0
Laboratory	5	0.1
Miscellaneous	5	17.0
TOTAL	**18**	**100**

An overview of consumers is shown in Exhibit 9.

Exhibit 9: CFC-113, Consumption (kg), 1999-2002, and Applications

Company	1999	2000	2001	2002	Use	
Electroquímica Delta	25,270	23,140	25,220	14,120	cleaning aerosols	WB Project N° ARG/ARS/36/INV/128
Servex	6,400	6,940	6,812	4,800	cleaning aerosols	WB Project N° ARG/ARS/38/INV/131
Almagro Refrigeración	77	100	0	0	refrigeration	
Anedra	6	25	30	0	laboratory	
Diaz Rubén	0	130	0	0	refrigeration	
Indubel	0	0	939	0	refrigeration	
Le Fontane	100	0	0	0	refrigeration	
Merk Quimica Argentina	36	20	16	0	laboratory	
Nobel	2	0	0	0	laboratory	
Profertil	0	3	0	0	laboratory	
Quimica Erovne	1	0	0	0	laboratory	
Refrigeración Indumet	1,252	626	626	0	refrigeration	
Refrimet	420	0	0	0	refrigeration	
Other customers (*)	6,000	6,000	6,000	6,000	miscellaneous	
TOTAL	**39,564**	**36,984**	**39,643**	**24,920**		

(*) According to distributors' information

Analysis

The average for 2000-2002 is 33,849 kg/year, representing 27,079 ODP kg, with an ODP of 0.8.

The two approved World Bank projects being implemented represent 27,011 kg/year average over 2000-2002, i.e. 21,609 ODP kg/year.

The remaining eligible enterprises have an average consumption over 2000-2002 of 5,470 ODP kg/year. A wide definition of "Solvent" is used here in order to capture the remaining minor uses of CFC-113, which would otherwise fall through the net.

A C/E of US$ 15/kg is applied in view of the small size of the users, whereby economies of scale are unlikely. Therefore US$ 82,050 (ICC + IOC) are needed to eliminate CFC-113 in the Solvent Sector.

The remaining identified eligible users of CFC-113 are listed in Annex 2.

4.3.4. Use of BCM in the Solvent Sector

There is but one user of BCM, Maprimed S.A., which makes Losartan Potassium. BCM is used as a process agent during the production of the intermediate 2-nitrobenzyl bromide. The cost to Maprimed is about US$ 5/kg BCM.

Exhibit 10 shows the consumption over 1999-2002.

Exhibit 10: BCM Consumption (kg) as per MP Definition, 1999-2002, and Application

Company	1999	2000	2001	2002	Use
Maprimed	25,200	20,000	13,727	0	Process agent

Analysis

The average for 2000-2002 is 11,242 kg. With an ODP of 0.125, this is 1,405 ODP kg.

The closest parallel to this process is the Panscheel Organics Industries Project (India), where CTC in the synthesis of 2-nitrobenzyl bromide is replaced by chlorobenzene (bromination of a benzylic group with NBS). For 18 ODS MT of CTC, ICC is US$ 211,750 (including contingency) and IOC is US$ 7,950, for total US$ 219,700.

The scale of use is similar, so in the absence of experience with BCM substitution, the C/E used in this Plan is US$ 156/ODP kg BCM.

4.3.5. Summary

The eligible quantities and C/E values by ODS and Sub-Sector are shown in Exhibit 11.

Exhibit 11: Eligible Quantities and C/E Values by ODS and Sub-Sector

ODS	Sub-Sector	ODP MT/y 2000-2002	C/E US$/ODP kg	US$
CTC	Solvent	13.426	11	147,693
TCA	Solvent	19.86	36	715,068
CFC-113	Solvent	5.47	15	82,050
BCM	Process Agent	1.405	156	219,700
TOTAL		**40.16**		**1,164,511**

The weighted average C/E is US$ 29.00/ODP kg.

For BCM, IOC is US$ 7,950, basic ICC is US$ 192,500 and contingency is US$ 19,250.

For CTC, TCA and CFC-113, IOC is taken as 10% of the total, so for

CTC, IOC is US$ 13,427, basic ICC is US$ 122,060 and contingency is US$ 12,206, for

TCA, IOC is US$ 65,006, basic ICC is US$ 590,965 and contingency is US$ 59,097, and for

CFC-113, IOC is US$ 7,459, basic ICC is US$ 67,810 and contingency is US$ 6,781.

Overall IOC is then US$ 93,842/40,160 = US$ 2.36/ODP kg.

Overall basic ICC is US$ 973,335/40,160 = US$ 24.23/ODP kg.

Contingency is US$ 97,334/40,160 = US$ 2.41/ODP kg.

5. STRATEGY

The Solvent Sector Phase-out Plan will enable the Republic of Argentina to eliminate the remaining consumption of 40.16 ODP MT of ODS solvents (TCA, CTC, CFC-113 and BCM) in the Solvent Sector (Solvent and Process Agent Sub-Sectors) by 1 January 2007.

