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COMITÉ EJECUTIVO DEL FONDO MULTILATERAL
PARA LA APLICACIÓN DEL
PROTOCOLO DE MONTREAL
Trigésima primera Reunión
Ginebra, 5-7 de julio de 2000

PROPUESTA DE PROYECTO: VENEZUELA

Este documento consta de los comentarios y recomendaciones de la Secretaría del Fondo acerca de la siguiente propuesta de proyecto:

Espumas

•	Eliminación de CFC-11 sustituido por HCFC-141b en Friobox para fabricación de paneles de poliuretano rígido	ONUDI
•	Eliminación de CFC-11 sustituido por HCFC-141b en Nevecor para fabricación de paneles de poliuretano rígido	ONUDI

HOJA DE EVALUACIÓN DE PROYECTOS
VENEZUELA

SECTOR: Espumas Uso de SAO en el sector (1999): 256.06 toneladas PAO

Umbrales de relación de costo a eficacia en el subsector: Espumas rígidas US $7.83/kg

Título de los proyectos:

a) Eliminación de CFC-11 sustituido por HCFC-141b en Friobox para fabricación de paneles de poliuretano rígido
b) Eliminación de CFC-11 sustituido por HCFC-141b en Nevecor para fabricación de paneles de poliuretano rígido

Datos del proyecto	**Espumas rígidas**	**Espumas rígidas**
	Friobox	**Nevecor**
Consumo de la empresa (toneladas PAO)	18.50	40.90
Impacto del proyecto (toneladas PAO)	16.50	36.40
Duración del proyecto (meses)	18	18
Suma inicial solicitada (US $)	128,387	198,374
Costo final del proyecto (US $):		
Costo adicional de capital a)	64,000	86,000
Costo de imprevistos b)	4,900	105,274
Costos adicionales de explotación c)	59,487	7,100
Costo total del proyecto (a+b+c)	128,387	198,374
Propiedad local (%)	100%	100%
Componente de exportación (%)	0%	0%
Monto solicitado (US $)	128,387	198,374
Costo a eficacia (US $/kg.)	7.81	5.45
Financiación de contraparte confirmada?		
Organismo nacional de coordinación	Fondoin	Fondoin
Organismo de ejecución	ONUDI	ONUDI

Recomendaciones de la Secretaría		
Monto recomendado (US $)	128,387	198,374
Impacto del proyecto (toneladas PAO)	16.50	36.40
Costo a eficacia (US $/kg)	7.81	5.45
Gastos de apoyo del organismo de ejecución (US $)	16,690	25,789
Costo total del Fondo Multilateral (US $)	145,077	224,163

DESCRIPCIÓN DEL PROYECTO

Antecedentes del sector

- Datos últimos disponibles de consumo total de SAO (1999)*	2 385,59	Toneladas PAO
- Consumo básico de sustancias del Anexo A Grupo I (CFC)	3 321,00	Toneladas PAO
- Consumo de sustancias del Anexo A Grupo I para el año 1999	2 207,57	Toneladas PAO
- Consumo básico de CFC en el sector de espuma	615,30	Toneladas PAO
- Consumo de CFC en el sector de espumas en 1999	242,04	Toneladas PAO
- Fondos aprobados para proyectos de inversión en el sector de espumas al cierre de 1999	US $2 785 703,00	
- Cantidad de CFC por eliminar en proyectos de inversión en el sector de espumas al cierre de 1999	455,18	Toneladas PAO
- Cantidad de CFC eliminadas en proyectos de inversión en el sector de espumas al cierre de 1999	332,60	Toneladas PAO
- Cantidad de CFC por eliminar en proyectos de inversión en el sector de espumas aprobados en 1999	99,70	Toneladas PAO
- Fondos aprobados para proyectos de inversión en el sector de espumas en 1999	US $771 670,00	

* Según lo notificado a la Secretaría del Fondo en abril de 2000.

