

The Introduction and Adoption of Low-Carbon Technology through the Implementation of the Montreal Protocol

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21 percent of UNIDO Montreal Protocol projects are implemented in the MENA region. In northern Africa, UNIDO assists: Algeria, Egypt, Libya, Morocco and Tunisia. Whereas in the Middle East, the assisted countries are: Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria and Yemen. The type, number and scale of projects differ from country to country. The projects range from national phase out plans (NPP) aimed at phasing out the use and production of ozone depleting substances (ODS) in the refrigeration manufacturing and servicing sectors, to phasing out ODS applications in the solvents and aerosols sectors, as well as eliminating the use of methyl bromide, an ozone depleting fumigant.

The Montreal Protocol is a good example of a functioning compliance-driven agreement. Binding countries to ODS phase-out schedules and reduction targets has given weight and momentum to the environmental cause. Moreover, the concerted commitment to protect the ozone layer from both the industrialized and developing countries has been one of the main ingredients for the Protocol's success. From the early days of its implementation in the 1990s, the Protocol has been able to guide countries to cleaner and greener technology. The selection of alternatives to ODS has always taken energy-efficiency into account, however in recent years, the focus on introducing low-GWP alternatives has heightened. This was first formally discussed at the 19th Meeting of the Parties (Decision XIX/6).

Since 1993, UNIDO has implemented around 1,340 Montreal Protocol projects, phasing out some 70,290 ODP¹ (ozone depleting potential) tonnes. Moreover, the introduction of green ODS-free technology has garnered greenhouse gas emissions reductions of around 359 million tonnes of CO₂eq² from UNIDO MP projects alone. In order to account for the climate change benefit, yielded from the direct phase out of CFCs, which are ODS with high GWP, and the introduction of energy-efficient technology, the Executive Committee of the Multilateral Fund set up a Multilateral Fund Climate Impact Indicator (Decision 59/45, Addendum 62nd ExCom Meeting). Therefore, since 2010, all new project proposals have to include a climate benefit impact to fully integrate the phase-out of ODS with climate change concerns. The inclusion of climate benefits is crucial for securing additional sources of funding to help finance the projects, e.g. through the carbon market, other environmental funds, etc. and to ensure for green and sustainable solutions.

The Montreal Protocol's newest programmes include the phase-out of HCFCs (hydrochlorofluorocarbons). UNIDO submitted an HCFC phase-out management plan (HPMP) for Macedonia at the 60th Meeting of the Executive Committee, which was the

¹ Figure as end of 2010

² Figure as end of 2010

first HPMP to be submitted by an implementing agency of the Multilateral Fund. In the MENA region, UNIDO has been developing HPMPs for the majority of the assisted countries listed above and is looking forward to submitting most of these plans at 65th Meeting of the Executive Committee, in November 2011.

Another programme is the disposal and destruction of ODS stockpiles, and obsolete equipment containing these substances. ODS-destruction projects, including waste management and disposal elements, are being developed for Algeria and Lebanon. The lessons, which can be drawn from these demonstration projects, will be used as markers for similar projects in the region.

Chiller replacements projects are good examples of how the protection of the ozone goes hand in hand with reducing greenhouse gas emissions. UNIDO is conducting chiller replacements in Egypt and Syria. The demonstration project in Egypt is part of the African regional project, whereas the one in Syria is intended to demonstrate the functionality of chiller replacements in West Asia. Both projects aim at replacing chillers charged with CFCs with ODS-free, energy-efficient models. The financing of chiller replacements were sought through subsidies, co-financing from chiller owners and involvement of financial institutions. The replacements in Syria were co-financed by chiller owners. Retrofitting chillers was technically feasible in some cases but proved to be economically unviable, as the main components such as the compressors would have to be replaced. In Egypt on the other hand, where there are considerably more CFC-chillers to be replaced, chiller owners can acquire co-financing through loans from the National Bank. By monetizing energy savings from the newly installed chillers, owners are able to repay their loans. This method of payment is still in its initial stages, therefore the mode of operation and security for both parties is yet to be assessed in the practically. As a whole, another mode to encourage the procurement of green sustainable technology would be through tax incentives, e.g. tax relief on the procurement of zero ODP and low GWP alternatives.