Investment, non-investment, technical assistance and capacity building activities are proposed to achieve this target.

6. IMPLEMENTATION

6.1. Management and Execution

The overall management of the Plan will be carried out by UNIDO with the assistance of Government of the Republic of Argentina.

OPROZ will be responsible for monitoring the implementation of the Phase-out Plan. OPROZ will also be responsible for tracking the promulgation and enforcement of policy and legislation and will assist UNIDO with the preparation of annual implementation plans and progress report to the Executive Committee.

6.2. Performance and Disbursement Schedule

Exhibit 12 gives an overview of the annual phase-out targets for the Solvent Sector Phase-out Management Plan. Ongoing World Bank projects are not included.

Exhibit 12: Annual Phase-out Targets for the Solvent Sector Phase-out Management Plan

Year (as of 1 Jan.)	ODS phase-out target (ODP MT)			Remaining ODS consumption in Solvent Sector (ODP MT)	Total cost to Multilateral Fund US$
	From approved ongoing projects	From Phase-out Plan	Total		
2004	0	17.36	17.36	40.16	754,034
2005	0	11.40	11.40	22.80	405,589
2006	0	11.40	11.40	11.40	405,589
2007		0	0	0	0
TOTAL		**40.16**			**1,565,212**

6.3. Funding Arrangements

6.3.1. First Year (2004)

Upon approval by MLF of the Phase-out Plan, the Government of the Republic of Argentina, through UNIDO, requests the Executive Committee to authorise disbursement of funding in advance for 2004, the implementation plan for which is as below:

a) Establishment of operational mechanism for management and monitoring of the Phase-out Plan
b) Formulation of detailed terms of reference and work plans for various activities under the Technical Support and Policy & Management Support components
c) Establishment of an operational mechanism for participation in the Phase-out Plan and for obtaining phase-out commitments from enterprises
d) One workshop under the Policy & Management Support component for training and capacity-building activities for government/industry stakeholders and decision makers
e) One workshop under the Technical Support Component for technology assistance to participant enterprises in the sector.
f) One workshop under the Policy & Management Support component for public awareness and information dissemination.

Since the average duration for completion of a sub-project is expected to be about 12 months, the phase-out activities initiated at the beginning of 2004 will not produce results until the end of 2004, contributing to the reduction of consumption starting 2005. Therefore, the Government of the Republic of Argentina through UNIDO, will request the disbursement of the 2004 funding not later than the last Meeting of the Executive Committee in 2003.

This procedure is requested because of the need to implement 85% of the CTC part and 30% of the TCA part of the ODS Solvent Sector Phase-out Plan during 2004.

6.3.2. Subsequent Years

Annual programs will set out the annual Solvent Sector phase-out targets and funding requests. The amount of annual funding request will be consistent with the funding amounts indicated in the Solvent Sector phase-out plan. The Executive Committee will be requested to release funds at the levels agreed to in the phase-out plan based on achievement of previous phase-out targets, so that the next annual program could start in the following January. In general, approval of funds would be based on achievement of agreed Solvent Sector phase-out targets.

In case Argentina fails to reach the phase-out targets for a given year, i.e. if the amount of ODS consumption exceeds the agreed targets, UNIDO and Argentina will agree on remedial actions before applying for the next year's funding. The remedial actions proposed are to bring the program back on track in the coming year. These remedial actions would be subject to the approval of the Executive Committee.

The Annual Program would contain the following sections:

1.) Sector phase-out schedule, including phase-out activities, enterprises involved, phase-out approaches adopted and the phase-out timetable;
2.) Status of all activities of previous year(s) and any agreed remedial actions if necessary, for the current year;
3.) Objectives of following year's Annual Program – phase-out targets and funding requirements for activities in the following year;
4.) Description of activities in the subsequent year's Annual Program, including phase-out activities for the enterprise involved, any new policies to be taken up, and technical assistance activities; and
5.) Performance indicators of the Annual Program.

The programmes for the subsequent years will include

i) One workshop under the Policy & Management Support component for training and capacity-building activities for government/industry stakeholders and decision makers
ii) One workshop under the Technical Support Component for technology assistance to participant enterprises in the sector.

6.4. Investment Component

The investment component of the plan will focus on enabling the participant enterprises to physically eliminate ODS from their production activities and would comprise of the following elements:

- Assessment of the technical requirements of conversion
- Determining the scope of international and local procurement
- Development of technical specifications and terms of reference for procurement
- Pre-qualification and short-listing of vendors
- International/local competitive bidding
- Procurement contracts
- Site preparation
- Customs clearance and delivery
- Installation and start-up
- Product and process trials
- Operator training
- Commissioning and phase-in of ODS-free production
- Destruction of baseline equipment

This approach draws on previous implementation experience and has been designed based on the size, level of organization, location and customer base of enterprises concerned and also based on ease and convenience for execution and management. Given the generally small to medium size of the remaining enterprises in the sector, the need for adequate investments for plant and process changes, supported by investments on adequate technical assistance, trials and training, is critical and will involve significant inputs. It is foreseen that the duration for the project would be set in such a way as to ensure that the verifiable annual performance targets as may be required for the Phase-out Plan, would be quantifiable and achievable. ODS phase-out in ineligible enterprises will not be funded under the sector phase-out plan and is expected to take place through the control which the Government will have through policy and regulatory actions. Any

unaccounted or unidentified eligible enterprises will be identified and accommodated within the resources approved for this sector phase-out plan.

