International Law and Environmental Policy

As the Montreal Protocol (MP) and subsequent negotiations ratcheted down requirements for industry to move away from ozone depleting substances (ODS), industry was involved and largely cooperated with the regime through the Technology and Economics Assessment Panel (TEAP). In order to ease the rapid phaseout of useful ODS, the concept of an essential use exemption (EUE) was adopted. On balance, the use of these EUEs has been as it was intended. The phaseout of methyl bromide (MeBr), on the other hand, has been tortuous. The unique commercial applications of MeBr, coupled with more shrewd tactics from producers and users of this chemical, and a diluted public sentiment can explain the differences between its phaseout and that of other ODS[1]. MeBr has "unique a highly effective broad-spectrum capabilities as a fungicide and pesticide" and was thus "virtually indispensable" for a large portion of high-value domestic and global agricultural trade. Indeed, many developed countries mandated its use to quarantine imports from developing countries (Benedick 1998). In contrast, other ODS could not match MeBr in terms of cross-national utility in such a fundamental industry as food production.

The industries producing ODS were initially not receptive to the prospect of ozone regulations, which were looming large. The ozone issue was kept salient in the US public's mind by the media and NGOs; there was not a similar pressure in Europe (Benedick 1998). During the 1970s, the industry had a stranglehold on knowledge of substitute chemicals. Even groups such as the World Resources Institute had pessimistic pre-MP estimates about reduction in ODS, saying cuts of 1/3 would be possible in five years (Brunnée 1988). Before the negotiation of the MP, ODS producing firms played

[1] In this paper, the term ODS is used to refer to ozone-depleting substances other than methyl bromide.

defensively, developing enough knowledge about substitutes to have a fall-back plan, but they did not share enough information to make alternatives appear feasible and thus increase the likelihood of regulation (Parson 2003). In the build up to the Vienna Convention and the MP, industry was also able to dispute relevant science, thus deflecting the charges of ozone advocates. With this control, ozone advocates were at a loss to challenge industry positions. This challenging of science is a technique that was later employed by MeBr producers (and opponents of greenhouse gas regulation).

Because of domestic restrictions on ODS in the United States, ODS producers came to understand that ODS were on the way out; US producers responded by both 1) resurrecting and accelerating research into ODS alternatives, and 2) joining in calls for international regulation, so that their competitors would be subject to the same costly regulations (DeSombre 1999). In contrast, MeBr producers did not accept the inevitability of regulations, despite a clear mandate for EPA to regulate MeBr. Furthermore, the creation of substitutes for ODS – and the subsequent demand for those products – was an incentive to ODS producers to support the ozone regime (DeSombre 1999). Again, MeBr producers seem to have taken a different path. Alan Miller noted that "the competitive incentive brought forth by a recognition that those companies who develop the best alternatives will capture a multi-billion dollar world market" created strong pressure for innovation (quoted in DeSombre 1999). This captive market gave ODS producers the assurances necessary to invest in development of alternatives (DeSombre 1999).

In the initial MP negotiations, the European Community's negotiating position was more influenced by industry than was the US position; although this industry dominance may have slowed international progress towards agreement, it may have also allowed pressure to build for a stronger agreement (Benedick 1998). Extrapolating from this case to the future, it may be that industry efforts to preserve MeBr could lead to stronger restrictions than if MeBr users had not pushed against MeBr controls so strongly. However, it should be noted that in the case of MeBr, producers had strong influence in both the US and EC.

There was a rapid move away from the deadlock that had characterized efforts to protect stratospheric ozone. As argued by Parson (2003) and others, industrial support for this agreement was not motivated by secret discoveries of ODS alternatives. Rather, the following factors accounted for the change in diplomatic landscape: incremental institutional momentum begun by the Vienna Convention, a change in ozone advocates' strategy that protected them from charges of hypocrisy, an authoritative scientific assessment by NASA, and fortuitous leeway given the US State Department. At the end of day, the ODS industry found itself fitted to a Procrustean bed, one that it had partially made.

The Vienna and Montreal agreements, designed for adaptive updating, have created and used existing systems to motivate the ODS industry to reduce and sometimes eliminate production of ODS (DeSombre 1999). One such mechanism is that of expert panels convened to make recommendations to the Meeting of Parties (MoP). The Technology and Economics Assessment Panel (TEAP) was directed to determine what

reductions in ODS were feasible. For example, the TEAP report for the 1992 MoP in Copenhagen stated that it was technically feasible to nearly eliminate controlled ODS in the industrialized countries by 1997, although some substitutes – such as for MDIs – were not yet available (Benedick 1998). Although largely accepted as unbiased, the TEAP's recommendations have been criticized. Environmental groups, for example, disagreed with the TEAP findings when TEAP concluded that HCFCs – themselves ozone-depleting – were a necessary interim step in phasing out more dangerous chemicals (Parson 2003).

Certainly, the involvement of industry representatives in the TEAP and other panels has been beneficial, making it more likely for industry to pursue technologies and policies that are consistent with the spirit of the MP (DeSombre 1999). By allowing intra-industry collaboration, TEAP helped firms to solve technological challenges, while at the same time enabling them to solve environmental problems, and providing benefits to the international regime (Parson 2003). One of the keys to successful adaptation of a regime to new technologies is redundancy in expert panels; this overlapping will prevent prejudice and charges of partisanship.