Espumas rígidas

1. Dos empresas (Friobox, Nevecor) fabrican paneles de espumas de poliuretano rígido para aislamiento mediante dos máquinas, ambas de baja presión, Vickitalia de 120 kg/min y de 200 kg/min instaladas en 1983 y 1990 respectivamente en Friobox, asi como Decker DB30 de 60 kg/min y Decker DB40 de 80 kg/min instaladas en 1985 y 1990 respectivamente. En virtud de los proyectos actuales, se efectuará la conversión de la producción a tecnología a base de HCFC-141b. El costo de estas conversiones comprende el cambio de equipo de las máquinas existentes. En Friobox, esto suma US $49,000, mientras que en Nevecor el costo es de US $71,000. En estos costos se incluye la puesta en servicio y los ensayos. El costo adicional de explotación por dos años será de US $59,487 en Friobox, y de US $105,274 en Nevecor.

Justificación del uso de HCFC-141b

2. ONUDI indicó que las empresas habían sido informadas con detalle acerca de los impactos medioambientales, técnicos y económicos de la opción de HCFC-141b como sustancia sustitutiva. Sin embargo, las empresas optaron por la tecnología a base de HCFC-141b como solución provisional en espera de que se dispusiera de tecnologías sin PAO.

3. ONUDI presentó también, en consonancia con la Decisión 27/13, una carta del Gobierno de Venezuela en apoyo de la opción de la tecnología por parte de las empresas. Se adjuntan como anexos al presente documento la justificación de ONUDI y la carta del Gobierno.

Impacto de los proyectos

4. Las 52,9 toneladas PAO de CFC por eliminar con los dos proyectos corresponde al 1,6% del consumo básico de Venezuela de sustancias del Anexo A Grupo I y al 22% de su consumo de 1999.

COMENTARIOS Y RECOMENDACIONES DE LA SECRETARÍA

COMENTARIOS

1. La Secretaría del Fondo y ONUDI debatieron acerca de la presentación de información relativa a la ejecución de los proyectos y a los hitos en su supervisión, después de lo cual ONUDI revisó su información en consonancia con el formato vigente. Se ha convenido en los costos aplicables de los proyectos.

RECOMENDACIONES

2. La Secretaría del Fondo recomienda la aprobación general de los proyectos de Friobox y Nevecor al nivel de financiación y con los costos correspondientes de apoyo indicados en la tabla siguiente.

	Título del proyecto	Financiación del proyecto (US$)	Costo de apoyo (US$)	Organismo de ejecución
a)	Eliminación de CFC-11 sustituido por HCFC-141b en Friobox para fabricación de paneles de poliuretano rígido	128,387	16,690	ONUDI
b)	Eliminación de CFC-11 sustituido por HCFC-141b en Nevecor para fabricación de paneles de poliuretano rígido	198,374	25,789	ONUDI

ANNEX I

ADDITIONAL JUSTIFICATION FOR USING HCFC TECHNOLOGY AT FRIOBOX, VENEZUELA

The ONUDI technical expert appraised the enterprises in this project prior the preparation of this project document in March 2000, and had discussions with the company's representatives about the choice of technology for replacing CFC-based technology. The enterprise was briefed in detail about the following:

a) An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.
b) The "techno-economic impact"of each technology on the products manufactured, and the process and practices employed.
c) Possible implications of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, etc.
d) It was emphasized to the company that HCFC technologies are interim technologies due to their residual ODP and therefore may continue to adversely affect the environment, although at a lower rate than CFC's.
e) It was further explained that HCFCs may become controlled substances under present or future international conventions and will therefore also need to be phased out at a future date, and any investment required for their phase-out and for conversion to a permanent technology will have to be borne by the enterprise itself.

The main conclusions reached by the enterprise through discussions with the ONUDI technical expert were:

1. The use of HCFC-141b is the only currently feasible option for the rigid P.U. foam production.
2. Water blown technology at this point results in a product that could not be sold commercially, its density increases by 20-30% with a reduction in insulation value of 35-40%.
3. The companies are not prepared, as per today, to operate with inflammable and explosive materials. Their industrial safety, alarm monitoring and training system has been established in accordance with the relevant requirements of the existing production programme.
4. Many types of mechanical works, including welding are carried out in the production building, restricting application of flammable blowing chemicals.
5. Hydrocarbons are too expensive to be implemented for the small scale production of foams.

In view of the above, among the solutions mentioned, HCFC-141b based systems in the interim technology selected until new developments (water or HFC-based systems) or new relocation of the factories allows the use of zero ODP technologies.