To the best knowledge of UNIDO and OPROZ of the Republic of Argentina, nearly all enterprises in the Solvent Sector are now known.

6.4.1. Plant and process investments

UNIDO will ensure the installation of modern technologies that are best adapted to the needs of the enterprises. Equipment will be specified for solvent cleaning so as to ensure protection of workers, together with measures to recycle solvent where economically practical.

Aqueous cleaning techniques will continue to be preferred and applied where they are best suited, with provision for protection of the environment from discharges of untreated wastes.

6.4.2. Technical assistance

Technical assistance will be provided by international and, when available, national experts to ensure a smooth transition to the new replacement technology. The experts would need to be process specialists and their functions will include overall technical supervision of conversion projects and technical co-ordination between equipment/chemical suppliers, recipient enterprises and the implementing and/or executing agency. Their specific responsibilities include:

a) Technical assistance for preparing specifications of equipment to be procured in the sub-project
b) Technical equipment bid evaluation from suppliers during the competitive bidding process
c) Technical guidance to the recipient enterprise during start-up with the new equipment and process
d) Resolving technical issues with the phase-in of the new equipment and processes
e) Technical evaluation of the results of production and product quality trials jointly with the recipient enterprise
f) Technical project commissioning including final technical inspection of equipment and process for establishing completion and compliance with project objectives such as the destruction of the baseline ODS-based equipment where applicable, verification of depletion of ODS stocks, and verifying that the non-ODS production process is in operation
g) Technical evaluation of enterprise reimbursement claims on equipment, raw materials, local works and other items and certification of the same
h) Technical clearance of project completion, so that the project assets can be handed over and the project closed
i) Technical assistance for completion and other reporting requirements
j) Technology transfer.

UNIDO will conduct Workshops under the Plan to ensure a high level of professional technical assistance.

6.4.3. Product and Process Trials

Trials will be required to validate the new equipment as well as the production process using the new technology, specifically to establish their performance and suitability for the conversion in accordance with specifications and project objectives. Trials will also be needed to evaluate and establish satisfactory end product properties. Trial costs will cover the cost of chemicals, raw materials, components, consumables and utilities required during site preparation and commissioning. These costs are normally covered by the enterprise, and some may be included in the supplier budget.

6.4.4. Application and Process Training

Training will be needed to acquaint the production personnel in the enterprise with the new equipment and processes. Training will also be required to address safety and industrial hygiene issues and health hazards and to institute the required industrial practices as applicable to the replacement technology. Suppliers should include training of workers in safe operation of the equipment as a component of the commissioning procedures.

UNIDO will cover application and process training in its Workshops.

6.5. Technical Support Component

Since the Sector Phase-out Plan will address the entire Solvent Sector, the industry as a whole will need to be supported through provision of a technical support component for ensuring that their phase-out actions and initiatives are not only technically sound but also sustainable. They should be consistent with the important priorities of the Government, which are to prevent industrial dislocation and obsolescence. The Technical Support component will assist Solvent Sector as a whole, for the following:

a) Establishment of quality and performance standards for the ODS-free products and applications within the sector
b) Interaction with the user industry for providing technology assistance for sustainability of ODS-free applications, through technical workshops and meetings
c) Expert assistance with the conversion of process agent applications
d) Establishment of a training, program for production operators and technicians, to sustain the ODS-free technologies.

6.6. Policy & Management Support Component

The implementation of the Phase-out Plan will need to be closely aligned and co-ordinated with the various policy, regulatory, fiscal, awareness and capacity-building actions the Government of the Republic of Argentina is taking in order to ensure that the implementation of the Phase-out Plan is consistent with the Government priorities. Further, in view of the performance-based targets needed to be achieved under the terms of the Phase-out Plan, the implementation of the Plan will need to be closely and efficiently managed and will introduce additional co-ordinating, reporting and monitoring activities.

The Phase-out Plan for the Solvent Sector will be managed by a Policy & Management Support Committee, comprised of a co-ordinator to be designated by the Government and supported by representatives and experts from the implementing/executing agency and the necessary support infrastructure. The Policy & Management Support component of the Phase-out Plan will include the following activities, for the duration of the Plan:

- Management and co-ordination of the Plan implementation with the various Government policy actions pertaining to the Solvent Sector
- Establishment of a policy development and enforcement program, covering various legislative, regulatory, incentive, disincentive and punitive actions to enable the Government to acquire and exercise the required mandates in order to ensure compliance by the industry with the phase-out obligations
- Development and implementation of training, awareness and capacity-building activities for key government departments, legislators, decision-makers and other institutional stakeholders, to ensure a high-level commitment to the Plan objectives and obligations
- Awareness creation of the Phase-out Plan and the Government initiatives in the Sector among consumers and public, through workshops, media publicity and other information dissemination measures
- Preparation of annual implementation plans including determining the sequence of enterprise participation in planned sub-projects
- Verification and certification of ODS phase-out in completed sub-projects within the Plan through plant visits and performance auditing
- Reporting of implementation progress of the Plan for the annual performance-based disbursement.

