

Annex V

LESSONS LEARNED FROM THE CHILLER PROJECT DOCUMENTS AND THE THREE CASE STUDIES

I. Lessons learned from the document review

(a) Mechanisms and methodologies

1. Different methodologies/replacement schemes, with a high degree of flexibility, are necessary to adapt a programme to the needs in different countries where markedly different local conditions prevail.
2. Support for the replacement of existing chillers, short of funding full replacement, can be provided in a number of different ways such as rebates, loans to the owner or performance contracting where the technology provider guarantees energy efficiency.
3. National policies regarding the final phase-out of CFCs are not just awareness raising and a needed stimulus, but likely a precondition for a large number of centrifugal chiller owners to pursue replacement projects.
4. A key lesson learned in Thailand was that when field testing a new or innovative mechanism such as this project entailed, flexibility (time allocation) needs to be build into the project to take account of unforeseen barriers and impediments.

(b) Financing

5. Demonstration projects have shown that replacement of CFC chillers can successfully be funded with grants combined with loans but their overall efficacy in facilitating replication remains questionable.
6. The amount of financial support required for chiller replacement varies depending on the prevailing national conditions such as tariffs, regulations, energy costs, etc..
7. The use of two funding sources, the Multilateral Fund and the Global Environment Facility (GEF), can complicate project implementation. For example, in the Thailand project, the financial intermediaries (FI) and enterprises had to report separately on their utilization of the two funds, and the World Bank task team had to manage two budgets and report completion twice. From the Bank and the country perspectives, similar learning objectives could have been incorporated into a simpler instrument, possibly even by a technical assistance project. Efforts need to be made to merge reporting requirements.

(c) Recovery and recycling of CFCs

8. If a non-governmental organization (NGO) is utilized to implement a CFC recovery and recycle programme, it will need to prepare a business plan to maintain the facility and provide the service continuously. It will also need an assurance of continuing financial support. Any lack of response from the owners of chillers and other stakeholders will make it difficult for voluntary societies or NGOs to implement the business plan effectively. According to the information available, recovery and recycling for chillers is so far economically not sustainable. However, with rising CFC prices and rapidly declining supplies of virgin CFC this might change.
9. The success of a refrigerant recovery and recycling network depends on close cooperation between the network operator and the government authority, which enforces the relevant regulations requiring the CFC users to recover and recycle their refrigerants.

10. The nature of the recovery and recycling network facility, if using a highly sophisticated technology and electronic controls, requires a dedicated team to maintain and operate the equipment on a full time basis.

(d) Lessons learned from the Mexican chiller project

11. As per an implementing agency, the main lesson learned from the Mexican chiller project was that it is feasible to design a revolving fund that is sustainable over time and that can help speed the replacement of chillers. Other lessons learned were:

- (a) The revolving fund design is easy to implement and can be easily replicated in other countries. This mechanism can be used to efficiently replace a significant number of chillers with a relatively small budget;
- (b) Reliable procedures developed to measure and verify electricity savings are essential to guarantee that chiller producers offer the best products and stand behind them. This is especially important if energy savings are to be used to generate Certified Emission Reductions (CERs) with a view to carbon financing;
- (c) Loan conditions, both in units of investment (i.e., an inflation-adjusted monetary unit updated daily based on the consumer price index) and the US dollar, were attractive to building owners, proving that a credit programme in the sector is feasible;
- (d) CFC losses (leaks) may be much higher than anticipated. In one extreme case, in Mexico, the old chiller was supposed to contain 240 kg of CFC-11, but only 40 kg were recovered.

(e) Private sector response and economic framework

12. Effective communication is required to dispel an often high degree of initial scepticism of chiller owners, particularly during the start-up phase. Experience has shown (for example, Thailand) that once the benefits of chiller replacement become clear, the scepticism disappears. Demonstration projects thus play an important role.

13. One driving factor for chiller replacement is the increasing realization of the future declining availability of CFC supply.

14. There is significant interest from the chiller manufacturers who wish to market their replacement products. Their marketing efforts can include activities such as identifying chiller owners, awareness raising, assessing the owners' needs for replacement, and their interest, and offering other forms of support. Manufacturers of centrifugal chillers have excellent avenues for communicating with chiller owners.

15. As per the implementing agency, the Thailand project was technically well conceived, but overestimated the willingness of the participants to come forward in spite of the low interest rate that was meant to attract them. The financial attraction of the offer was also eroded by the rapidly falling interest rates since the end of 2001. Other factors included rapidly changing economic conditions such as interest rate earnings and CER prices.

16. As per the PCR document THA.REF.26.INV.104, it was noted by the financial intermediary that more time was needed to identify and appraise the enterprises. In spite of the success of the project, the formalities and requirements of the programme discouraged additional participation by enterprises. If the

programme had been made more flexible and designed with a different approach of investment (i.e., financing) results could have perhaps been better.

