

The 20th Anniversary of the Montreal Protocol

Preserving the Ozone Layer

The World Bank and its Partners' Contribution
to the Evolution of Funding Policy



THE WORLD BANK

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Foreword

There is no denying that the well-being of humanity is linked to the integrity of the earth's ecosystems. More than 30 years ago a scientific consensus began to emerge that the destruction of the ozone layer was caused by industrial utilization and anthropogenic releases of ozone-depleting substances (ODS). These scientific observations were confirmed in 1985 by satellite observations of a vast hole (severe ozone concentration depression) in the ozone layer over Antarctica. This emerging catastrophe was projected to create havoc in both human health and the ecosystem for future generations. The expression of global political will to address this challenge was the Vienna Convention on the Protection of the Ozone Layer, which led to the Montreal Protocol (MP) established 20 years ago during the Diplomatic Conference held in that city September 14-16, 1987.

This paper traces the policy framework that has evolved over time since then. Its evolution has undoubtedly created numerous unheralded collateral benefits through the growth of the institutional capacities of developing countries. They have built their confidence and knowledge bases through participating in the ongoing process of developing and debating policy. Perhaps most important, its accomplishments have been achieved through mutually respectful partnerships, which in turn derived from shared concerns, a willingness to understand, and a desire to cooperate in resolving outstanding issues. The success of the MP was also evident from the manner in which it integrated both environmental and economic considerations, based on full engagement of all stakeholders (private sector, nongovernmental organizations, and government).

The path to success has been paved with a very large, and often innovative, input from the parties involved: the Executive Committee established by the Montreal Protocol, which oversees administration of the Multilateral Fund (MLF), and especially the implementing agencies, which include the International Bank for Reconstruction and Development (IBRD, commonly referred to as the World Bank). One major factor underpinning the success of the MP is that it was the first multilateral environmental agreement driven by clear (and early) cost-benefit analysis. This was an early demonstration of the precautionary principle.

In particular, the probable long-term global and ecosystem costs of inaction were clearly articulated. The theory was postulated that the greatest health cost consequences would be incurred by developed countries such as the United States, Canada, Australia, and those in Europe, owing to increased rates of ultraviolet light B (UVB)-induced Caucasian skin cancer. The threat of this potential consequence helped to reduce political anxiety associated with transferring



new and additional support resources to developing countries to address such a global threat. It was also recognized, however, that a depleted ozone layer would have both adverse health and economic impacts on developing countries. The developed countries concurred with the developing countries: all came together to contribute to this remarkable success story.

The World Bank has been an active participant in this process. We are, therefore, proud to report to you on the Bank's performance according to the latest available global data (December 31, 2006). The Bank has facilitated a cumulative phase-out of nearly 260,000 ozone-depleting potential (ODP) metric tonnes, and has undertaken more than US\$800 million of work. Projects have included country program preparation, country program updates, as well as investment projects covering technological change in sectors such as aerosols, the electronics industry, foam manufacturing, refrigeration manufacturing, and servicing. More important, the Bank has been instrumental in assisting countries in the developing world that produce chlorofluorocarbon (CFC) to stop their production. Other projects include customs and refrigeration servicing training, technology transfer seminars, capacity building, institutional strengthening projects, and the preparation and delivery of refrigeration management plans and National ODS Phase-out Plans. In total, since program inception, and up to December 31, 2006, the Bank has undertaken approximately 915 investment and non-investment activities in 25 developing countries.

We are also proud to note that the Bank, with its partners, has demonstrated leadership in many areas and has been the catalyst for innovative approaches to solving many implementation problems. The Bank recognizes the need for sustainable results, and this remains foremost in our thinking and program planning.

We, therefore, join with you in celebrating the 20th anniversary of the Montreal Protocol. I especially appreciate the efforts and contribution of all of the developing countries with which the Bank has had the good fortune to partner in creating this global success story. The race to preserve the atmospheric heritage of humankind remains our chief concern and we look forward to continuing this success through equitable and mutually respectful country partnerships.

Katherine Sierra
Vice President, Sustainable Development Network
World Bank
September 2007

Brief History and the Policy Background

In the early 1970s, scientists warned that the release of certain substances into the atmosphere could deplete the ozone layer, hindering its ability to filter harmful ultraviolet radiation that adversely affects ocean ecosystems, agricultural productivity, and animal populations, and harms humans through inducing higher rates of skin cancers, cataracts, and weakened immune systems. The United Nations Environment Programme (UNEP) convened a conference in March 1977 that adopted a world plan of action on the ozone layer, and established a coordinating committee to guide future international action on ozone protection. Negotiations on an international agreement to protect the ozone layer were initiated in the early 1980s under a cloud of controversy (similar to the controversy regarding climate change but a scientific consensus did evolve, and in March 1985, the Vienna Convention for the Protection of the Ozone Layer was adopted. The convention was characterized as a framework convention, because although it called for cooperation on monitoring, research, and data exchange, it contained no imposition of measures to phase out, or even control, the growth of ODS. However, a resolution adopted at the time called for convening a meeting of plenipotentiaries within two years to agree on a regulatory protocol.

Negotiations continued, focusing on control measures, and at the close of the Diplomatic Conference on September 16, 1987, culminated in the Montreal Protocol on Substances that Deplete the Ozone Layer (MP), which set out binding obligations to reduce the consumption (defined as production plus imports minus exports) of ODS. The MP is broad in scope and introduced control measures covering not only CFCs, but halon and other chemicals as well, for developed countries (non-Article 5 parties). Developing countries (Article 5 parties) were granted a compliance grace period of 10 years.

Since 1987 there have been several amendments of the MP, adding new obligations, including additional ODS, and adjusting existing control schedules: The *London Amendment* (1990) added other CFCs, carbon tetrachloride and methyl chloroform. The *Copenhagen Amendment* (1992) added Methyl Bromide, hydrochlorofluorocarbons (HCFCs), and introduced schedules for controlling them. With the *Montreal Amendment* (1997), schedules were tightened and licensing systems mandated. With the *Beijing Amendment* (1999), bromochloromethane and additional controls on HCFCs were imposed, as was reporting on methyl bromide for quarantine and preshipment applications.

As the need to develop country financial assistance was recognized from the outset, the Multilateral Fund (MLF) was established on an interim basis through a decision of the parties in London, U.K., in 1990. To provide intersession governance, an Executive Committee with a mix of developed and developing countries, was formed to meet three times per year. The Executive Committee represents the parties between meetings. The designation of implementing agencies followed (IBRD, UNDP, UNEP, and later UNIDO). The implementing agencies were assigned responsibility to help developing countries develop and implement ODS phaseout project proposals.

Furthermore, it was early recognized that the design of a global phaseout schedule should be predicated on the identification, transfer (and often, the development) of conversion processes (new or indigenous adaptations), chemicals, and technologies that were both technically and economically feasible. A technology panel, as well as an economics panel, of experts was formed with these objectives in mind. (These two panels were later combined to form the Technology and Economic Assessment Panel). Scientific and environmental effects panels were also created.

The work accomplished during the annual meeting of these panels ensured that any proposed control measures adopted were (and are) based on a balance among (i) scientific evidence of ozone layer depletion; (ii) the associated environmental and human health risks, and (iii) the availability of economically feasible substitute technology. This well-planned approach was likely one of the chief reasons for the remarkable “buy-in” to the MP process.

The Bank’s vision for its ODS operations was to provide the financing, help create the incentive and regulatory systems, and build local capacity to support developing countries in meeting their obligations under the MP to phase out ODS quickly and efficiently. The operational vision of the Bank was to improve the economic efficiency of ODS phaseout by moving to a sectoral approach with standardized coefficients for compensating ODS phaseout. This was done, wherever possible, through sectorwide incentive systems that encouraged innovation and cost saving at the enterprise level, tapping into the willingness of enterprises to adopt cost-effective measures and bid for ODS funding on a least-cost basis to phase out ODS as part of industrial efficiency improvements.

To put into operation the vision of the parties regarding the need to balance scientific evidence with associated environmental and human health risks, and the availability of economically and technically feasible substitute technologies, the Bank established the Ozone Operations Resource Group (OORG). The OORG was tasked with providing the latest technical information that would enable environmentally and economically sound decisions regarding conversion technologies and replacement equipment. Technology-led phaseout programming is the process by which the knowledge of state-of-the-art replacement or conversion technology and products is inserted into the decision framework in a timely manner.

Ozone Operations Resource Group (OORG) 1992-2006—The OORG, composed of a group of leading-edge experts in their respective fields, was tasked to ensure provision of the latest information on commercially available and emerging technologies that should be deployed as replacements for ODS-based technologies. The engineers and scientists in the group were recognized internationally as leaders in particular subsectors currently using ozone-depleting substances. Its members were appointed by the Director, Environment Department, World Bank. This technical review by the OORG, which was in addition to the internal peer review by Bank staff, was carried out by an outside specialist selected from the OORG; or, if necessary, from a roster of other specialized experts approved by the OORG and available from the Global Environment Coordination Division.

A signed opinion from the outside specialist on the technical merits (or demerits) of the proposed phaseout technology and level of funding for each subproject or single-component project was obtained and circulated with the project documents during the internal Bank review processes. Subprojects that were not yet preappraised and were being processed under an umbrella agreement were subject to the same technical review requirements. To ensure quality, each project or subproject undertaken in the ozone program by the Bank was subjected to an independent technical review.

Whereas the OORG was created to be the Bank's radar screen for new and emerging technology, the Bank made efforts to share the OORG outcomes with both other implementing agencies and the MP Secretariat. This was achieved through technical publications and annual meetings to which all of the previously mentioned entities were invited. Thus, the OORG, although financed by the Bank, was a resource for all.

As multiyear national and sectoral phaseout projects replaced individual investment projects, ultimately the OORG was disbanded in 2006 after its specific tasks of providing technical guidance on non-ODS alternatives and technologies were achieved. The model of the OORG and its success may prove extremely valuable in the future, as the Bank and its client countries engage in the next step of HCFC phaseout.

Turning now to the historical policy perspective, the 17-year history of the Multilateral Fund (MLF) for the implementation of the MP is rich in the number and scope of project activities sponsored to permit countries to meet the agreed incremental costs for complying with MP control measures. The evolution of policy approaches and the respective delivery mechanisms for these approaches were, in many ways, significantly shaped by the needs arising as projects and programs were conceived, developed, and implemented in parallel with the progressive MP timeline for Article 5 countries. These needs ranged from cost effectiveness and efficiency requirements to accountability and sustainability.

In particular, exemplary projects and programs highlighted throughout this publication are activities that pushed forward, or embodied, key principles and policies under the MLF. They stemmed from the context of their time, including the nature of the national and global ODS market and advancement of technologies, the amount of ODS consumption in individual countries, emergent national policies, the political economy of different countries and regions, and, of course, the influence of MP obligations and decisions.

This report will highlight the various contributions to the evolution of the cross-cutting policy approaches under the MLF and the associated mechanisms for delivering MLF assistance to Article 5 countries in accordance with Article 10. Beginning with country programs, from the first national-level action plans to phase out use of ODS, to the strategic approach aimed at compliance and permanent, sustained ODS phaseout, the MLF has been diligent and timely with its policies and approaches to ensure that countries are equipped to meet remaining MP obligations.