6.6.1. Workshops and Expert Visits

6.6.1.1. Stakeholders Training

Training and capacity-building activities for government/industry stakeholders and decision makers through 3 workshops, one per year.

6.6.1.2. Application and Process Training

UNIDO will cover application and process training in three Workshops, one per year.

6.6.1.3. Information Dissemination Workshop

As part of the awareness programme, an information dissemination workshop will be held.

6.6.1.4. Process Agent Technology Conversion

Appropriate international expert visits to sites with process agent ODS use are needed to ensure that the most economical solution is reached. One visit per process agent site is included in Annex-3 B, Policy & Management Support Component.

6.6.1.5. Small Scale Enterprises (SSE)

In view of the large number of small scale enterprises in Argentina using ODS and in view of the hardship that ODS elimination will cause them, the Policy & Management Support Committee will organise a programme to reach and assist SSEs. The solvents distributors are expected to play a vital role in this effort.

Information dissemination to SSEs is essential. This will be done with the optimum efficiency by co-operation with the solvents distributors. Regional seminars could be organised for SSEs as part of the workshops described in **6.6.1.2** and **6.6.1.3** where the impact of the phase-out will be made clear and phase-out options can be elaborated.

7. SELECTION OF TECHNOLOGIES

The selection of approved alternative technologies for conversion is governed by the following:

- Proven and reasonably mature technology
- Cost-effective conversion
- Availability of the systems at favourable pricing
- Critical properties that have to obtained in the end product
- Compliance with established (local and international) standards on safety and environment.

The technology selected would also need to be easily adaptable at the recipient enterprises, which would be participating in this project. The selection of the technology would also need to be consistent with the priorities of the Government and industry and to ensure sustainability of the technology in the long-term.

7.1. Surface Cleaning

7.1.1. Aqueous Alkaline Cleaning

7.1.1.1. General Considerations

Aqueous alkaline cleaning is preferred for cleaning requirements with less complicated shapes, a minimum of different metal substrates, and where primarily inorganic residues are to be removed. Since cleaning efficiency is less than for solvent cleaning, an ultrasonic system is normally incorporated in the liquid phase wash stage. The usual sequence is a 4-stage system with

ultrasonic wash – rinse – final rinse – hot air drying

An ultrasonic wash requires the prior degassing of the water, otherwise its efficiency drops dramatically. Suppliers of ultrasonic wash units normally incorporate a degassing unit in their equipment. Ultrasonic systems are not effective on large workpieces because there would be too much dissipation of energy. They are only effective in the liquid phase and so are unsuitable for spray-type cleaners.

Spray-type cleaners may be static (cabinet/chamber spray cleaners) or of the continuous (tunnel) type. Since ultrasonics are not effective in the vapour phase, the usual sequence is

wash – rinse – final rinse – hot air drying (WRRD)

Demanding applications may need a further rinse stage with de-ionised water. Rusting of workpieces can be prevented by use of a rust inhibitor applied by metering, typically 0.5 kg/hr at US$ 1.50/kg to the bath in the last rinse stage. A vacuum drier (about US$ 150,000) can be considered if incorporation of a rust inhibitor treatment is not practical.

An oil-water separation system (wash fluid regeneration) is essential to remove oils from the wash fluid. Fluid filtration and steam extraction are also needed.

A waste water treatment plant is needed to minimise discharge of harmful effluent to the environment if suitable tertiary waste treatment facilities are not accessible.

7.1.1.2. High Pressure Precision Aqueous Jet Cleaning

This technique has been developed and introduced in the European motor industry to clean metal dust from cavities. Various techniques are used to ensure that the aqueous jets are applied with precision, for example:

- A cabinet/chamber batch cleaner is equipped with a robot arm is programmed to direct the jets in pre-determined directions.
- A continuous (tunnel) cleaner is fitted with an indexing device (jigs); the moving band is stopped and directed jets then clean out the holes of the work piece.

7.1.1.3. Choice of Aqueous Cleaner Type

A liquid phase aqueous cleaner is indicated when ultrasonics are needed to maintain product quality. A spray-type aqueous cleaner is preferred where ultrasonics are not necessary to maintain product quality or are not helpful because of energy dissipation. The cabinet/chamber (batch) spray cleaners are often, but not always, less expensive than the continuous (tunnel) type. The continuous (tunnel) type benefits when very long pieces are involved or when directed jets are needed to clean holes.

For the cleaning of holes with high pressure jets, the jigged continuous (tunnel) spray cleaner with conveyor indexing facility and directed spray jets is preferred to the batch type with robot arm or comparable device. This is because the spray bar of the chamber cleaner must rotate around the basket and so the directed jets are further from the holes to be cleaned than is the case with the continuous cleaner.