Converting production lines of refrigerator, freezer and air-conditioning manufacturers is somewhat more complicated but would benefit from similar government policies as discussed above. Phasing out HCFCs in the manufacturing sector has to by-pass HFC (hydrofluorocarbons) or other potent greenhouse gases to ensure for an environmentally sustainable solution. However, zero ODP and low GWP alternatives, such as hydrocarbon technology would need higher investment capital due to added safety requirements. Hence, subsidies in the adoption of new technology for the manufacturers may be useful. Likewise, for end-users of these refrigerators and freezers, government subsidies may foster confidence and ensure for market share of the new technology. The technology for the production of foam, used for insulation and upholstery can be tackled in the same way. Guidance from the governments in the region may also be required when searching for suitable refrigerant alternatives for air-conditioning applications, as these are still under discussion. Due to the high ambient temperatures experienced across the majority of the countries in the region, this issue is of utmost importance. Conventional refrigerants charged to European air-conditioners, such as R410A for example, may not be suitable for countries in the MENA region.

The introduction of low-carbon technology is thought to be more straightforward in the manufacture of foams. There are a number of known alternatives, such as HFC-245fa and HFC-356mfc (moderate GWP), hydrocarbons and CO₂/methyl formate (low GWP). A number of demonstration projects showcasing the use of the latter two alternatives have yielded positive results. However, there are still a number of concerns. With regards to hydrocarbon technology for example, smaller companies are unable to afford the added expenses in relation to increased safety measures. The use of methyl formate on the other hand is cheaper but relatively novel, which leaves room for a few uncertainties at this point in time. However, the willingness of individual countries to opt for ozone and climate-friendly alternatives enables relatively new technology to gain practical credentials, giving rise to rapid progress in the development of technology.

In the same way that technology is regulated, good practices in servicing refrigeration units, demonstrated in MP projects, should be enforced through policies minimizing ozone-depleting refrigerants being released into the atmosphere, which inadvertently accelerates the decrease of energy-efficiency of the unit being serviced. Another area in need of policies is the collection and transport of ODS and ODS-containing equipment for destruction. The share for ODS disposal projects financed under the Multilateral Fund only accounts for the destruction itself, excluding collection and transportation costs. Depending on government involvement, this aspect is vital for ODS to be properly extracted from obsolete equipment and transported to destruction centers, which are not available in all countries. Transportation, possibly via other countries, further calls on enforcement of policies pertaining to customs.

The phase-out of ODS also encompasses the agricultural industry. The use of methyl bromide, a strong ozone depleting fumigant for soil and stored goods, is being replaced by non-chemical alternatives. In Algeria, Egypt, Libya, Morocco, Tunisia, Iraq, Jordan, Lebanon, Oman, and Syria farmers are introduced to steam pasteurization, soil-less cultivation and grafting, as feasible alternatives to soil fumigation with methyl bromide. These methods are environmentally sustainable and yield just as many or more sellable crops for the farmers.

The Montreal Protocol is calling for the transfer of all-round environmentally-friendly technology, i.e. technology that protects the ozone layer and the climate. In terms of the overall trend under the Montreal Protocol, there is a steady convergence of high-end technology being employed in industrialized and in developing countries. UNIDO for example, has tried to avoid the use of transitional alternatives and has opted for the most sustainable options available, i.e. offering solutions which are ODS-free and reduce greenhouse gas emissions. Ensuring beneficiaries are equipped with technically viable machines and methods, production quality and capacities are not impaired. In the same way that technology transfer is provided with capacity building activities, decisions of the Meeting of the Parties and the Executive Committee of the Multilateral Fund must be supported by practical Government policies.