The Policy in the Early Years (1991–1996)

The period 1991–1996 could be described as the time when the groundwork was laid for ODS phaseout. Newly commissioned, with the task of implementing Article 10 of the MP, which sets forth the principle of incremental cost, the Executive Committee of the Interim Financial Mechanism (and subsequently the financial mechanism) focused early assistance on more palpable areas of work. The availability of alternative technologies in the aerosol, foam, refrigeration, and solvents sectors, as well as experience in conversions, made these sectors the obvious first choice for determining incremental costs and channelling funds. The Executive Committee used the “Indicative List of Incremental Cost Categories” approved by the parties in November 2002 and set forth developing a regime of policies, criteria, and guidelines to govern the use of funds—working closely with the MLF Secretariat and in cooperation with the four implementing agencies.

The Bank’s policy contribution was predicated on the Bank’s existing competence to design and support implementation of policy and regulatory frameworks to efficiently achieve sectoral development goals. The Bank started doing this in relation to the MP as early as 1993–94. This led, for example, to the Bank’s focus on China, India, and other larger countries, combined with investment operations to phase out ODS elsewhere. It is important to note that the MP ODS sector phaseout approach adopted in China was the first example of a market-based approach to pollution abatement in China, not merely a first for the MP. Getting this approach validated was a key objective and mechanism for implementing the Bank’s vision at that time.

The initial tool developed to help Article 5 countries delineate the type of assistance required was the country program. It contained a review of ODS consumption trends and identified main stakeholders in relevant sectors, a description of the policy and regulatory framework, a description of needs as far as projects for technological conversions to end the use of ODS, and an action plan that included proposed investment and technical assistance projects. Reflecting the knowledge of the time about the level and nature of ODS consumption (which predated the Article 5 baseline years for MP data reporting), alternative technologies, incremental costs, and enabling policies, country programs facilitated identification and development of some projects, but served more to initiate country dialogue (internal and external) about the MP. They also established a country interface for facilitating project identification and implementation by the implementing agencies.

Country programs had their limitations. Although they were intended as both a situational analysis and a strategic document for MP implementation—through the identification of concrete investment and technical assistance activities and a corresponding timetable—they did not always reflect the circumstances in the country, and were therefore unreliable as planning documents. This was particularly the case for ODS consumption and production data. Thus, the development and approval of projects and the surrounding MLF regime of policies, criteria, and approaches, took on a momentum of their own and became somewhat delinked from country programs. A period of intense project preparation and approvals ensued. By the end of 1994, the MLF Executive Committee had approved more than US\$300 million for activities under the four implementing agencies and bilateral agencies.

The prevalent thinking of the time was to base funding decisions on the technical and cost merits of conversions on a case-by-case basis as a means to safeguard the efficacy associated with the disbursement of MLF funds while maximizing returns on investment (that is, ensuring that ODS was phased out in the most technologically efficient and cost-effective manner). This required complete understanding of incremental costs. Accordingly, a great deal of criteria as well as technical and policy guidance accumulated over the years for various sectors under the MLF. The most notable result of this approach was the adoption of cost-effectiveness (C.E.) threshold values for incremental cost categories in five sectors in early 1995.

Cost-effectiveness threshold values were derived from the agreed cost of standard equipment and associated technology transfer needed. They were introduced with the backing of knowledge gained from implementing investment projects to convert enterprises to non-CFC use in specific sectors because of the large demand for conversion projects, and the need to guarantee that the principle of incremental cost was systematically applied within sectors across countries. Cost-effectiveness was introduced initially as a priority-setting mechanism. The level of funding was then calculated by multiplying the threshold value by the amount of ODP consumption of an enterprise.¹ This was seen as necessary

¹ Cost effectiveness is understood to be the U.S. dollar value of the intervention divided by kilograms of ODP (C.E.=US\$/kilo ODP).

in light of limited MLF funding in relation to demand, and in practice, served to leverage a significant amount of counterpart funding—generally understood as the means to increasing beneficiary buy-in and commitment. It also served to provide a level of certainty to the Executive Committee, implementing agencies, and countries, in the project review process.

Early in this period, the World Bank introduced a mechanism for a few countries for delivering a lump sum of funds for further project development and implementation. “Line of grant” projects allowed some flexibility to the country and the Bank by providing funds that could be used to cover projects identified in parallel to building capacity of country stakeholders to deliver these projects. This approach was later abandoned in favor of further development of the project-by-project approach. However, the early delivery mechanism did introduce the concept of a programmatic approach toward project implementation, combining investment with noninvestment activities. It also reflected the Bank’s principle of national execution, which places responsibility for project implementation in the hands of the country, encourages integration of MLF activities into comprehensive ODS phaseout programs, and employs national agents to execute activities.

In the early days of the MP, the Bank, primarily a global lending institution, was set up to administer all aspects of loans. However, the nature of the MP process was different and required a new business model. The new model also required new tools. The Bank developed and revised procedures to be as responsive as possible to client country needs specifically for implementation of the MP, and these are still in place almost 20 years later. For example, the Bank created the Umbrella Grant Agreement with a notional grant amount for the MP business, instead of using a traditional legal agreement model for which the grant amount and list of activities to be financed by the project should be known from the beginning. This approach gives the required flexibility in terms and conditions, and is needed to allow the Bank and the country to address the many unknowns. Umbrella Grant Agreements are thus time-saving framework agreements that allow multilateral funds to be transferred to eligible countries without repeat processing for individual, smaller grant projects. Brazil was the first country to sign an umbrella agreement with the Bank, followed by 24 more countries.

More successful were innovative mechanisms developed to increase grant effectiveness at the project level while addressing some strategic concerns of countries. For example, the government of Turkey observed that the enterprises coming forward for conversion early on were large, profitable firms looking strategically toward non-article 5 country markets and which definitely could absorb costs of conversion as opposed to smaller enterprises. In cooperation with the MLF implementing agency (the World Bank) and the country executing agency, Turkey set up a revolving fund with MLF funding in 1994 to provide some of the funding to enterprises in the form of interest-free loans while freeing up funds for technical assistance activities to help a wider group of beneficiaries. This incentive framework fit well with well-timed government policies to accelerate CFC phaseout.

Turkey's revolving fund—In 1992, Turkey prepared a national program with support from the World Bank and decided to implement an accelerated ODS phaseout program. In 1994, the local project implementation unit (PIU)—the Technology Development Foundation (TDF), in coordination with the Turkish Ministry of Environment, undertook the management of ODS phaseout funds that were approved by the MLF. Although Turkey received the funds from the MLF as a grant, Turkey decided, owing to the economic health of the first enterprises participating in the program, to use part of the grants as loans to enterprises through a revolving fund. This was the first environmental revolving fund where flow-back of grant funds can be used only for ODS purposes. Turkey's revolving fund flow-back feature ensures that future ODS-related financial needs that may arise after MLF grant funding ceases will still be met through an anticipated reservoir of funds earmarked for sustaining ODS results post 2010. The sectors covered by the fund were refrigeration, foam and solvents. To date, 11 organizations have received grants and eight organizations have received partial loans. This approach has helped to phase out about 1,600 ODP tonnes of ODS. The repayment rate has been very high, with more than 71 percent of the loans paid back to date. An important key to the success of the revolving fund in Turkey has been the establishment, since the onset, of clear and transparent terms. With Turkey's engagement with, and movement into, the EU, EU trade and other ODS-related rules and prohibitions also provided impetus to move expeditiously on CFC phaseout; especially since Turkey is a supplier of refrigeration equipment to the EU market. As a result of its excellent performance, Turkey received an award from the United Nations Environment Programme (UNEP) in 1997 for being one of nine countries out of 49 that had most successfully implemented the MP.

A major conclusion from the Turkey experience is that enterprises are interested and willing to participate in mixed financing (loans and grants) for ODS phaseout projects, as long as the subsidy provided by the project covers or exceeds their opportunity costs. The high repayment rate demonstrates the feasibility of using lending through a country grant to meet environmental challenges, providing certain conditions are met, such as the investment renders substantial benefits, or the market conditions are driving a move to non-CFC products).

In general, however, government capacity and policies to curb supply and demand of controlled substances in this period lagged behind the considerable efforts made to transform markets to ozone-friendlier technologies and practices through project funding and MLF policy development. The Executive Committee had decided to provide funding to countries for institutional strengthening in 1992 (eventually through national ozone units [NOUs]). This support centered on facilitating and supporting project implementation rather than meeting country protocol obligations per se, which would not have been considered an incremental cost. In fact, the parameters for determining MLF effectiveness in a study presented to the

Executive Committee in early 1996 were the establishment of criteria for eligible costs; policy guidelines; review procedures, and division of labor.² This captured the thinking of the time.

One issue that was becoming clearer by the mid-1990s was that ODS phaseout presented unique challenges for countries with lower amounts of ODS consumption, and hence a smaller developed sector surrounding ODS use. This could be observed particularly through inadequate results of early recovery and recycling projects that were delinked from country approaches and policies. The Executive Committee decided to formalize the categorization of low ODS volume-consuming countries (LVCs) by setting a cap of 360 ODP tonnes to facilitate providing assistance for this group. The United Nations Environment Programme, the implementing agency tasked to channel assistance for capacity building, knowledge sharing, and other “noninvestment” activities was tasked as the lead to explore innovative approaches to phasing out ODS in LVCs. This was the beginning of a more discerning view of the various Article 5 country recipients.

Course Corrections—1996–1999

By early 1996, a total of US\$315.7 million in project assistance³ had been approved to phase out nearly 58,000 ODP tonnes in 92 countries. Notable trends under the MLF and MP regimes included the peak in growth of Annex A (CFCs and halons) chemical production in Article 5 countries—while full phaseout obligations had commenced for non-Article 5 countries; increased MP policy formulation by Article 5 countries whereby an end to manufacturing with Annex A chemicals was now visible considering the pending 1999 freeze; a shift in demand for projects and financial assistance from large beneficiaries to small and medium-size enterprises (SMEs); and as countries more carefully recorded their use of controlled substances for the MP 1995–1997 baseline years, the slow realization that there was, in some cases, a disconnect between results of individual project activities and overall country progress in phasing out ODS consumption.

This was at a time when the institutional framework for facilitating project approvals to phase out agreed amounts of ODP was maturing and experiences in project implementation had accumulated. This, along with the trends mentioned previously, were giving way to newly-defined needs at the project and country levels which translated to additional policy issues to be addressed under the MLF. In fact, at its 16th and 17th meetings in 1996, and as a result of the study on the MLF’s effectiveness, the Executive Committee set up new procedures for considering policy issues in an expedited but thorough manner. These procedures put increased emphasis on the implementing agencies and the MLF Secretariat to identify policy issues and propose ways to move forward.

² Review and Evaluation of the Financial Mechanism of the Montreal Protocol—Draft Final Report. Cowiconsult, March 1995.

³ Investment, demonstration and technical assistance projects—funds include some training projects for three regions. It does not include funding provided for country programs, institutional strengthening, and project preparation.

Addressing SMEs with New Project Modalities and Approaches

One of the policy issues arising after adoption of C.E. thresholds was the difficulty in reaching all enterprises in sectors for conversion because the combination of low CFC prices, no imminent controls on use and the requirements for a counterpart financial contribution made it an unattractive undertaking. Some implementing agencies and countries took it on themselves to explore innovative mechanisms to overcome these hurdles. The government of Chile, for example, needed a way to address disparate capacities and resources of enterprises in various sectors in view of the fact that MLF assistance was strictly based on the C.E. threshold and the amount of ODP consumption. It used a market-based approach and set up an auction program with funds approved by the MLF in 1996 to allow enterprises to bid on grants, and permitted some enterprises to receive funding above the C.E. threshold, provided that the overall program's C.E. did not exceed threshold values.