7.1.1.4. Minimum Requirements for Aqueous Cleaners

Because aqueous cleaners operate in a corrosive environment of steam and hot water, special attention must be paid to their construction, otherwise there will be a rapid deterioration of the machines.

The minimum requirements for aqueous cleaners should include:

- Construction material – 3mm thick 304 /306 grade stainless steel (inside and out), full double skin thermal and sound insulation
- Stainless steel 316 grade spray bar arrangements
- Low fluid level protection for pumps and heaters in all fluid tanks
- Automatic mains water fill for all tanks
- Variable speed controlled conveyor system
- Steam extraction fan assembly
- Inspection/maintenance hatches with safety interlocks
- Adjustable fluid temperature control
- Integral fluid filtration network, fine particle filtration at least on wash stage
- Corrosion/chemical resistant immersion fluid heaters
- Continuous oil/water separation system fitted to hot wash stage (not oil skimmers)
- Hot air drying stage and/or air knife blow dry facility, dependent on shape of component
- Essential spares package
- Stainless steel component baskets
- Air powered/electrically operated entrance/exit doors with pressure sensitive safety for liquid phase or cabinet spray washers only).
- Stainless steel external load/unload platform, c/w stainless drip tray (for liquid phase or cabinet spray washers).

7.1.2. Solvent Cleaning

This technique is preferred for more complicated shapes and where oils and grease are to be removed. It is the most effective technique to prepare parts for plating.

Techniques of vapour degreasing in low emission equipment of various types were developed in the late 1980's in response to pressure from legislation relating to environmental and worker health protection. This change was not an upgrading of cleaning technology. Cleaning performance is the same but emissions to both the working and outside environments are greatly reduced. Equipment cost is higher and batch times are longer because of the additional steps in the cycle.

The earlier designs of low emission vapour or vapour-liquid (two-compartment) degreasers had open tanks with heating coils to generate the solvent vapours in the vapour tank and a solvent vapour zone where condensing solvent cleaned the work piece and carried soil back down to the tank. Cooling coils condensed solvent vapours and hindered the escape of solvent to the workplace.

Recent designs of open top vapour degreasers are much improved with higher freeboards, additional cooling coils, sometimes with refrigeration, manual or mechanically operated lids for down-time, improved ventilation and other features to further reduce emissions to the workplace. Vapour-liquid degreasers are equipped with a partition wall so that all contaminants end up in the vapour compartment, from which they were periodically removed. Workplace exposure levels can be reduced to 10 - 15 ppm on a time-weighted average basis (over 8 hours).

An external still is needed for vapour-liquid degreasers to maintain solvent purity in the liquid degreasing tank by periodically draining spent solvent and replacing it with fresh solvent (virgin or re-distilled).

Minimum requirements for the open-top cleaners include:

- 304 SS construction
- insulation of tank body
- motorised sliding cover to minimise evaporation when cleaner not in operation
- two-sided condensing coils manufactured from hot tinned, finned copper tubing
- external copper solvent piping/bronze valves
- containment tray to prevent contamination of the ground by spills or leaks
- freeboard ratio greater than 120% to eliminate diffusion losses
- refrigerated condensing coil to condense the bulk of the solvent vapours
- equipment monitoring controls and safety devices to protect against loss of cooling water, over-contamination of the solvent, and low solvent level
- access platform for manual loading/unloading of the cleaner
- a vapour/liquid two phase cleaner should have provision in the immersion sump for additional space to accommodate the installation of ultrasonic immersible transducers, should these prove to be necessary to maintain product quality (this does not apply to the vapour only type of cleaner).

Workplace Occupational Exposure Levels (OELs) of 10-15 ppm PCE, on time-weighted average (TWA) over 8 hours, should be achieved with proper design and operation of the equipment.

To achieve OEL-TWA levels below 10 ppm, a refrigerated sub-zero freeboard condenser is required, which will provide a cold air barrier and minimise fugitive losses.

Increasing concern for the quality of the atmosphere, especially in Europe and California, has led to severe restrictions on emissions of solvents in some areas. There has been a considerable degree of conversion to aqueous systems. For applications where aqueous systems are unsuited and, solvents are needed, closed solvent degreasers have been developed. An internal still recycles solvent within the machine and waste is drawn off periodically from the sump. When the cleaning operation is completed, solvent vapours are removed from the working chamber by suction or by vacuum before the work piece is removed. This ensures that losses to the workplace and outside environment are absolutely minimal.

Perchloroethylene (PCE) is used in metal cleaning in the same type of closed equipment as TCE, with similar investment costs. PCE has a higher boiling-point (121°C compared to 87°C). Power requirements for PCE are higher for internal solvent distillation and since the work pieces are cleaned at a higher temperature. The higher operating temperature also means that equipment must be closed, not only to minimise workplace exposures, but also to provide adequate and fast drying under vacuum. In closed equipment the hot metal of the work pieces is cooled much more easily during drying, which is important for throughput.