PROJECTED TECHNO-ECONOMIC IMPACT OF ZERO-ODP TECHNOLOGIES

FRIOBOX, VENEZUELA

The projected impact of applying various zero-ODP technologies with respect to the selected technology (HCFC-141b) in this project is summarized below:

The only currently available zero-ODP technology is **water-based** systems. Water based systems are however, more expensive than other CFC-free technologies due to reductions in insulation value (requiring larger thickness) and lower cell stability (requiring higher thickness). Water based systems can be applied where insulation performance is relatively less critical, but in case of the enterprises in this project, which manufacture foam for thermal insulation application, thermal conductivity is crucial.

Presently, suitable water-based formulations are not technically mature or economical. If such formulations become available in the future, it is expected that there would still be some drawbacks related to performance and costs. The net additional impact on project costs due to increased densities, with water based systems, is conservatively expected to be about US $175,000 with respect to HCFC-141b technology.

HFC-134a based systems are not offered in the applicable regional area and are not a feasible zero-ODP option.

Liquid HFC based systems do not meet requirements on maturity and availability at present time.

Thus, the selection of **HCFC-141b** based systems, as the preferred conversion technology, are justified taking into account all the technical, commercial and cost factors.

ADDITIONAL JUSTIFICATION FOR USING HCFC TECHNOLOGY AT NEVECOR, VENEZUELA

The ONUDI technical expert appraised the enterprises in this project prior the preparation of this project document in March 2000, and had discussions with the company's representatives about the choice of technology for replacing CFC-based technology. The enterprise was briefed in detail about the following:

a) An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.
b) The "techno-economic impact"of each technology on the products manufactured, and the process and practices employed.
c) Possible implications of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, etc.
d) It was emphasized to the company that HCFC technologies are interim technologies due to their residual ODP and therefore may continue to adversely affect the environment, although at a lower rate than CFC's.
e) It was further explained that HCFCs may become controlled substances under present or future international conventions and will therefore also need to be phased out at a future date, and any investment required for their phase-out and for conversion to a permanent technology will have to be borne by the enterprise itself.

The main conclusions reached by the enterprise through discussions with the ONUDI technical expert were:

1. The use of HCFC-141b is the only currently feasible option for the rigid P.U. foam production.
2. Water blown technology at this point results in a product that could not be sold commercially, its density increases by 20-30% with a reduction in insulation value of 35-40%.
3. The companies are not prepared, as per today, to operate with inflammable and explosive materials. Their industrial safety, alarm monitoring and training system has been established in accordance with the relevant requirements of the existing production programme.
4. Many types of mechanical works, including welding are carried out in the production building, restricting application of flammable blowing chemicals.
5. Hydrocarbons are too expensive to be implemented for the small scale production of foams.

In view of the above, among the solutions mentioned, HCFC-141b based systems in the interim technology selected until new developments (water or HFC-based systems) or new relocation of the factories allows the use of zero ODP technologies.

PROJECTED TECHNO-ECONOMIC IMPACT OF ZERO-ODP TECHNOLOGIES

NEVECOR, VENEZUELA

The projected impact of applying various zero-ODP technologies with respect to the selected technology (HCFC-141b) in this project is summarized below:

The only currently available zero-ODP technology is **water-based** systems. Water based systems are however, more expensive than other CFC-free technologies due to reductions in insulation value (requiring larger thickness) and lower cell stability (requiring higher thickness). Water based systems can be applied where insulation performance is relatively less critical, but in case of the enterprises in this project, which manufacture foam for thermal insulation application, thermal conductivity is crucial.

Presently, suitable water-based formulations are not technically mature or economical. If such formulations become available in the future, it is expected that there would still be some drawbacks related to performance and costs. The net additional impact on project costs due to increased densities, with water based systems, is conservatively expected to be about US $225,000 with respect to HCFC-141b technology.

HFC-134a based systems are not offered in the applicable regional area and are not a feasible zero-ODP option.

Liquid HFC based systems do not meet requirements on maturity and availability at present time.

Thus, the selection of **HCFC-141b** based systems, as the preferred conversion technology, are justified taking into account all the technical, commercial and cost factors.