Chile's auction program—The Bank has used market-based or economic instruments to facilitate program implementation. Such instruments increase the cost effectiveness of phaseout projects. In Chile, the Bank provided assistance for a grant auction mechanism in which private companies bid on cofinancing grants for conversion to alternative technologies. Grant funds were allocated to companies that undertook conversion to non-CFC technology in refrigeration and foam manufacturing. For a winning company, the grant cofinanced part of the conversion cost while the company covered the remainder. Because companies had to compete for limited grants, they had a strong incentive to minimize their conversion costs. Before each auction, CONAMA (the local environmental authority) would announce the maximum amount that could be awarded: for example, US\$10 for each kilogram of CFC that would be eliminated by conversion. This amount was the “cost effectiveness threshold” that companies tried to undercut in competitive bidding. (The upper limit of the effectiveness threshold was determined at the global level by the MLF but at the local level by CONAMA.) The local ozone team organized the public bidding process and then evaluated the resulting proposals for funding eligibility on the basis of MLF requirements, technical feasibility and the financial record of the company. Companies received their grant funds retroactively after showing proof of the conversion.

The auction system offers many advantages: all sizes of enterprises can afford to participate, and with more effective use of MLF money, companies are forced to find the best value for conversions. The program was very successful in terms of tonnes of CFC eliminated and lowered costs for removal.

At the same meeting that the Chile Auction Program was approved, the Executive Committee approved a new project modality. This was needed because of the increased demand for assistance for smaller-sized beneficiaries that faced barriers to ODS phaseout, including receiving MLF assistance (this issue was discussed in a policy paper by UNEP and UNDP on approaches to ODS phaseout in SMEs⁴). The umbrella project modality allowed assistance to be channeled to SMEs in a group to permit some flexibility in the application of the C.E. threshold, as well as in the level of baseline information required at the individual enterprise level. The new modality was significant in that the Executive Committee captured for the first time a more sectoral view of ODS consumption and financing (Decision 19/32); it marked the recognition of necessary bounds to grant funding for a sector in relation to ODP consumption. In addition, it also introduced the concept of flexibility insofar as the application of the C.E. threshold within the umbrella.

The umbrella project modality became a foundation for future delivery mechanisms of MLF grant funding and permitted the formulation of innovative projects. For example, the commercial refrigeration terminal umbrella project in Thailand introduced a new methodology to first identify SMEs in the sector, as they can be difficult to reach, and then encouraged them to take part in the project. It also employed a private sector player in the distribution chain as an executing agency, which made both the agency and SMEs vested in the results, more so than if the government had played the major role in implementation. The development and approval of this project led to the adoption by the Executive Committee of a derivative of the umbrella project, the terminal umbrella project modality in July 1998. This modality was to be used when the number of enterprises to be addressed in a sector was large. To deal with a number of unknowns on an enterprise level, representative equipment and tools could be assessed for the group and costing was also modified from the project-by-project approach, such as the omission of incremental operating costs. The terminal umbrella modality also encouraged the notion that the group of beneficiaries be supported institutionally with policy and regulatory measures.

In dealing with a large number of SMEs, especially in the servicing sector, an innovative and cost-effective outreach approach was required. In response to this challenge, the Bank developed a voucher scheme for distributing equipment to refrigeration and mobile air conditioning service shops.

⁴ Approaches to ODS Phaseout in Small and Medium-Size Enterprises: Overall Recommendations and Summary Sectoral Reviews. UNDP and UNEP, UNEP/OzL.Pro/Executive Committee/19/54, April 1996.

The Bank's voucher scheme—Ozone-depleting substances, and CFC-12 in particular, are commonly used in refrigeration and mobile air-conditioning (MAC) equipment. Such equipment, accounting for 30 percent of the overall consumption of ODS, is serviced by a large number of small service shops normally run by only one or two technicians, who, because of lost income and a desire to remain “off government records,” lack interest in training (3,500 in Thailand and Malaysia). A new approach was therefore needed.

To respond to this challenge, the Bank developed a voucher scheme that has now been implemented in most of the national CFC phaseout programs implemented through the Bank. This voucher scheme addresses the difficulty in identifying a large number of beneficiaries; the often-observed lack of willingness to participate in government-run training and other programs; and involvement in procurement decisions.

The voucher scheme is thus a mechanism that provides a financial subsidy to the usual, very large number of beneficiaries—small service shops. Vouchers represent cash payments for part of the cost of service equipment. The difference between the actual cost of the equipment and the value of the vouchers, which is predetermined by the National Ozone Unit (NOU), must be borne by service shops. In most countries for which this scheme has already been launched or implemented, the value of the voucher represents approximately 80–90 percent of the median price of the equipment. The equipment items provided by the voucher scheme thus far includes vacuum pumps, leak detectors, refrigerant charging units, pressure gauges, and recovery and recycling machines. The requirement for service shops to contribute financially ensures that only those service shops in need of this equipment participate in the program.

Needs of Low ODS-Consuming Countries

The growing recognition that different groups of countries had unique issues to face in phasing out ODS and implementing the MP led to development of another project modality specifically for LVCs. With UNEP testing ideas on innovative ways to assist LVCs at the regional network meetings for ozone officers, the parties to the MP asked the Executive Committee to provide support to LVCs at their 7th meeting in late 1995. In particular, they asked that sufficient funding be allocated for refrigerant management and that assistance be targeted for regulatory and legislative measures required to control and monitor consumption of ODS phaseout. The United Nations Environment Programme confirmed through its report to the Executive Committee⁵ that most ODS consumption in LVCs was

⁵ Innovative Approaches for the Phasing Out of ODS in Low ODS-Consuming Countries. UNEP, UNEP/OzL. Pro/Executive Committee/19/53, April 1996.

concentrated in the refrigeration sector, mainly in the servicing and maintenance sectors, and that CFC phaseout could be achieved through noninvestment projects.

The Executive Committee endorsed a new project modality based on the elements captured through UNEP's country consultations, and refrigerant management plans (RMPs) came into existence in October 1996. Lessons learned from implementing recovery and recycling projects by the implementing agencies were also collected and used in developing guidelines for RMPs, which were approved a year later. The RMP became the delivery mechanism for assistance to LVCs in transitioning to non-ODS refrigerants through a comprehensive program of noninvestment activities (training, awareness raising, good practice, and so on), synchronized policies and related equipment and tools that were founded on a solid assessment of the sector. The Bank also learned other lessons, as highlighted in the text box.

Early Lessons the Bank Learned

- Early cost benefit analyses are a key success factor.
- Widespread dissemination is critical to mustering the required political support needed for successful global acceptance and implementation.
- Partnerships are at the heart of successful endeavors and must recognize and respect local practices and customs. Stakeholder engagement is thus critical.
- Homegrown problem solutions arise from a sense of problem ownership, engagement, and commitment, and are underpinned by partnerships; each partner brings an element to the actual solution, thereby creating synergistic results.
- Incentives are needed as a catalyst. Where resource constraints prevail, creative financing and other schemes need to be developed together. Private sector financial constraints often dictate the necessity for grants and other forms of incentives, and creative approaches are needed (for example, the Bank's voucher scheme; innovative delivery systems such as revolving fund; concessional lending; auctions, and use of indigenous technologies, to mention a few) are often required to address implementation barriers and must be custom tailored to the specific country situation.
- Sustained infrastructural capacity is essential.
- Financial intermediaries (FIs) have proven themselves to be cost-effective partners regarding implementation, especially in dealing with a very large number of individual enterprises.
- Incentives, not only to beneficiaries, but also to key elements such as enforcement, are necessary for problem resolution. (Example of an enforcement incentive—where private inspection agencies are deployed in the MAC sector, the agencies usually can obtain the repair work when contraventions are detected.)
- The ability to think outside the box is important when solutions are not readily apparent. The Bank's Russian Special Initiative project (SI) mobilized new partnerships and monies needed to support conventional financial assistance streams, providing a unique solution to a critical ODS problem component.

Sector Approach for Assisting Large ODS Consumers and Producers

Directly cutting off the supply of CFCs and halon was, and is still considered by many, to be the most straightforward way to curb consumption, and the production sector had indeed been on the minds of MLF policymakers for years. However, the challenges in determining incremental costs and the number of uncertainties faced by the producers prevented concrete measures to be taken until a decision at the 7th meeting of the parties precipitated action. The parties asked the Executive Committee, as a priority, to agree on modalities to calculate and verify production capacity in Article 5 countries, as well as to ensure that incremental costs for projects were consistent with the list indicative of incremental costs. They also decided that beginning December 1995, no party will install or commission new capacity for the production of Annex A- or B-controlled substances.⁶

The Executive Committee consequently accelerated work on the production sector by requesting specific data from producer countries, requiring technical audits to consider projects in the sector, focusing interim guidelines on closure first, and creating a dedicated subgroup to further deliberate technical details. It was clear that unique circumstances of the production sector would require a new project modality. In October 1996, the Executive Committee approved project preparation funds for a new modality—an undertaking covering the entire halon sector in China.

The government of China and the World Bank had begun to work on a halon sector approach with a driving need to find a cost-effective way to phase out halon production, and corresponding consumption, considering the size of the sector, and level of supply and use (characteristic of larger countries). They turned toward previous experiences in implementing MLF projects, including the commercial refrigeration sector in China. Dealing with that sector proved not to be a straightforward matter of converting compressor manufacturers, but one that involved consolidation and closures. It also required policy incentives to accelerate unified action by enterprises in the sector to create a level playing field and predictability for downstream end users. The Turkey Revolving Fund project also had demonstrated the crucial role of policy implemented in parallel with investment activities, whereas the Chile Auction Program served as a model for a market-based approach to channeling assistance to beneficiaries through a “reversed” auction (bidding for funding instead of services or goods).

In the end, an approach was conceived whereby all aspects of the consumption and production of halon were to be addressed at one time under an incentive-based framework. Objectives of this new approach were to identify phaseout options and select the most cost-effective options; develop a more efficient delivery mechanism to channel grant funds from

⁶ Annex B chemicals are other CFCs, in addition to those controlled under Annex A of the Montreal Protocol, carbon tetrachloride, and methyl chloroform.

the MLF to China and its beneficiaries, such as the use of auctions; provide more flexibility in grant utilization and management; develop policy instruments (including a quota on and licenses for halon production); monitoring and enforcement mechanisms to support halon phaseout; and, ultimately, reduce total phaseout costs to China and the MLF.

Prompted by the World Bank paper on policy issues involved in sector-based financing in early 1997,⁷ the Executive Committee agreed on ground-breaking project guidance for a new project modality based on the China halon sector plan—a significant departure from the project-by-project approach. A “sector approach” to financing ODS phaseout would be a complete program focusing on total phaseout of a controlled substance in a sector with financial and policy incentives. Moreover, it would be performance-based—total funding to be covered by the MLF would be agreed from the beginning, but released in tranches, based on the agreed schedule and achievement of annual ozone depleting potential (ODP) phaseout targets as verified independently. The approval was cemented by an agreement between the country and the Executive Committee, making the country directly accountable for achieving phaseout targets in return for funding. This eliminated the degree of separation between countries and project implementation common to earlier projects.