Current practice often results in landfill disposal of spent solvent (CTC, TCA or CFC-113 plus cleaning wastes). This is not a practice to be recommended. Fortunately these solvents are quite volatile so that little if any significant amount of halogenated solvent will eventually reach the groundwater.

In the case of spent solvent wastes containing perchloroethylene, the much higher boiling point of this solvent means that evaporation of the solvent is considerably slowed and a significant portion of perchloroethylene will penetrate to and contaminate groundwater reservoirs.

Any equipment installed that is intended to use perchloroethylene needs to have spill controls, such as the use of floor pans or similar containers, and the minimisation of the solvent content of drummed waste to be sent for disposal. Therefore a simple, external single-plate still is needed as part of the cleaning machine installation. This still vaporises and recovers the PCE from spent solvent, leaving the sludge to be drummed for disposal, preferably by incineration. The substitution of PCE for CTC, TCA or CFC-113 calls for a responsible approach to environmental protection. This includes the recovery of PCE from spent solvent in order to prevent contamination of groundwater by PCE.

7.1.3. Hand-wiping

Formulations have been developed to replace the less toxic ODS solvents such as TCA or CFC-113 in cold-dip and hand-wiping applications.

The Dowclene series 3660/3670 for dip and brush cleaning and 3650 for cloth wiping. These formulations are based on alkoxypropanols. MC2 Chimie has introduced the “Evolve” line of solvents for cold-dip and hand-wiping applications, based on linear non-aromatic hydrocarbons with non-smearing additives.

These hand-wiping solvents cost about $US 6/kg.

7.1.4. Hydrocarbon Solvent Cleaning

Techniques have been developed for hydrocarbon (HC) solvent closed machine cleaning. These use non-aromatic isoparaffins such as Exxon Actrel, Isophar H or Shellsol TK, with high flash-points (> 55°C), and very low levels of carcinogenic aromatics such as benzene. They have found favour primarily in situations where chlorinated solvents are either banned or severely restricted and aqueous cleaning is not well suited. The major disadvantages of HC cleaning are:

- Costs of equipment and chemicals are significantly higher
- Cleaning performance is inferior to chlorinated solvents
- Risk of fire (reduced by having explosion-proof motors and other precautions).

7.2. Textile Industry

CTC and TCA may be used for equipment cleaning, de-sizing.

TCA is frequently used in spot removal from textiles. Equipment and solvents have been developed to replace TCA, for example Krebs Cleaning Station Tex-12 M and Krebs Cleaner 580.

TCA, CFC-113 or even CTC may occasionally be used in dry cleaning operations. If so they can be replaced by perchloroethylene.

7.3. Retrofitting

Should a retrofit be needed, e.g. to convert from TCA or CTC ultrasonic or vapour-liquid cleaning to perchlorethylene, the original equipment supplier should be able to help, otherwise an experienced retrofitter can be contacted, such as Schumacher (Germany) or D&S Technical Services (U:K.).

Several suppliers are available should new aqueous or solvent cleaners be necessary. These include:

Aqueous cleaners – FinnSonic (Finland), Technowash (U.K.), Proseco (Canada)

Solvent cleaners – Farr (USA), MacDry (Italy), AMA (Italy), D&S Technical Services (U:K.), Branson (USA).

7.4. Process Agent Technologies

The use of a solvent as a process agent is usually specific to the process. Replacement involves replacement with a new solvent with comparable properties, or complete replacement of the solvent technology by an aqueous technology.

In either case substantial costs may be incurred for partial or complete replacement of equipment. Even when a replacement solvent is proven to be suitable for the process with a minimum of changes, it is likely to be flammable and to require at least flame-proofing of motors and perhaps nitrogen blanketing of reactors.

8. INCREMENTAL COSTS

8.1. Summary of Incremental Costs

The incremental capital and operating costs for the Phase-out Plan are calculated based on the guidance provided by the various Executive Committee Decisions and precedents and agreements reached with MLF during recently approved similar projects in this Sector. The basis and detailed calculations for the various cost elements are presented in Annex-3 and Annex-4.

The total costs are given in Exhibit 13.

Exhibit 13: Total Costs

Item	$US
Incremental Capital Costs	973,335
Contingencies	97,334
Incremental Operating Costs	93,842
TOTAL	**1,164,511**

8.2. Economies

The incremental costs of the Plan are budgeted on the basis that the sector-wide phase-out approach will result in economies through adoption of cost-effective execution strategies and also through dynamics of the market forces. Some of the salient provisions of the economies considered for calculating the incremental costs of the sector-wide approach as compared to the individual project approach, are

a) In the investment component, budgets for technical assistance, trials and training are reduced to reflect the savings in the group/sector-wide approach, based on prior agreements for similar projects.
b) The proposals for replacing the baseline equipment have been based on functionality rather than eligibility alone, resulting in savings in the overall costs of the replacement equipment, in accordance with prior agreements with MLF on similar projects.

More details are provided in Annex-3.