17. As per an implementing agency report for the Thailand chiller project, projects of this nature being implemented in a very dynamic macroeconomic environment (for example, economic recovery, falling interest rates and increase in private savings) should have a flexible design to adjust to this environment. In addition, the Thailand project needed to remain competitive in the existing policy framework, even during implementation.

18. The Government of Thailand supported simultaneously competing initiatives (energy saving programmes and the chiller project) both focused on chillers and providing financing and other programmatic requirements on markedly differing terms. This was problematic.

II. Lessons learned from the three case studies

19. From Turkey's experience it was learned that it is difficult to convince chiller owners to convert their chillers if there is a need for a very high initial investment combined with a lack of incentives for energy efficiency (if low electricity tariffs and lack of other fiscal incentives for adopting energy saving devices prevail). To overcome these problems a high proportion of funding needed to be subsidized (Turkey offered 75 per cent as an interest-free loan and 25 per cent as a grant).

20. Detailed and separate case study reports have been prepared for Turkey (Chiller Revolving Fund) and the chiller demonstration projects for Croatia and the former Yugoslav Republic of Macedonia (both are part of the UNIDO-assisted demonstration project with the aim of replacing 12 CFC-based centrifugal chillers in five countries in the Eastern Europe and Central Asia Network with new energy efficient ones. This UNIDO project was designed to facilitate the early replacement of CFC chillers with low-energy efficiency to non-CFC chillers with a high-energy efficiency. These case study reports set out in each case the relevant background, the contextual setting, the project experience, the project specific evaluation conclusions and lessons learned. These are available from the Secretariat upon request.

21. Demonstration projects are often designed to give local commercial banks, suppliers and project promoters more comfort and flexibility in implementing and financing such projects on a stand-alone basis. They are usually often designed to address concerns and uncertainties related to new technology and the associated economics. However, with regard to large centrifugal chillers, there is only one viable refrigerant alternative at this time which is HFC-134a. Replacement technologies are also well known as there are only three significant suppliers (McQuay, Trane and Carrier) and these also are well known as is the associated economics. The projects in Croatia and the former Yugoslav Republic of Macedonia were thus more of a "kick-start" than a demonstration project and the "value added" aspects are open to question. This modality needs to be given close policy review in the context of future application in relation to the HCFC phase-out.

22. Demonstration projects such as those conducted in Croatia and the former Yugoslav Republic of Macedonia may not offer the best financing modality for future HCFC phase-out/replacement projects as such an approach as evidenced in these countries presented difficulty in selecting fairly a very limited number of beneficiaries (four in Croatia and two in the former Yugoslav Republic of Macedonia). In these cases financial support was often offered where it was often not really needed and tended to ignore those in most need because of credit worthiness, knowledgeable staff, etc. Furthermore, there was no evidence to suggest that this modality enhances the potential for replication except in the enterprises or entities receiving a grant.

23. It appears from the case studies in Croatia and the former Yugoslav Republic of Macedonia that energy savings are/were not a sufficient driver for chiller replacement. The key drivers noted were repair

costs and declining availability of CFCs and the 100 per cent funding of equipment cost through the Multilateral Fund was just an added bonus.

24. A key aspect of the Executive Committee's decision to fund chiller projects was to establish the extent to which projects have a built-in potential for replication in the absence of additional resources from the Multilateral Fund. In the case of the former Yugoslav Republic of Macedonia, the potential for replication seems to have been limited to, at a maximum, to any additional chillers owned by the beneficiaries.

25. The selection of beneficiaries for the demonstration projects in Croatia and the former Yugoslav Republic of Macedonia were reportedly made in concert with the Ozone Units. However, given the generality of the beneficiary selection criteria, it is not easy to see why the selected beneficiaries were picked. Major considerations were likely ease of implementation and low transaction costs. There may therefore be a need for the Multilateral Fund to direct more of its support to those beneficiaries where the support will make a critical difference and address the credit risks associated with those enterprises which cannot afford replacement. Perhaps the concept of "additionality" as per CDM requirements would be a good idea to include or at least take into consideration in establishing beneficiary selection criteria.

26. With the demonstration project funding approach utilized in Croatia and the former Yugoslav Republic of Macedonia where the Multilateral Fund pays for the equipment and the beneficiaries pays the collateral expenses such as building changes etc., the potential for additional chiller replacements appears to depend on the will of the chiller owners themselves. Based on the experience in Croatia and the former Yugoslav Republic of Macedonia, where there is more than one piece of equipment to be replaced at an enterprise and the associated building renovation costs are high, it is the view of the beneficiaries that it would have been better to replace both or all at the same time.

27. The regulatory frameworks established in Turkey appear to have been the primary driver and success factor for successfully phasing out early consumption of CFCs. A comprehensive legal regime with supply-side controls, set in place in a timely manner is thus essential to an effective and efficient phase-out but not enough. There is no plan in place as yet in Turkey to phase out the remaining chillers, many of which are suspected to be in hospitals and other critical locations. A comprehensive strategic plan with the full engagement of all stakeholders and especially the Government is necessary for the success of phase-out sub-projects.