The China halon sector phaseout project—The World Bank’s China halon project was the first project under the MLF to employ not only a performance-based approach (performance indicators), but also, an innovative market instrument (an auction) to facilitate the phaseout. With the cessation of production and consumption of ODS in developed countries at the end of 1995, China became the world’s largest producer and consumer of both CFCs and halons. The Sector Plan for halon phaseout for China addressed both production and consumption simultaneously. From 1998 to 2005 China gradually reduced its halon 1211 production from a baseline of 34,932 ODP tonnes and its halon 1211 consumption to a complete phaseout by 2006. At the same time, China reduced its halon 1301 production and consumption from 6,000 ODP tonnes to less than 100 ODS tonnes in 2007. China introduced production quotas for each halon producer.

The China halon sector plan was approved in November 1997 and became the prototype for the sector approach. The CFC production closure project followed suit in March 1999 with a landmark approval, in principle, of US\$150 million for China to gradually close production over 10 years. The CFC production sector plan became one of the most important milestones in the history of the MLF, and catalyzed the closure of CFC production in Article 5 countries throughout the world, as well as in the Russian Federation

⁷ Sector-Based Financing under the Multilateral Fund: List of Issues Requiring Consideration by the Multilateral Fund. The World Bank, UNEP/OzL.Pro/Executive Committee/21/24, February 1997.

Progress and Challenges of Medium-size ODS Consuming Countries

As policy developed to facilitate assistance to targeted sectors and countries, implementation of numerous stand-alone investment projects continued. Progress in converting enterprises to new technologies and non-CFC use was notable by the degree of ODP phaseout achieved. Moreover, measures to monitor the speed of project implementation and to ensure that baseline equipment from conversions was destroyed were beginning to show sustained results in phaseout. This was particularly visible in medium-volume consuming countries, in which increasing responsibility in overseeing enterprises using ODS, as well as the larger market of CFCs and other controlled substances, were being assumed by NOUs. The encroaching MP obligations, combined with several years of capacity building and awareness raising through NOU assistance (IS projects and the regional network meetings) served to mobilize policy makers at the country level to start adopting regulatory measures to control ODS.

Medium-size ODS-consuming countries also joined the push to shift gears and look at other mechanisms that might be used to channel MLF assistance, given that progress made with the well-understood sectors (manufacturing in aerosols, foam, refrigeration, solvents) and larger enterprises were giving way to more difficult sectors (servicing, halon, methyl bromide, chillers), and stakeholders (SMEs and end users).

For instance, in 1998 Thailand put forward, with the assistance of the World Bank, not only the Thai SME umbrella project but also the Thai chiller project, which succeeded in leveraging funding from the Global Environment Facility as well as the MLF to replace CFC-based chillers with more energy-efficient chillers. Also targeting the chiller sector, Mexico received assistance from the United Kingdom to demonstrate how concessional lending could overcome barriers to chiller replacement, such as high interest rates. These projects illustrated how innovative project modalities could be used to make limited funds more effective as well as accessible to specific groups. The Executive Committee decided in July 1999 that implementing agencies and Article 5 governments should develop umbrella projects and sector approaches.

Chiller replacement programs—The MP mandates a complete phaseout of consumption and production of ozone depleting substances (ODS) in developing countries by January 1, 2010. This includes air conditioning equipment located in hospitals, schools, hotels, government, and private sector buildings in developing countries. These are often quite expensive pieces of equipment for which there are not sufficient grant funds from the MLF to facilitate the required conversions, only to provide small grants. For chiller replacement and other programs, it was clear to the Bank that new and additional financing schemes were required. To address this need, the Bank consulted the stakeholder community, including the large international chiller suppliers, and developed funding schemes that could supply the required cofinancing and leverage. These leveraging-based schemes facilitated concessional lending, and with a small grant from the MLF, have been used to establish revolving funds.

The Bank's chiller replacement programs offer many examples of Bank creativity and needed innovation. Early demonstration projects in Mexico, Thailand, and Turkey, and a comprehensive chiller sector study in India confirmed that the internal private incentive to early replacement of CFC-based chillers is simply not sufficient to achieve a timely replacement under the constraints of the MP. These activities further confirmed the existence of numerous barriers (technical, financial, managerial, among others) to the conversion of CFC-based chillers to more energy-efficient, non-CFC chillers. Two interesting examples are the Chiller Replacement Demonstration Program in Thailand (with joint funding by the MLF and GEF, which is also an example of innovative resource mobilization), and the Mexican Chiller Program.

The Thai chiller program—This involved an initial MLF and GEF concessional loan to establish a fund for replacing 24 old CFC-type chillers with energy-efficient, alternative refrigerant technology. Five hundred more chillers were then replaced through the Energy Conservation Fund of the Thai Government. The idea was that the lessons learned, as well as project design, monitoring system, and other related requirements, developed through the demonstration project, would be replicated by the bigger project to be funded by the Energy Conservation Fund of Thailand.

Turkey's chiller replacement program—Difficulty was experienced in convincing chiller owners to convert their chillers. They expressed concern regarding the need for such a high initial investment. Also noted was the lack of incentives for energy efficiency (low electricity tariff and lack of other fiscal incentives for adopting energy saving devices). To overcome these problems the chiller program in Turkey offers 75 percent as an interest-free loan and 25 percent as a grant. The loan must be paid back in five installments. The 25 percent and 75 percent grant versus loan was adopted as a carryover from the revolving fund set up for earlier ODS phaseout projects.

The Mexico revolving fund—There are an estimated 1,500 CFC-based chillers in Mexico, the conversion of which could not be fully subsidized by the MLF. Mexico therefore required an innovative approach and designed a concessional lending/revolving fund to enable long-term chiller substitution. The concessional lending pilot project was financed in part by a bilateral contribution from the United Kingdom, of US\$2.3 million, with cost sharing of US\$1 million from the MLF; US\$1 million from a financing firm in Mexico; and US\$0.3 million from participating chiller owners. The objective was to test the concept and promote the replacement of ODS-based chillers with newer ODS-free units that would be more efficient in electricity consumption. The project design was a win-win situation, as it brought about not only the elimination of CFCs, but also savings in energy consumption. The pilot project aimed to replace chillers in Mexico in two phases, with 10 chillers replaced in each phase. This subproject was carried out by the Trust Fund for Electrical Energy Savings (Fideicomiso para el Ahorro de Energía Eléctrica, or FIDE). The MLF approved US\$500,000 per phase. FIDE contributed an additional US\$700,000 for the first phase. Available funds were used to create a revolving fund from which chiller owners could borrow money to replace their ODS-based equipment. Energy efficiency gains from the new equipment allowed chiller owners to repay the loan in less than two years, using only the savings from electricity consumption. The innovative chillers replacement project established a robust methodology for chiller replacement projects that can be applied easily worldwide.

Regarding results, 10 chillers were originally scheduled to be replaced during the first phase, which concluded in February 2004. However, although the pilot project was considered completed by February 2004, the funds used to replace the initial 10 chillers were fully recovered and FIDE is still using these funds to replace additional chillers. By the end of the first phase, 13 chillers had been replaced, surpassing the target initially established. The MLF released the funds for the second phase (that is, US\$500,000) by the end of 2005. These funds were added to the revolving fund, and by July 2006, 19 chillers had been replaced in Mexico using these funds. The second phase is still ongoing.

Interestingly, during the first phase, replacement of 13 chillers was financed with the same level of MLF resources as a result of increased building owner contributions. ODP eliminated during the first phase was 56 percent greater than expected: 7.8 tonnes instead of 5 tonnes. By the closing date of the first phase, 13 subprojects had been concluded. Chillers were replaced, baseline equipment was destroyed, and 100 percent of the loans were recovered. Overall, the project design proved very successful, as there was great interest from chillers owners in participating, and loans for the first phase were fully recovered.

A central part of this project was the design of a revolving fund for long-term chiller substitution. Funding from the MLF was applied on a 50 percent basis to the cost of chillers below US\$100,000. When the chiller cost exceeded US\$100,000, the excess was financed entirely by the chiller owners.

However, this did not optimize all the conditions surrounding ODS control and phaseout efforts that were characteristic of some of the medium-size consuming countries at that time. Having put into place licensing systems and quotas in accordance with the 1997 Montreal Amendment, these countries could associate consumption and phaseout with ODS imports and were a step closer to identifying the patterns of consumption not only within sectors, but across sectors. Drawing on the idea of a menu of project modalities to choose from in addressing specific country needs, building on the core principles of the China sector approach (policy-investment link, country-driven, results-based, and so forth), and taking into account the stage of ODS phaseout and related policy in some medium-size countries, the Bank requested and received project preparation funds to explore a national approach to addressing remaining CFC use in Thailand and Malaysia in early 1999.

CFC phaseout in Malaysia—The historical use of ODS in Malaysia, as reported in the first country program in 1990, was 4,193.6 MT. The consumption was in seven sectors, namely, mobile air conditioning; refrigeration, including servicing domestic and commercial refrigerators; chillers; foams; solvents; aerosol and fire fighting. To facilitate the phaseout, in 1994 the Government of Malaysia implemented an import control and licensing system that reduced the imports of ODS by 15-20 percent and increased the import duty. The prohibition on the use of CFCs in foam production and as propellants in aerosols was enforced in 1993. Use of CFCs in new installations of refrigeration systems and halons in fire-fighting equipment was prohibited in 1999.

The Bank requested and received project preparation funds to explore a national approach to addressing remaining CFC use in Malaysia in 1999, and in December 2001 the Executive Committee approved the Malaysia national CFC phaseout plan with a ceiling grant of US\$11,517,005. This grant is to be disbursed between 2002 and 2010 through the Bank to phase out the remaining consumption of 2,092 ODP tonnes of CFCs in residual manufacturing activities and service sectors for mobile air conditioning and refrigeration, as well as 33 ODP tonnes of methylchloroform.

This was the first project that addressed all remaining use of CFCs in the country collectively, and facilitated the Executive Committee's shift from project-by-project funding to a permanent and sustainable phaseout of aggregate consumption in the country.

The Compliance Period

In November 1999 the Executive Committee held its first discussions on the need to deliver MLF assistance in a more strategic manner in view of approaching reduction targets for Annex A chemicals in 2005, 2007, and, ultimately, 2010. Compliance with the MP would now be linked to a strategic national phaseout approach. This launched a flurry of work over a 16-month period that came to be known as strategic planning for the compliance period.

The objective of strategic planning was to establish a framework for developing policies and approaches to enable compliance with the MP while enhancing the effectiveness of MLF support. It therefore involved reforms on several fronts: creating a baseline from which to evaluate progress; redefining roles and responsibilities of key actors; establishing a planning and monitoring framework based on accurate data, linked to compliance needs; aligning project implementation mechanisms with compliance needs and context of various countries through guidelines and templates; stepping up targeted policy assistance, and underwriting commitments.

The degree of success of the monumental transformation of the MLF's support is yet to be seen in full; however, as of the end of 2006, the key indicators linked to achievement (discussed further below) overwhelmingly show that the MLF is on the right track. Article 5 countries have made significant progress in establishing national ODS phaseout programs to the point that some have integrated the MP into sector and national development planning.

Development of the MLF Strategic Framework and Performance-Based Approach

As has been demonstrated, policies emerged from challenges arising during intense periods of project implementation and in the face of quickly approaching MP compliance targets. These challenges presented the need for comprehensive, cost-effective, and efficient interventions, exploiting economies of scale, accountability, sufficient flexibility, and, ultimately, compliance. By the end of the 1990s, it became increasingly clear that Article 5 countries needed to be given the lead in developing and implementing national compliance strategies if sustained results were to be achieved. The fact that all Executive Committee members agreed on the basic needs did not mean that it was easy to delineate the strategy.

