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Addendum

PROJECT PROPOSALS: INDIA

Sector: Foam

Please insert the attached Annex I after page 14 of document UNEP/OzL.Pro/ExCom/28/31.

Sector: Foam

Annex I

JUSTIFICATION FOR USE OF HCFC-141B TECHNOLOGY

(Extract from the Project Document)

NOTE FROM THE SECRETARIAT:

The analyses and justification provided in all 11 project documents, including one integral skin foam project, an umbrella rigid foam project for 28 SMEs and a project for a systems house were similar. Therefore the description of the justification for use of HCFC-141b in one project, that of Ashoka Metals, has been reproduced below as a sample. The others, if required, will be provided on request.

Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulated thermoware at Ashoka Metals

The implementing agency expert appraised the prospective recipient enterprise, Ashoka Metals, prior to the preparation of this project document, during January 1999 and had detailed discussions with the technical and managerial personnel of the enterprise, regarding the choice of technology for replacing the existing CFC-based technology, under the project. The enterprise was 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 Ashoka Metals.

3. 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.

4. It was emphasised to Ashoka Metals, that HCFC technologies are interim in nature due to their residual ODP and therefore may continue to adversely affect the environment, though at a lower scale than CFCs.

5. 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 investments required for their phase-out and for conversion to safer technologies, may have to be borne by Ashoka Metals.

Ashoka Metals indicated their preference for selection of HCFC-141b based technology, in their manufacture of rigid polyurethane foam insulated thermoware. The justifications offered by them are summarised as below:

1. Hydrocarbon (pentanes) technology involves fire and explosion hazards. The local laws governing the use of hydrocarbons cannot be complied with, in the existing manufacturing premises of Ashoka Metals, as they are located in a crowded industrial area. Due to the sharp competition in the thermoware market, investments on changing or relocating the factory are not commercially justified at this point.

2. Thermoware production in India is labour intensive. Therefore there are a large number of workers in the factory at any given time. Hydrocarbon technology will cause a safety and security risk, due to the fire and explosion hazard.

3. The local polyol producers offer stable HCFC-141b based formulations, which are being successfully used by their competitors who have earlier participated in the Montreal Protocol programme. They also doubt that pentanes of the necessary grades are easily or economically available for the relatively small quantities they consume.

4. Ashoka Metals also feel, that the additional equipment required for using pentane-based technology would present a long term operation and maintenance challenge, in terms of additional costs and trained labour. They would rather opt for simple and rugged equipment, which is adequate for HCFC based systems.

Ashoka Metals believe that HCFCs are environmentally much safer than CFCs. The changeover is cost-effective and quick as compared to other options. The technology is proven in the Indian market. Thus, they would prefer HCFC technology.

Projected techno-economic impact of zero-ODP technologies

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

Pentane (n, iso, cyclo) based systems meet most selection criteria and are the preferred option, when safety issues can be addressed cost-effectively. The relatively high investments for safety costs tend to limit pentane use to relatively large CFC users. In addition, the use of pentane is limited to those enterprises whose facilities can be adapted to meet safety requirements, and can be relied on to maintain safe operations in the long term. In case of this enterprise, use of pentane based systems will require introduction of in-house blending, extensive plant modifications and also the relocation of the premises, to ensure safe operation conforming to local regulations. There also expected penalties on density and thermal conductivity with respect to HCFC-141b technology. The estimated additional costs involved with pentane-based systems include cost of plant relocation (US$ 400,000), safety systems (US$ 100,000), retrofitting foaming equipment (US$ 80,000), investments on in-house premixing (US$ 80,000) and costs on account of increased foam density and thermal conductivity (US$ 20,000). The benefits include savings due to lower cost of pentanes (US$ 15,000). **The net additional impact**

on project costs with pentane based systems, is expected to be about US$ 665,000 with respect to HCFC-141b technology.

Water-based systems are an alternative in cases where pentane is not feasible due to safety concerns, cost efficiency or availability. 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 densities). Water-based systems can be applied where insulation performance is relatively less critical. But in case of this enterprise, which manufactures insulation products, thermal conductivity is crucial. Moreover the presently available water based systems lead to an unacceptable increase in density. Due to these reasons, applying water-based systems in this project will make the enterprises' products un-competitive and may even lead to closure of the operations. The additional costs of implementing water-based systems include costs due to increased foam density and thermal conductivity (US$ 60,000). The cost of plant closure would be at least about US$ 500,000. **Thus, the net additional impact on project costs, with water based systems, is expected to be about US$ 560,000 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 the present time.

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