9. COST EFFECTIVENESS

The Cost Effectiveness (ratio of the total incremental costs to the net ODP phased out per year post-project) of this project works out to US$ 29.00/kg ODS. This has been calculated from the net incremental project costs of US$ 1,456,011 and the total ODS to be phased out upon completion, 40.16 ODP MT. Details are provided in Annex-4. According to guidance from Executive Committee Decisions, sector-wide phase-out plans are not subjected to a cost-effectiveness threshold.

10. FINANCING

The total requested grant funding is **US$ 1,565,212.**

11. RESULTS

This project will eliminate the use of CTC, TCA, CFC-113 and BCM in the Solvent Sector in the Republic of Argentina.

ANNEXES

Annex-I: List of Approved Investment Projects in the Solvent Sector in the Republic of Argentina
Annex-II: List of remaining enterprises in the Solvent Sector in the Republic of Argentina
Annex-III Incremental Capital Costs
Annex-IV: Cost Effectiveness
Annex-V: Environmental Assessment
Annex-VI: Project Documents
Annex-VII: Draft Agreement
Annex-VIII: Technical Reviews

ANNEX-I: LIST OF APPROVED INVESTMENT PROJECTS IN THE SOLVENT SECTOR IN THE REPUBLIC OF ARGENTINA

Beneficiary	MFS Project number	ODP MT	Approved	Comments
Electroquimica Delta	ARG/ARS/36/INV/128			Pending
Servex	ARG/ARS/38/INV/131			Pending
Argelite, La Rioja, CIMCAN, Grimoldi, Heliodino, Integral Met., Orbis Mertig, Tresh, Unisol, Buffalo	ARG/SOL/28/INV/91	10.19	YES	On-going
Siderar	ARG/SOL/28/INV/90	6.7	YES	Cancelled
TOTAL ODP MT				

ANNEX-II: LIST OF REMAINING ELIGIBLE ENTERPRISES IN THE SOLVENT SECTOR IN THE REPUBLIC OF ARGENTINA

1. Solvent Sub-Sector

1.1. CTC

Average per year for 2000-2002.

Enterprise	MT CTC	ODP MT	Comments
Dorwil	2.3	2.54	laboratories
FV	0.006	0.007	laboratories
Melvil	7.5	8.25	cleaning products
Merck Quimica Argentina	0.8	0.88	laboratories
Química Industrial Bahiense	0.5	0.55	industrial solvent
Sintorgan	3.3	3.63	laboratories
TOTAL	**14.41**	**15.86**	

Status: August 2003

1.2. TCA

Average per year for 2000-2002.

Enterprise	2000	2001	2002	MT TCA	ODP MT
Acerbrag	520	520	520	0.52	0.05
AGA	0	0	75	0.03	0
Alcesa	0	0	2,000	0.67	0.07
Aluar	816	2,176	1,896	1.63	0.16
Anaeróbicos	3,580	2,200	3,220	3	0.3
Aprol	600	600	600	0.6	0.06
Atucha	843	1,177	595	0.87	0.09
Bardahl	3,900	3,640	3,250	3.6	0.36
Broderie Suizo	100	100	100	0.03	0
Bunker Oil	260	260	0	0.17	0.02
Canadian Chemical Systems	14,868	5,136	1,550	7.18	0.72

Enterprise	2000	2001	2002	MT TCA	ODP MT
Carla	544	272	280	0.37	0.04
Ciaquim	29,506	22,307	3,356	18.39	1.84
CNEA	843	1,177	595	0.87	0.09
Colores especiales	780	780	780	0.78	0.08
Derben	600	500	500	0.53	0.05
Dorwil	1,560	780	2,104	1.48	0.15
F. H. Pinelli	260	260	260	0.26	0.03
FV	156	1,320	1,716	1.06	0.11
Galfione	624	624	624	0.62	0.06
Gatic Addidas	7,800	7,800	7,800	7.8	0.78
Indura	120	135	180	0.15	0.02
Inta	3,120	3,120	3,120	3.12	0.31
La Nación	100	100	0	0.03	0
Lentini	11,200	7,000	6,000	8.07	0.81
Limindar	260	520	260	0.35	0.04
Merck Quimica	50	50	50	0.05	0.01
Propulsora Patagonica	7,200	7,200	7,200	7.2	0.72
Quimica True	43,390	27,000	2,545	24.31	2.43
Enterprise	**2000**	**2001**	**2002**	**MT TCA**	**ODP MT**
REPSA	1,600	2,000	2,400	2	0.2
Siderca	9,000	9,000	9,000	9	0.9
Silvestrin	600	600	600	0.6	0.06
Sniafa	780	780	780	0.78	0.08
Suelas Leal	15,600	0	0	5.2	0.52
Uranga	312	312	312	0.31	0.03
Vadex	3,676	9,248	6,800	6.58	0.66
Wassington	854	3,412	2,697	2.32	0.23
Others	78,000	78,000	78,000	78	7.8
Total	**244,022**	**200,106**	**151,765**	**198.53**	**19.88**

1.3. CFC-113

Average per year for 2000-2002.