The process of setting priorities for the strategy reflected the diverse views as to how best to address country needs in the compliance period. Members agreed that countries experiencing difficulties in meeting their freeze obligations should be prioritized for assistance. Non-Article 5 countries felt it important that existing MLF commitments to sector plans were respected (US\$294 million in future commitments for CFC and halon sector

plans in India and China). Some felt that the elimination of the global supply of CFCs, halons, and other controlled substances went hand in hand with curbing global demand and had to remain a priority. Many members agreed on the urgent need to reduce the consumption and production of halon and methyl bromide with impending freeze obligations. Some other members maintained that countries successful in implementing ODS phaseout projects and policies should be provided assistance to maintain momentum, and in some cases, to accelerate phaseout.

In March 2001, after three meetings involving arduous debate and finally, compromise as well as adoption of a draft framework, the Executive Committee agreed on the framework for strategic planning. The framework was designed to evolve based on lessons learned and needs, and began by listing 10 priorities for funding, including those mentioned previously. The basis of the framework was a country-driven, compliance-driven approach that would permit countries to choose the type of assistance required from the MLF to meet specified national goals.

However, the discussion of how funding would be delivered under the framework was not finished. The concern for sustained reductions at the national level was, in the view of some, insufficiently addressed. Closely linked to this was the issue of reliability and accuracy of ODS data. A strategic approach to delivering assistance for compliance had to facilitate the quantification of reductions or progress made to ascertain long-term funding requirements. Some committee members spoke of permanent reductions to be subtracted from an agreed baseline, but other Article 5 countries were quite concerned, given the implications from data uncertainties. In addition, some countries did not feel they were ready to relinquish the project-by-project approach entirely in favor of country-led, programmatic approaches.

Demonstrating the Core Principles of the Strategic Framework

During the time of Executive Committee deliberations on a strategic approach, important country-level work was unfolding that actually served to draw out and refine the core principles of the coalescing framework. In Southeast Asia, two countries had asked the Bank for assistance in crafting comprehensive national plans that strategically addressed remaining sectors of consumption according to the MP's control schedule up to 2010. This work assisted in defining the core principle for the strategic framework. Multilateral Fund project preparation funds approved to assist Malaysia and Thailand to develop a national approach to CFC phaseout supported a process of strategy formulation that lasted nearly two years.

The Thai phaseout program—Thailand’s national approach employed both legal measures and financial subsidies. Legal measures included the issuance of four notifications: on the prohibition of the import of CFCs-based refrigeration equipment into the Kingdom, on the prohibition of the uses of CFCs or methylchloroform in the manufacturing sector, a prohibition on establishing, or expanding the aerosol manufacturing facility that uses CFCs as a propellant, and the notification on CFCs’ import quota. All ODS (except bromochloromethane) have been controlled, and importing, exporting, or possessing these substances is prohibited.

With regard to financial subsidies, the total program funding of US\$55,242,390 provided by the MLF is used for assisting enterprises in several manufacturing sectors. Thailand was the first country to introduce the voucher system, which successfully enabled both the Thailand mobile air conditioning (MAC) recovery and recycling project and the commercial refrigeration terminal umbrella project to achieve successful outcomes. The vouchers were distributed to MAC shops and small and medium refrigerator manufacturing enterprises for purchasing non-CFC-based equipment. For the chiller project, Thailand succeeded in reshaping the local market by proving the efficiency and high energy savings associated with the use of non-CFC chillers to end users and manufacturers, and successfully inducing them to use such equipment before the end of the remaining useful life of their CFC chillers. Thailand was able, in its carbon tetrachloride (CTC) conversion project, to totally phase out CTC in the pharmaceutical manufacturing sector. This success is attributable to the coordinated efforts of local government agencies, including the Department of Industrial Works and the Government Pharmaceutical Organization.

What emerged in the end were two national CFC phaseout plans (NCPs) that laid out strategies across CFC-consuming sectors with investment and noninvestment activities: policies and regulations, timetables for their implementation, and a costing of broad categories of activities, including a project management unit able to recruit necessary technical and legal expertise to implement the NCP.

The NCPs differed from early country programs in several important ways. First, there was the process of NCP development. The unusually long preparatory time was because the process itself was part of the approach to securing country ownership. A programmatic approach required the collaboration of several ministries and agencies representing industry, trade, environment, and health, to name a few. After all, these entities would be responsible for instituting and implementing supporting regulations and policies to form a systematic approach to CFC control and phaseout. Therefore, to ensure stakeholder buy-in, NOUs needed to engage these stakeholders in consultative meetings and dialogue *before* a strategy was finalized. Their insight also allowed NCPs to be tailored to the realities on the ground as well, in accordance with the existing national institutional and regulatory frameworks, and facilitated data collection, which was one of the main challenges in NCP development.

Guidelines for the preparation of phaseout plans—The Executive Committee sought the assistance of the bilateral and implementing agencies to develop the draft guidelines for the preparation, implementation, and management of performance-based, substancewide national phaseout agreements. The Bank, uniquely positioned and experienced, made a very large contribution to this exercise. In fact, the guidelines are framed according to the approach developed by the Bank for the delivery of the NCPPs for Malaysia and Thailand.

Performance-based approaches—The performance-based approach makes sense for sector-based approaches, whether in small, medium-size, or large countries. However, performance measurement tools must vary, since they must take local conditions into account. For example, the approach for China and India is much different from that for Malaysia and Thailand. For China and India, most projects are a sector approach. For smaller countries, the approach is a national phaseout plan, which is performance based.

The Bank's China halon project was the first project under the MLF to employ not only a performance-based approach (performance indicators), but also an innovative market instrument (an auction) to facilitate the phaseout. China introduced production quotas for each halon producer. The production phaseouts in China, Argentina, India, and Venezuela all demonstrate the effectiveness of the performance-based approach.

Also noteworthy is the fact that the Russian Special Initiative (SI) was perhaps the most direct performance-based project, with the formula of an agreed set of technical closure steps, payment of an advance on all players signing, and final payment when compliance is verified. This same approach is currently being used for dismantling a CTC plant in the Ukraine.

Russia: the Special Initiative for ODS Production Closure—By 1998, Russia accounted for half the world's production capacity of CFCs and halons. The Bank provided funding to seven Russian enterprises that have ceased production of chlorofluorocarbons (CFCs) and halons, the most potent ozone depleting substances. The ending of ODS production in Russia completed the phaseout of CFCs and halons in developed countries as required by the MP. The funds for the compensation of US\$25 million to the seven enterprises came from a group of donors organized by the Bank, known as the Special Initiative for ODS Production Closure. The donor countries included Austria, Denmark, Finland, Germany, Italy, Japan, Norway, Sweden, the United Kingdom, the United States, and the GEF.

Second, the NCPP necessitated certain preconditions. These were monitoring capacity for CFC imports through functioning licensing systems and an advanced state of implementation of ODS, whereby most of the remaining consumption was among SMEs in specific sectors—permitting the country to deduce the pattern of consumption in the absence of detailed data. Monitoring capacity was required for long-term country planning and for apprising the Executive Committee of the progress made.

Third, as discussed earlier, the approach was predicated on policies and project modalities developed over the history of the MLF, whereas the early country programmes did not have this bedrock. The NCPPs used a historical C.E. average of previously MLF- approved projects in the country for costing; Executive Committee guidelines and policies for establishing program parameters; and existing project modalities, such as innovative market-based mechanisms and the terminal umbrella modality, for receiving and delivering the funding assistance. This also included the performance-based approach taken from the production sector closure projects, in which tranches of funds would be released to the country after annual national CFC consumption was verified to be within agreed targets. An agreed envelope of funding guaranteed through an agreement and released in tranches was key to gaining country commitment to a long-term plan spanning eight years.

Innovative financing—The Bank developed a number of creative financing arrangements and mechanisms for overcoming obstacles that could be described as “incremental risks.” These are risks that cannot be mitigated by instruments and tools available in conventional project financing—for example, those risks due to high transaction costs, lack of collateral, and small project costs. Other obstacles include:

- Uncertainty of ODS market price developments, especially for CFCs
- Perceived capital market distortions
- Lack of concrete project experiences with innovative schemes
- Lack of reliable information for investment opportunities
- The full range of transaction costs.

The Bank also developed methods for overcoming barriers to conversion to CFC-free technology or energy-efficient technology. These include methodologies to accommodate the actual time needed to meet the targets of the MP; the possibility of commercial banks providing imperfect information about capital markets especially targeted for SMEs and the high degree of perceived risk (due to inadequate incentive structures) and costs; possible regulations that would create a specific condition or result, but which are neither in place nor enforced; and technology risks.

Finally, the NCPPs incorporated elements seen as necessary for sustainable results through past project experiences, including national execution with reliance on national systems, agencies, and staff to implement project activities. Tackling ODS phaseout in a program rather than piecemeal ensured that all required stakeholders were involved and policies were appropriate and realistic. Flexibility to governments to tailor and reorient phaseout plans as needs arose gave countries needed autonomy for ownership and relied on a monitoring framework to track progress. Earlier projects, such as the line-of-grant projects under the Bank, as well as sector approaches, brought these elements to light.

Other countries were also becoming interested in developing their own strategic and programmatic plans to phase out remaining CFC consumption. The government of Turkey, as we have seen, was well advanced in CFC phaseout, and in early 1999 it had also requested preparation funding to develop a national CFC phaseout. With the remaining unfunded CFC consumption in the refrigeration sector, a performance-based project was conceived to gradually phase out all CFC consumption by 2006.

In addition, the government of the Bahamas also initiated a “terminal” CFC phaseout plan that targeted the consumption characteristic of an LVC—consumption in the servicing sector. By 2000, more and more Article 5 countries were attracted by the notion of assistance that they could tailor to national ODS phaseout needs, including policy support.

Terminal CFC phaseout plan for the Bahamas—The Country Program for the Bahamas was approved at the 19th meeting of the Executive Committee. The baseline consumption is 58.7 tons; the allowable consumption in 2005 was 19.4 tons of CFCs. To meet this challenge, with the assistance of the World Bank a terminal phaseout management plan (TPMP) was developed (and approved at the 35th Executive Committee in 2001), which is allowing the Bahamas to phase out all remaining CFC use by 2007. The government, in collaboration with the private sector and NGOs, established a series of fiscal and regulatory measures to meet ODS phaseout requirements, provided information to consumers of the commitments to phasing out ODS, and provided the services needed to facilitate the transition to, and use of, non-ODS alternatives. The TPMP is being implemented through a system of policy-based actions by the government; several performance-based contracts; a technical assistance program; a locally managed action plan to phase down imports and implement specific individual phaseout activities, monitored through a system of performance-based indicators; and corrective measures to ensure compliance with main objectives of the TPMP.

Implementation Mechanisms and Approaches Under the Framework

It was not until the end of 2001 at the 35th Executive Committee meeting that the “how” of the strategic framework materialized in a synthesis of separate, but related, issues. The meeting was momentous for the number of key policies and approaches approved, including the previously articulated framework on the objective, priorities, problems, and modalities for strategic planning.

Permanent Aggregate Reductions

Sustained and permanent reductions in ODS consumption implied a cap on total MLF assistance available to a country for achieving MP commitments—making the determination of remaining ODS consumption eligible for funding all the more delicate. The negotiation for choosing a “starting point” hinged on the additional assistance that Article 5 countries maintained was necessary to allow them to assume the lead in national ODS phaseout.