28. An impact analysis, if prepared in advance, can assist in improving the priorities for beneficiary selection and at the same time minimize economic disruption. Croatia banned the import of CFCs early but without any consideration of, or economic analysis of, the impacted enterprises.

29. Tax exemptions can serve as an incentive when expenditures are incurred to meet international treaty obligations. Countries should be encouraged to include such legislative measures as part of their upcoming HPMPs.

30. Uncertainty exists currently with regard to the destruction of waste ODS especially CFCs. Some may be needed for equipment still in use since the equipment suppliers will need time to fill orders beginning 1 January 2010. Also, from a country economic perspective where the largest deterrent is the unavailability of funds, rather than consider destruction of unwanted CFCs through Multilateral Fund support alone, there is also the possibility that these wastes may qualify for cost support (destruction) under the various carbon credit financing schemes. Also, it may be wise to keep these in storage as they may be needed for bridging time delays that may be encountered with chiller replacement equipment deliveries and building modifications.

31. A revolving fund modality was considered for Croatia and the former Yugoslav Republic of Macedonia and whereas these are, or can be, a very useful financial mechanism as in the case of Turkey,

they can only be deployed if implemented early enough to allow for two-three payment/re-issue cycles. This was not possible in Croatia or the former Yugoslav Republic of Macedonia. The lesson learned is that if this is to be considered in the context of HPMPs then an early start will be necessary.

32. The revolving fund in Turkey was an innovative modality that has been demonstrated to be viable. Nonetheless, greater attention was needed regarding strategic planning to ensure that such mechanisms are identified as just a part of a needed comprehensive strategy or implementation plan to facilitate the phase-out of all chillers in both the private and public sectors. This was not the case. The lesson learned is that whereas a revolving fund can be a very useful funding mechanism, it must be viewed as just one component of a more comprehensive plan to address all of the targeted components. Whereas the revolving fund was very successful in Turkey for the participants, there is no plan in place to deal with the non-participants such as hospitals.

33. In the case of Turkey, it is not certain how the public sector chillers, especially those in the 400-600 hospitals in Turkey can or will be replaced when there are no more CFCs to maintain these chillers. Based on the experience in Turkey, it was reported that a revolving fund mechanism may not have effective and efficient application to public sector conversions or replacements unless procurement and other bureaucratic procedures can be streamlined.

34. When contemplating the need for different approaches for the private and public sector, the former Yugoslav Republic of Macedonia offers an interesting situation. All factories in the country were formerly state-owned enterprises. Some have now been sold in whole or part to the private sector. Where state partial ownership is retained, it is difficult to distinguish what is public or private. This can best be characterized as a private-public partnership enterprise with its own unique set of constraints. The lesson is that flexibility is required to accommodate such situations.

35. Careful consideration needs to be given to the terms of reference (TORs) for NGO assigned project agents. In the case of Turkey, the performance indicator (PI) for the Technology Development Foundation of Turkey (TTGV) (the NGO chiller revolving fund manager and project agent) ought not to have been solely the disbursement of funds as was reported. One PI could have been creating the “kick-start” or catalytic effect (including awareness) needed to create the needed country-wide momentum for replacements. The lesson is that ministry oversight on an ongoing basis is needed.

36. Revolving fund mechanisms in future could include as a target at least some of those in most need (where participation in the fund is necessary to enable the replacement). This means less emphasis to be given to wealthy beneficiaries with their likely enhanced credit worthiness, knowledgeable and trained staff and thus lower transaction costs who indicate they will convert regardless. This could be achieved by including or at least considering a clause in the selection criteria for beneficiaries relating to “additionality”.

37. Large financial incentives may be required in some cases but not for all and perhaps not when energy saving are likely to relate to payback periods of less than five years which was the case for some in the former Yugoslav Republic of Macedonia and Turkey.

38. Special attention needs to be given to awareness raising and should be constantly reviewed if difficulty is encountered in identifying those that need most assistance from the Multilateral Fund. It appears, especially in the case of Turkey, that the only outreach appears to have been through awareness created by the chiller suppliers in their efforts to sell replacement equipment. There was no evidence to indicate that the implementing entity (TTGV) had in place any active programme to enhance participation relying largely on the suppliers to create business. This was an implementation shortfall.

39. Multi-stakeholder engagement from the onset is necessary for both problem ownership and sustainability of results and to ensure the creation of a level playing field.

40. Although there are numerous efforts being made to facilitate tripartite funding (GEF/MLF/carbon funding), and this will likely be a reality in future, based on discussions in the case study countries this arrangements remains impractical at this time due the longer processing time for project approval and the need for counterpart funding and mainly to the short compliance times dictated by the Montreal Protocol.