Enterprise	MT CFC-113	ODP MT	Comments
Almagro Refrigeración	0.03	0.03	refrigeration
Anedra	0.02	0.02	laboratory
Diaz Rubén	0.04	0.03	refrigeration
Indubel	0.31	0.25	refrigeration
Merk Quimica Argentina	0.01	0.01	laboratory
Refrigeración Indumet	0.42	0.33	refrigeration
Others	6.00	4.80	miscellaneous
TOTAL	**106.17**	**5.47**	

Status: August 2003

2. Process Agent Sub-Sector

Average per year for 2000-2002.

Enterprise	MT CTC	MT BCM	ODP MT	Comments
Maprimed		11.24	1.4	benzyl bromide
TOTAL		**11.24**	**1.4**	

Status: August 2003

ANNEX-III: INCREMENTAL CAPITAL COSTS

A. Investment Component

The following table summarises the basis and considerations for calculating the incremental capital costs, for the remaining unfunded eligible participant enterprises in the Phase-out Plan:

Sub-sector	Incremental Capital Costs (US$)				Contingencies (US$)	Total (US$)
	Equipment	Trials and Training	Technical Assistance	Sub-total		
Solvent	759,052	0	0	759,052	75,905	834,957
Process Agent	192,500	0	0	192,500	19,250	211,750
TOTAL						**1,046,707**

B. POLICY & MANAGEMENT SUPPORT COMPONENT

Activity	Cost (US$)
Management, co-ordination and monitoring (200 days/y x 3 y = 200 days) @ US$ 200 /day	120,000
Training and capacity-building activities for government/industry stakeholders and decision makers through 3 workshops @ US$ 15,000 per workshop	45,000
Awareness programme, 1 information dissemination workshop @ US$ 15,000	15,000
Sub-total	180,000
10% contingency	18,000
TOTAL	**198,000**

C. Technical component

Activity	Cost (US$)
Application and process training, 3 technical workshops @ US$ 15,000 per workshop	45,000
Verification and certification (150 days) @ US$ 200/day	30,000
Two international expert visits to assist with process agent processes	10,000
Sub-total	85,000
10% contingency	8,500
TOTAL	**93,500**

D. Summary

Activity	Cost (US$)
Investment Component	1,164,511
Policy & Management Support Component	198,000
Technical Component	93,500
TOTAL	**1,456,011**

ANNEX-IV: COST EFFECTIVENESS

A. ODP Impact of the Project

SUBSTANCE	ODP	CONSUMPTION (kg)	NET ODP (kg)
CTC	1.10	12,206	13,427
TCA	0.1	198,631	19,863
CFC-113	0.8	6,838	5,470
BCM	0.125	11,242	1,405
Remaining ODP Consumption in the Sector			**0**

B. Cost Effectiveness Calculation

PARAMETERS	UNIT	TOTAL
Total Project Costs		
A. Incremental Capital Costs	US$	973,335
B. Contingencies (10% of A)	US$	97,334
C. Incremental Operating Costs	US$	93,842
D. Policy and Management Support Costs	US$	198,000
E. Technical Support Costs	US$	93,500
F. Total Project Costs (A + B + C+D+E)	US$	1,456,011
Adjustments to Project Costs		
G. Adjustment for non-Article-5 ownership	US$	0
H. Adjustment for export to non-Article-5	US$	0
I. Adjustment for technological upgrade	US$	0
Net Project Costs		
J. Net Project costs (F – [G+H+I])	US$	1,456,011
ODS Phase-out		
K. Total ODS phase-out	kg	228,917
L. Net ODP phase-out	ODP kg	40,165
Cost-effectiveness		
M. Cost effectiveness (J/L)	US$/kg	36.26
Eligible MLF Funding	**US$**	**1,456,011**

ANNEX-V: ENVIRONMENTAL ASSESSMENT

There will be minimal emissions of PCE to the atmosphere. PCE has a minor Global Warming Potential (GWP).

PCE and detergents should not be allowed to reach aquifers or other groundwater supplies. Therefore handling practices and training must include measures to avoid spills and leaks in order to protect water supplies from contamination.

Aqueous alkaline cleaning wastes should be collected and neutralised with acid and then flocculated to allow the removal of solids before disposal in accordance with the relevant regulations.

Wastes need to be disposed in an environmentally acceptable manner and in accordance with local and governmental regulations. A discharge of untreated wastes to waterways is not acceptable. Collection of oily PCE sump waste for incineration in an appropriate cement kiln should be examined for acceptability.

Destruction and disposal of the equipment used for ODS should be carried out in accordance with local regulations and good environmental practices. Landfill is suitable for broken concrete and cut metal can be recycled as scrap.

Solid wastes from the aqueous cleaners need to be sent for disposal at an acceptable site. Wastes from the PCE cleaners are **not** to be sent to landfill; they should be disposed by incineration in a suitable cement kiln, so that they are completely destroyed and no harmful or toxic materials can reach the environment.

ANNEX-VI: PROJECT DOCUMENTS

There are no projects in preparation.