In the end, to address the concerns of Article 5 countries of using their data to form a baseline to quantify CFC reductions, a compromise was reached whereby countries would be able to choose one of two options as a starting point, as appropriate to country circumstances. Either a country could choose to use its MP baseline (the average of 1995–1997 consumption), or use the latest data reported to MLF (either for 1999 or 2000). The CFC phaseout for projects that had been approved since either baseline was established would be deducted from the starting point. In addition, countries would be entitled to assistance for strategy development and ozone unit support.

The concept of permanent aggregate reduction was pivotal for the Executive Committee to make substantial early financial commitments to countries during the compliance period. It also created the baseline needed for business planning, fund management, and progress assessment in delivering MLF assistance.

New Roles and Responsibilities

With a new country-driven approach and concomitant focus on national execution, the traditional roles and responsibilities and functions of key participants needed to be revisited. Historically, a number of Article 5 countries had not played a prominent role in project implementation; now countries had not only to make strategic decisions as to the kind of projects they wanted, they had to be responsible for both project management and results.

The agreement to strengthen NOUs for their new role took the form of increased funding for ongoing institutional strengthening (IS) projects (30 percent from historical funding levels) in each country. The additional funding was complemented by assistance for UNEP to provide policy support to countries and for project management assistance within national ODS phaseout projects.

National execution or the country-driven approach—The Bank has always held the view that national execution, or the country-driven approach, was a critical component of building developing country capacity for national execution. National execution, and the advocacy for this approach, were also predicated on the Bank’s early recognition that the sustained phaseout of ODS will depend primarily on the countries, not the implementing agencies. The country-driven approach is therefore not only about countries undertaking project implementation, but also includes the requirement, for broadly based buy-in, ensuring understanding of the purpose of the project, creating a demand for it, and, exerting leadership. A country-driven partnership approach must, by design, be flexible in accordance with the needs and the requests of each country.

At its 35th meeting the Executive Committee established the requirement for a greater degree of country ownership in the ODS phaseout program, Decision 35/57. After 10 years of advocacy by the Bank, the decision was triggered by the Bank’s submission of the national CFC phaseout plans for Thailand and Malaysia. The notion behind the decision is to place the country in the driver’s seat—which, as noted, has always been a pillar of the Bank’s modus operandi, and has been referred to internally and historically as “national execution.”

China’s country-driven program—The China MP program is the largest in the world. It is a partnership with the Bank, and the pursuant projects are nationally executed (country-driven). Under the Bank’s national execution approach, the first partnership of the Bank is thus with the lead government agency or entity (example, China, SEPA). However, the Bank also uses financial intermediaries (FIs), which are local agencies. These are not limited merely to acting as the disbursement agent for external grant funds on behalf of the Bank, but for local lending on environmental projects as well.

Financial intermediaries (FIs)—The Bank uses financial intermediaries because they are trained in such matters, and thus equipped to provide financial services, manage funds, mobilize resources, ensure fiduciary responsibility, and so on. A competitive process (which evaluates ability to perform required functions) is often used to select FIs. The role of FIs is to manage local distribution of grant funds in accordance with previously agreed criteria and use both best management and auditable accounting practices. Financial intermediaries have a relationship with the private sector and are thus well positioned to create both awareness and outreach. The Bank created a network of FIs so that they might learn from each other's experiences and expertise, and holds annual workshops at Bank expense for dissemination of updates and communication. This undertaking has resulted in the FIs becoming more efficient and cost-effective, as well as reinforcing interest in the MP program and commitment.

The involvement of FIs in global environment projects is critical as it creates the necessary awareness of critical lending and financial management institutions to current and emerging environmental issues and obligations. Interestingly, the MP program has, in many instances, succeeded in changing the business of the FI. The creation of capacity and experience at these key financial institutions, through Bank support and partnerships, has enabled financial institutes to identify and exploit new business opportunities such as lending for environmental reasons. As an example, the LandBank in the Philippines is the designated FI for disbursing MLF grant funds on behalf of the World Bank in that country. This was a new role for the LandBank, in which it has operated very successfully for several years—so much so that the LandBank has sought to expand its services to non-ODS environmental program areas as well (for example, climate change).

In the early stages of the MP programs, the FI served as an important liaison mechanism between the Bank and the NOU, and also as an advocate. Interestingly, the turnover rate of staff in FIs has not been significant, adding stability to the delivery infrastructure in the country. In many cases, institutional memory, especially on the project implementation side, resides with the FIs. They often help new officials become familiar with the program, issues, and actors in the private sector. This has happened in Indonesia, Philippines, Pakistan, and Turkey. Interestingly, FIs contracted by national agencies can undertake these required services at much less cost than other agencies, especially UN agencies.

A country-driven approach did not eliminate the need for the implementing agencies but redefined their roles along the lines of being available more for advisory services, and, technical and policy support. The business plans of the implementing agencies had in the past been based on fixed shares, to promote a better division of labor across countries, but the Executive Committee members agreed that for implementing agencies to better assist

Article 5 countries in achieving compliance, more flexibility would be needed. Soon after the 35th meeting fixed agency shares were eliminated making it easier for countries to choose the implementing agencies needed to support their national strategies and projects. Eventually, the implementing agency administrative fee system was changed to reflect the nature of assistance required for different categories of projects under the new strategic framework.

One concern Executive Committee members faced in developing a compliance-based strategy was the fine line between the role of the Ozone Secretariat in monitoring compliance, and the new role given to the MLF Secretariat to track sector and country consumption and production data. Article 5 countries were clear that the role of the Protocol's Implementation Committee should not be co-opted by the MLF Secretariat or the Executive Committee. Ultimately, a choice for determining the starting point for MLF assistance and the associated provisos reassured countries that funding decisions under the MLF, based on the starting point, could be kept separate from decisions on compliance matters.

Establishing a Planning and Monitoring Framework Linked to Compliance Needs

As early as the Executive Committee's 20th meeting, some form of monitoring had been in place to track compliance. The result of the Executive Committee's 1999 request that countries, with the support of implementing agencies, begin looking at their baseline data by sector and in comparison to project activities approved, resulted in a survey by the MLF Secretariat of ODS sector consumption and production data in July 2000. The Executive Committee asked that this data be cross-checked with data held by the Ozone Secretariat, and so began development of a comprehensive framework for planning and monitoring ODS consumption and phaseout.

With a decision on permanent aggregate reductions, the Secretariat continued its role in tracking national ODS consumption and production in relation to MLF assistance to facilitate business planning and policy development. In July 2002 the Secretariat for Executive Committee planning and resource allocation developed a compliance-oriented model; this led the Executive Committee to adopt a three-year business planning cycle to ensure that the flow of funds was linked to compliance and that emerging issues could be spotted easily.

Monitoring and verification—Comprehensive verification was needed to expedite cooperation from the various stakeholder entities and relevant agencies (NOU, Customs, Ministry of Trade, and so on). Such cooperation is critical not only to creating and maintaining a robust control system, but also to establishing the linkages and cooperative mechanisms that will benefit not only CFC and other chemicals subject to controls in the short term, but also those in the long term (example, HCFCs). Moreover, the verification system (through management reporting) was needed to identify areas in need of improvement, again helping the country to continue to improve its control system.

The management and verification framework employed by national CFC and halon phaseout plans implemented through the Bank include verification of the process used for issuing import quotas; verification of quotas issued to importers; verification of customs records; reviewing and summarizing the methodology used by the government for data collection, and a list of the major customers from the importers. Two reports will be produced at the end of this exercise: first, an audit report expressing a professional opinion on the actual consumption (import-export) of the control chemicals, and compliance with the conditions agreed with Executive Committee; and second, the management report summarizing the findings, comments, and recommendations regarding the effectiveness of the government's import control system. The feedback to governments through these reports serves to address weaknesses, close loopholes, and otherwise continuously improve the existing systems. The methodology focuses on assuring countries' compliance with the agreed targets according to the definition of the MP, rather than verifying consumption at the level of the individual user. The methodology, originally designed to verify countries' achievement of the targets under the project agreement, has been beneficial to governments in improving control and monitoring of the overall imports of CFCs and accuracy of the Article 7 data.

Aligning Assistance Mechanisms with Compliance Needs and Country Context

Principles and approaches adopted under the strategic framework, such as performance-based implementation and country-ownership, called for complementary implementation modalities. During strategy development, however, it was understood that not all countries were ready to launch into nationally executed plans, particularly because of the need for accurate data. A gradual approach was acceptable, whereby a project-by-project approach could still be employed while support for capacity and noninvestment activities would be increased, to help countries assess their needs and develop strategies for more comprehensive phaseout plans.

A mechanism intended as the vehicle for national compliance strategies was an updated version of the country program. On the heels of its decision to better link compliance to a national approach to ODS phaseout in 1999, the Executive Committee asked that guidelines be developed for country program updates. This anticipated the need for a tool to help countries formulate national strategies and help the committee in its planning. (Some members had even wanted the country program update to be used for determining the starting point for MLF assistance during the compliance period.)

In view of the demand for a flexible approach toward implementing the strategic framework, the committee decided that the country program update would not be mandatory, but encouraged as an instrument for preparing a national compliance strategy, and could also be used as the basis for designing performance-based ODS sector or national phaseout agreements. Guidelines to updating country programs and a format were adopted at the 35th meeting. Country program updates require elements similar to those of their predecessors—the difference is the expectation of a direct link to compliance. Ozone depleting substance consumption and production data are accurate: regulatory controls on ODS supply and demand will be enacted, and they stem from the Article 5 country government concerned.

At the 35th meeting it was clear that the main project modality for delivering results in the compliance period would be performance-based agreements modeled on the sector plans, or new national CFC phaseout plans approved at the same meeting for four World Bank client countries (the Bahamas, Malaysia, Thailand, and Turkey). These project modalities made it easier to apply the concept of permanent aggregate reductions and to secure country ownership and commitment. Strategic actions were appropriately timed for reduction in ODS, which in turn was incorporated in an agreement.

The main project modality for LVCs, the RMP, was retained and special provision was made in the context of the country program update decision that country program update development could be combined with the development of an RMP. The RMP had been recast in July 2000 in view of the development of the strategic framework (with additional funding made available to countries). It continued to evolve to embody the objectives under the framework for strategic planning; for example, with the eventual approval of the terminal phaseout management plan for complete CFC phaseout and of a provision for additional flexibility.

Several delivery mechanisms that had evolved over the recent past were therefore packaged at the 35th meeting as tools for helping countries achieve their MP commitments. Discussions were even revived on concessional lending, a mechanism that some hoped could leverage additional funding for the compliance period. Five years after the hallmark decisions of the 35th Executive Committee meeting, performance-based agreements, supported in some cases by country program updates for strategy development, have become the dominant project modality under the MLF.

Stepping Up Targeted Policy Assistance

The difference between the project-by-project approach and the country-driven, compliance-based approach was largely the marrying of targeted MLF assistance to national ODS phaseout policies. However, the capacity of Article 5 countries to develop and implement complementary policies varied. Thus, in the new MLF funding policies adopted at the 35th Executive Committee Meeting, provision was made for support of policy formulation.

A Country Assistance Program was approved for UNEP to provide targeted policy assistance to Article 5 country governments to meet MP obligations. Specifically, it was directed toward the compliance regime of increased country ownership, institution and enforcement of regulations and policies, and of improved data reporting. The Country Assistance Program has become particularly important for LVCs, which have not all benefited from comprehensive national or sector ODS phaseout plans because of the nature and volume of ODS consumption.

Other implementing agencies were also asked to increase policy assistance. In practice, this was achieved through implementation of sector and national ODS phaseout plans, in which a combination of policy development and implementation with investment and noninvestment activities is implicit.

Sealing Country Commitment

The sector approach first introduced the performance-based agreement to seal country commitments to permanently reduce ODS consumption or production in return for agreed tranches of funding. Underwriting phaseout obligations by the Executive Committee and the countries in the form of a multiyear agreement (MYA), and performance audit has been crucial in putting the strategic framework into operation by obtaining country commitment and holding countries accountable to agreed targets.

Commitments to permanent aggregate reductions are captured in a schedule and the actual achievement of agreed reductions is verified by an independent audit. If a country does not meet the reductions stipulated in the MYA, the Executive Committee reserves the right to hold back additional funding. Agreements also included a penalty clause in case agreed ceilings of consumption and production were exceeded. The advantage of MYAs for countries is that they can proceed to plan and adopt long-term policy measures knowing that they are backed by guaranteed annual funding. This creates confidence and credibility in ODS policy makers on the national level to facilitate implementation and enforcement of national and sector phaseout plans.

Monitoring compliance—Implementing agencies are also often assigned responsibility to “monitor compliance” with project agreements made with the MLF; specifically, the agreed phaseout schedule. However, the diligence with which this responsibility is approached and the methodology or strategy used to fulfill this obligation can yield synergistic and enabling results. For example, the World Bank has a compliance monitoring obligation with respect to the CTC Sector Plan implementation in India. It is a condition for disbursements under the project, that production and consumption limits in the sense of the MP are met. The Government of India has established a CTC production and consumption control regime, pursuant to its ODS Rules and Regulations (2000), to help ensure that the country fulfills its obligations under the MP and the agreement between India and the Executive Committee. It is important to note that the definition of production, as per Article 1 of the MP, is the total production level, minus the total tonnage destroyed by technologies approved by the parties, and minus the total tonnage consumed as feedstock. Thus production for *feedstock* purposes is permitted under the MP, and the phaseout quantities apply only to *nonfeedstock* applications. However, the Bank’s plan, which put a system to monitor the use of CTC for feedstock applications (which are not even controlled by the MP) in place provided additional insight and a holistic view with regard to the total mass balance with respect to CTC. In verifying every element in the CTC chain (regulated or not), the verification team was able to present the total picture, and this resulted in amendments to the Ozone Rules.

Verification protocols—The Bank’s CFC project with India highlights the linkage between actions such as the development of comprehensive and meaningful verification protocols and the strengthening of government agency policy, programs, and procedures that affect not only short-term compliance, but also sustainability of results.

A good example is the verification framework for the production phaseout in India, where an international consultant (expert) is used annually to verify the CFC production level at India’s four production facilities. This is accomplished through inspections of appropriate records and other measures considered necessary, according to his or her professional judgment. This can include (a) purchase and stock of raw materials; (b) other inputs, such as labor and electricity, as needed; (c) production levels of CFCs; (d) addition to, and release from, product (CFC) inventory; (e) products released for sale; and (f) analysis by online gas chromatography of the crude product stream coming out of the reactors. If necessary, verification of HCFC production level would be carried out to determine the accuracy of CFC production figures cited for any particular plant. Recommendations, as appropriate, should be made on data management issues relating to the inspection of production. The Ministry of Environment and Forests’ contractor handling midyear inspections should be consulted, and the contractor should review their inspection methodology with them. Following site visits, a written evaluation of the annual CFC production sector audit report should be prepared and submitted.

The MP program experience of the Bank has served to strengthen the capacity of client countries as well as enhancing the utility and efficacy of internal Bank procedures.

Outcomes

The framework for strategic planning and the resulting adjusted funding policies represent a significant change from previous operations of the MLF. Existing operating procedures and business planning had to be revisited to accommodate new elements of the framework. As a result, several meetings of the Executive Committee were required before policies, procedures, and approaches fell into place.

Besides changes in the business planning process, the organization of the Executive Committee’s work was also modified. It was recognized that the organization of MLF operations had served and reinforced the previous project-by-project regime. The separation of individual project review and approval from MLF planning, monitoring, and evaluation in

two subcommittees was eliminated to permit the Executive Committee to make decisions in a more holistic and strategic manner—that is, to better link business planning and program monitoring with compliance needs and phaseout performance of countries.

Over the years, a substantial monitoring and reporting system surrounding individual projects had evolved. Although the shift from a project-by-project approach to more programmatic MYAs and TPMPs was required by a decision of the Executive Committee in late 2002, the system of reporting on individual projects was not changed. Rather, it was applied as much as possible to MYAs, in addition to reporting specifically on MYAs. The Executive Committee has considered ways to better adapt the monitoring and reporting system to the strategic framework, but this aspect has lagged somewhat behind.

The certainty gained by the Executive Committee of MLF funding needs and the associated impact has been one of the great successes of strategic planning. As a result, limited resources can be strategically channeled to evolving needs and strategic priorities under the MP and the MLF. Generally, the average cost effectiveness of sector and national ODS phaseout plans is much better than the most cost-effective sectors under the project-by-project approach. Moreover, because all the historical policies of the MLF to enhance the effectiveness of individual projects were retained, project modalities in the compliance period are fully equipped to accommodate the number of issues that can arise during implementation in different sectors.

In 2004, the MLF was evaluated as part of the fund replenishment exercise under the MP. The evaluation found that in general the MLF had been effective in helping countries meet their MP obligations. The bulk of its recommendations focused on improving operational and procedural aspects of the MLF, as well as the monitoring and evaluation framework.

The system currently in place under the MLF is a functional hybrid of policies and procedures catering to both individual projects and the newer MYAs. After five years of development, the new strategic framework has seen the approval of 94 separate MYAs in 63 countries, worth US\$1.02 billion in commitments. Forty-five percent of cumulative approved funding under the MLF has gone toward MYAs. Included in approved MYAs are CFC production closure projects for all remaining Article 5 producers. By the end of 2005, projects worth US\$1.78 billion were approved under the MLF for implementation of the MP to phase out 361,133 ODP MT and already, achievement is at 85 per cent.⁸ Although there are ongoing individual projects, the number continues to decline as projects reach completion.

The impact of the strategic shift of the MLF at the country level has been measured primarily by the ability of countries to meet annual consumption and production targets according to their agreements with the Executive Committee and consequently to meet their MP

⁸ 2007-2009 Consolidated Business Plan of the Multilateral Fund. UNEP/OzL.Pro/Executive Committee/51/6, March 2007.

obligations. This indicator has demonstrated, for Bank projects, that the new approach is effective in achieving sustained consumption and production reductions, as no countries with sector and national phaseout plans have encountered a compliance issue with the substances covered by the respective MYA. In fact, many countries consistently fall well below annual consumption and production targets because of effective import policies (controls) and one of the major CFC producers, China, has received assistance from the United States to accelerate its agreed CFC production phaseout. Other producers with closure agreements are expected to follow suit. Experiences encountered in managing and monitoring sector and national plans on the ground will be considered in an evaluation to be initiated under the MLF in 2007.

A country-driven approach is a central premise of the new funding regime, and among the criteria for evaluating the effectiveness of the MLF in the compliance period would be the degree of country buy-in achieved in implementing national compliance strategies. An interesting example of this is the methyl bromide sector plan for Turkey.

Country buy-in—Turkey's Methyl Bromide (MBr) Resource Group—

Methyl bromide phaseout demonstration projects began at selected sites in Turkey in 2002, and were highly successful in identifying and proving cost-effective non-ODS alternatives for the control of pests and weeds in agricultural soils and plants. However, by 2005 it had become apparent that although dissemination of results, follow-up, and ensuring sustained use of alternatives were critical to success, MBr knowledge resources remained scattered in Turkey.

To address this problem, in 2005 the Bank proposed establishment of a special MBr steering and oversight committee, the MBr Resource Group, to be composed of representatives from the Ministry of Agriculture and Rural Affairs (MARA), the Ministry of Environment and Forestry (MoEF), the Technology Development Foundation (TTGV), UNIDO, World Bank methyl bromide project staff, and independent experts. The MBr Resource Group was convened for the first time in November 2005 at TTGV headquarters in Ankara. Over four meetings, the group undertook regular reviews of ongoing MBr phaseout projects, revised and approved action plans for two institutional strengthening (IS) projects focused on MBr, assigned agency responsibilities for plant protection training, farmer training, and extension staff training in selected provinces, and reviewed or updated Turkey's MBr quota allocations for quarantine purposes and critical uses. The group is preparing an MBr phaseout guidebook for extension specialists, food processors, and exporters for completion by May 2007.

The evaluation to be carried out in future by the MLF will certainly look at this aspect more closely but already it is evident that many countries have taken full control of their national

and sector phaseout strategies and have integrated them in their overall planning for MP implementation. The catalytic affect of these plans on the national level is unquestionable. For example, in select country assistance strategies of the Bank, which are development planning tools that mirror country development priorities, work to implement the Montreal Protocol is cited. These country assistance strategies happen to be for countries that have benefited from sector and national ODS phaseout plans (China, Ecuador, Thailand, and the Philippines).

Toward Total Phaseout

There is no question that the amount of ODS phaseout over the 15-year history of the MLF is significant and commendable. This paper has shown that the road to sustained reductions and phaseout of the consumption and production of controlled substances in Article 5 countries to comply with MP obligations has been a process of identifying needs, developing policies and approaches, delivering grant assistance, and accumulating experiences. From country programs and the project-by-project approach in the grace period to programmatic MYAs in the compliance period, it has taken nearly two decades for experience and MLF policies to reach their current state of maturity.

What had been missing in the earlier days of the MLF was direct association of project achievements (that is, phaseout) to national-level reductions for MP compliance and, associated country-led planning and implementation. With the movement to a new strategy based on permanent aggregate ODS reductions and performance-based project modality, the Executive Committee can make the changes required to move to a country-driven, compliance-oriented approach, drawing on the earlier regime of policies, guidelines, and project experiences. Catalysts and innovative contributions were essential for transition as the compliance period drew nearer; production closure increased CFC costs, conversion of the manufacturing sector accelerated, and country capacity-building efforts led to necessary country-level ODS policies.

Innovative contributions from the World Bank—Following are a few examples of the Bank's innovative contributions:

- Revolving funds and concessional lending
- Auction programs
- The voucher scheme
- Using indigenous knowledge and technologies
- Innovative financing techniques
- Risk management techniques and methodologies.

The Bank strongly supports the use of indigenous knowledge and indigenous technologies. The Multilateral Fund support encourages not only transfer of technology from developed to developing countries, but also promotes development of indigenous technologies. Technologies imported from the European Union or North America often require adaptation to local conditions. With funding provided under the halon sector plan in China, Honsen Firetech Company developed, in cooperation with a domestic research institute, a new vegetable-based, biodegradable foam for fire fighting in the oil industry. After testing and evaluation, the foam proved to be as effective or, in some cases, better than imported products, and is now being produced in commercial quantities. Another example of indigenous knowledge and technology is the new chemical process to eliminate coproduction of carbon tetrachloride (CTC) in the chloromethane production process by Mei Lan in China. CTC is coproduced with chloroform at the methylene chloride (MC) facility at Mei Lan. Chloroform is used as the raw material for HCFC-22 production. With increased production of HCFC-22, the demand for chloroform increases, resulting in additional unwanted CTC. As the demand for CTC (as raw material for CFC) is at the same time disappearing because of the CFC phaseout, surplus CTC constitutes a major problem. The CTC conversion technology was developed by Beijing University Chemistry Technology Department in cooperation with Mei Lan. The MLF funding for the CFC production quota reduction payment was used by Mei Lan to set up the conversion facility. The process converts CTC back to MC, which is then used for chloroform production. The technology is now used by several MC producers in China, and is the main route for converting unwanted CTC. (This avoids the need for costly incineration of CTC.)

India—Conversion of chlorinated rubber manufacture from carbon tetrachloride to non-ODS process at Rishiroop Organics Pvt. Ltd.—This

Bank-assisted process agents project, completed in October 2003, is an excellent example of the use of indigenous technology, and resulted in the elimination of 248.82 ODP tonnes of carbon tetrachloride (CTC). Rishiroop Organics Limited, a 100 percent Indian-owned private limited company, was established in 1989, with a production facility located at Vapi in the state of Gujarat, India. Carbon tetrachloride was used as a process agent for the production of chlorinated rubber. Commercial production of chlorinated rubber started in September 1991, with a total production capacity of 550 MT of chlorinated rubber per year. Faced with the policy of the Government of India to phase out of CTC in all nonfeedstock applications, Rishiroop Organics had three options: close the facility, ensure better containment of CTC in its existing process, or convert to a non-ODS process. Closing the facility was not considered as a viable option because of the strategic importance of chlorinated rubber products to Indian industry and the local economy. Better containment of CTC would still mean limited but unavoidable emission of CTC. Rishiroop Organics decided to pursue the conversion option.

Available conversion technologies were limited and subject to patents, and Rishiroop Organics experienced difficulties in technology transfer because of competition in the chlorinated rubber market. An indigenous technology using a non-ODS medium was developed by Rishiroop Rubber International Limited. This technology was introduced at Rishiroop Organics and then replicated in other plants owned by the Rishiroop Group. This technology not only eliminates the need for CTC, one of the potent ozone depleting substances, but also improves the product quality and reduces energy consumption.

In addition, the enterprise has taken extra care in controlling its process emissions and effluents, with stacks now connected to gas scrubbers to absorb chlorine and hydrochloric acid gases, and wastewaters treated to meet all local environmental standards.

Much can be drawn from the experiences of implementing the MP. In hindsight, what might have prevented country programs from serving as viable national compliance strategies from the onset was lack of the very knowledge accumulated from years of MLF implementation, and of the impetus from approaching MP obligations. The programmatic approach that now embodies the MLF's assistance to countries includes the essential elements found in the project-by-project approach—cost-effectiveness and efficiency—but also added country ownership, flexibility, and accountability. We have learned that the programmatic approach is challenging in itself but eventually facilitates “buy-in” from all country stakeholders, which is indispensable for sustainable outcomes. Furthermore, by emphasizing national ODS consumption and production reductions while turning away from the details of project

identification, development, implementation, and evaluation, the MLF Executive Committee has been able to focus on strategy and compliance needs in its resource allocations.

The next three years mark the final phase of the compliance period for Annex A chemicals for Article 5 countries. This is when the strategic approach and its supporting policies and program and project modalities will be put to the test. Efforts will shift to monitoring in the wake of investment activities, technical assistance, capacity building, and policy formulation. This will place great demand on countries. The challenge will therefore be to ensure that there is sufficient flexibility in MYAs to adjust to evolving country needs, and that the lessons learned in the evolution of the MLF's policy approaches are kept in mind.

Lessons Learned from the Montreal Protocol

The lessons from the World Bank client countries are as follows:

- The **Turkey** revolving fund demonstration project revealed that enterprises are interested and willing to participate in mixed financing (loans and grants) for ODS phaseout projects, as long as the subsidy provided by the project covers or exceeds their opportunity costs. It is feasible to design a revolving fund that is sustainable over time and that can help maximize benefits of limited MLF resources.
- From the **Mexico** chiller concessional lending pilot project—procedures developed to measure and verify electricity savings constituted a key element to guarantee that chiller producers offered the best products and stood behind them; loan conditions both in units of investment (that is, an inflation-adjusted monetary unit updated daily, based on the consumer price index), and USD were attractive to building owners, proving that a credit program in this sector is feasible. Chlorofluorocarbon losses (leaks) were much higher than anticipated. Another lesson is that products and services must be tailor-made to the needs of the private sector. Tools such as guidelines for procurement and information covering monitoring, reporting, and certification have to be in place to assist participating enterprises. It is important that the implementation unit, preferably a local partner institution, has a clearly defined role and a lean organizational structure. Administrative procedures must be simple and flexible. Other key factors in the successful implementation of the Mexican program were complementary regulatory policies and the use of economic instruments (for example, a tax on CFC imports).
- From the **Chile** auction program—all sizes of enterprises can afford to participate, giving rise to a more effective use of MLF money because companies are forced to find the best value for conversions. Success was measured in tonnes of CFC eliminated and at the lowest costs for removal.

- In **Thailand**, the demonstrated benefits arising from the Bank-developed innovative voucher system approach are (i) more service shops have been identified; (ii) transactions are shared by equipment suppliers and minimized overall; (iii) more shops are willing to come forward; (iv) shops have an enhanced sense of ownership of the equipment provided; and (v) the program has introduced market competition (more suppliers and lower prices). A special noteworthy benefit is that this approach has greatly improved the government's image and private sector confidence in government institutions. A testimonial to success was that a voucher distribution ceremony attracted hundreds of service shop owners.
- In **Colombia** the Bank implemented three umbrella projects in the refrigeration, foam, and mobile air conditioning sectors focused at the sector level, which made it possible to address many small beneficiaries under the same operation and to take advantage of economies of scale. This gave the government enormous flexibility in the choices of technologies and technical assistance that could be provided to beneficiaries under the same MLF grant. These projects also contributed to accelerating the pace of conversion of each sector.
- In **China** a key lesson learned was that capacity built in phaseout plan delivery can and will enable and accelerate program delivery in other program areas. For example, the experience gained and capacity built by the consumption phaseout plan gave staff the knowledge, experience and thus, the capacity, to accelerate the CFC production phaseout schedule. They did this taking into account both supply and demand management needs. This action will have a global impact on enhancing the phaseout schedule for CFCs.
- From **Russia and the ECA region**—the most significant lesson learned in relation to future ODS phaseout initiatives is the market-related transboundary impacts that can occur. Undertaking a parallel consumption and production phaseout across the principal supply and consuming countries in the region had the beneficial effect of ensuring that phaseout would indeed occur rapidly, simply because the traditional ODS producers were to be closed on a preestablished date known to all. This allowed some planning of banks to sustain enterprises still using ODS until the enterprises completed conversions, and effectively forced others to do so with their own resources—albeit sometimes to transitional ODS, as noted previously.
- Regarding integrated program management the Bank has learned that financial assistance alone will not eliminate ODS consumption in developing countries. A locally tailored comprehensive slate of measures (a plan) is needed that takes into account local customs and culture to address first, awareness raising, so that the private sector as well as the public sector is fully aware of the issue; then supply-side and demand-side management measures that require both policy and regulatory adjustments; and assembling and developing both individual and institutional capacity to manage the

program effectively and sustain the results. Since the projects are highly technical, technical assistance is also required to facilitate conversion and phaseout. This required an integrated program management approach that the Bank was able to provide in partnership with client countries. As an example of integrated program management, China's total phaseout of halon 1211 was achieved through addressing both production and consumption simultaneously. This was facilitated along the way by a combination of investment activities, policy measures, technical assistance, and awareness raising.

Transferring Technology, Learning, and Lessons

Technology transfer implies not only an act of empowerment but also an act of power sharing. It is always a learning experience and must be completely satisfactory to all. It is predicated on relationship building and remaining cognizant of potential cultural constraints or barriers. With these needs in mind, the Bank has developed and put into effect standardized programs and procedures to transfer both lessons and learning. For example, the Bank hosts workshops periodically in the various regions of the world where countries can exchange views and experiences. The Bank also hosts training and learning transfer workshops in Washington, DC—for example, the annual Financial Agents workshop, in which program officers and government officials from Bank client countries come to exchange experiences and lessons learned.

Japan, in cooperation with the United States, has also exercised leadership in transforming markets to phase out ozone-depleting substances through accelerated technical development, encouraging the selection of environmentally superior technical options, and reducing costs in both developed and developing countries. One example of this is the 1996 phaseout of ODS in household refrigerators in Thailand. This phaseout was achieved only one year later than in the developed countries, despite the fact that developing countries had until 2010 to achieve the phaseout according to the MP.

Evolution of Key Policy Milestones Under the Multilateral Fund

Meeting	Date	Policy Action
5	Jun 92	First Country Programs identifying needs and required projects
16	Mar 95	Incremental cost categories and cost-effectiveness threshold values adopted for five sectors
17	Jul 95	New categorization of countries: LVCs
19	May 96	Production sector guidelines initiated—technical audits, focusing on closure, form for sector phaseout plans, subgroup on production New modality approved for delivering grant assistance: umbrella project
20	Oct 96	Project preparation funds approved for a new project modality: sector plan (production and consumption of halon in China) New approach for LVCs—First RMPs endorsed New annual monitoring on status of compliance
23	Nov 97	First production sector projects (halon) addresses supply and demand Guidelines for RMPs approved
25	Jul 98	Terminal umbrella project adopted as project modality
27	Mar 99	First project prep for developing a national CFC phaseout program First CFC production sector closure project approved
28	Jul 99	Executive Committee decides to encourage implementing agencies and Article 5 governments to develop umbrella projects and sector approaches Countries asked to look at baseline data in comparison to projects and sectors
29	Nov 99	Executive Committee's first discussion on strategic planning and the need to link compliance to strategic national phaseout approach
31	Jul 00	Draft guidelines for country program updates requested by Executive Committee RMPs should be reassessed for facilitating compliance; additional funding provided
32	Dec 00	Draft framework on the objectives, priorities, problems and modalities for strategic planning of the MLF in the compliance period (Decision 32/75) Annual updates of status of country compliance required

Meeting	Date	Policy Action
33	Mar 01	Framework on Strategic Planning adopted. Countries to have national strategic plans with goals, policies, and actions necessary for compliance
35	Dec 01	<p>New funding policies to match framework—performance based, accountability, country responsibility</p> <p>First national CFC phaseout plans approved in four countries</p> <p>Country program updates are encouraged for preparing national strategies for compliance (which can become the basis for RMPs or performance-based plans)</p> <p>Permanent aggregate reductions (from a starting point based on Options 1 or 2) (Decision 35/57)</p> <p>Country Assistance Program approved for policy assistance through UNEP</p> <p>Additional support to NOUs approved</p> <p>Phaseout assigned to noninvestment activities (with a C.E. of \$12.10/kg)</p>
36	Mar 02	<p>Issues in putting Strategic Planning Framework into operation presented</p> <p>Countries urged to move away from a project-by-project approach</p>
37	Jul 02	Resource planning (compliance-oriented model) and three-year business plans
38	Nov 02	<p>Model three-year phaseout plan on remaining consumption and coverage</p> <p>Terminal Phaseout Management Plans can now be considered</p> <p>Performance-based phaseout plan guidelines approved, based on experience from first NCPPs</p>
41	Dec 03	Flexibility in implementing RMPs because of changing circumstances



THE WORLD BANK