The MP regime's goal – and indeed the goal of any environmental regime – is to make actors take actions that ran counter to their self-interest in the pre-regime era; firms will respond with changes to maximize their net present value (Bohm 1997). It is easier for firms to accomplish this when their self-interest can be clearly defined, and this occurs when there are clear signals about coming regulation (DeCanio & Norman 2005). According to former German Environment Minister Klaus Töpfer, industry will meet

clear deadlines, and will conversely take as much time as ambivalent deadlines give them (Benedick 1998). The MeBr industry's truculence has borne this assertion out. Industry does indeed balk at unclear signals, as was the case with the Significant New Alternatives Program (part of the 1990 Clean Air Act). The threat of having regulatory approval revoked would discourage industrial investment in new technologies (Parson 2003).

Bans on products and processes "may be an efficient policy instrument when there are close substitutes at low additional cost" (Bohm 1997). The MP instituted bans when there were not available substitutes; as Bohm argues, this regime was not economically efficient. There were too many uncertainties to calculate social marginal cost and benefit curves for reduction in ODS use, so a theoretically efficient point could not be found; instead, the decisions were purely political (Bohm 1997). But a balance must be struck; if regulations push technology too much, substitutes may not be available, and non-parties could increase production to fill the void (Benedick 1998). Furthermore, developing substitutes is a task more suited to larger firms with strong R & D capabilities. This imbalance is due to commercial scale-up being risky and costly; large firms can hedge their bets, while smaller firms must put all their eggs in one basket (Parson 2003).

At the 1992 Copenhagen meeting, at which an accelerated phaseout had been settled upon so soon after meeting in 1990 in London, the parties agreed to allow limited essential use exemptions (EUEs) in order to prevent economic disruption. The EUEs were to be decided on a case-by-case basis. Although some European countries and environmental groups argued there were no essential uses for ODS, the US and others

used TEAP's findings of socially important uses of ODS for which substitutes were not available. Even so, the US acknowledged that the EUE system should be kept to a minimum, in order to prevent abuse as a loophole (Benedick 2003).

Essential uses are defined in Decision IV/25, taken at the fourth MoP in 1992 at Copenhagen: "A use of a controlled substance should qualify as "essential" only if: (i) it is necessary for the health, safety or is critical for the functioning of society (encompassing cultural and intellectual aspects); and (ii) there are no available technically and economically feasible alternatives or substitutes that are acceptable from the standpoint of environment and health." Furthermore, production and consumption of controlled ODS for essential uses are allowed, provided that "all economically feasible" measures have been taken to reduce the ODS' use and emission, and that there are not stockpiles of the ODS (UNEP 2003). In line with their phaseout dates, developing countries are given a grace period to submit EUEs. Health and safety are paramount to the definition of essential uses; in contrast, the criteria for critical use exemptions for MeBr, which are discussed later, are lenient.

The first iterations of the EUE process indicated that these exemptions were not to become a debilitating loophole. At the fifth MoP (1993), fifteen countries applied for halon EUEs; nine withdrew nominations after consultation with TEAP. The remaining six were all turned down because the needs could be met with existing stocks of halons (Benedick 1998, UNEP 2003, p. 113). In 1996, the Russian nomination for halon 2402 was granted, because they had phased out other halons, had reduced halon 2402 production to below 10% of 1986 levels, there were no stocks available for use, and

because the essential use was for fire protection in nuclear power stations and famous museums (Benedick 1998). Subsequent halon applications followed this precedent, as there were both technical and economically feasible alternatives and existing stocks (UNEP 2003, Decisions V/14 & VI/8).

With regard to non-halon ODS, many governments requested EUEs for CFCs, CT, and MC one year before their phaseout in 1995, but TEAP approved only three uses: metered-dose inhalers (MDIs), the NASA space shuttle, and laboratory uses (Benedick 1998). MDI exemptions accounted for 99% (by weight) of ODS exemptions; because the ODS in MDIs are "safe, effective, and inexpensive," drug companies and medical professionals involved themselves in promoting their continued use (Benedick 1998). Overall, the EUE system was "administered sparingly and with discrimination" (Benedick 1998); the culture at the MoPs was one of restraint, as governments often denied company applications before they reached TEAP, and as TEAP was willing to deny applications from heavyweights like the US (Benedick 1998).

There are, ostensibly, benefits to those that develop technology to make EUEs obsolete. For example, in Germany, Hoechst developed an HFC-based MDI; in the US, 3M developed an HFC-based MDI that was approved by health regulators in 20 countries by 1996. These developments led TEAP to set 2005 as a goal for the end of MDI EUEs (Benedick 1998). Pressure by one firm that had developed a non-ODS MDI to have TEAP revoke MDI exemptions without delay met resistance from firms whose non-ODS MDIs were still in development, thus injecting a bit of politics into TEAP deliberations (Parson 2003). However, the threat of the end of ODS-based MDIs was not enough to

spur the transition on its own; TEAP worked with the International Pharmaceutical Aerosol Consortium to promulgate transition strategies (including the following: future EUE applications should show research into alternatives, education of medical professionals and patients about alternatives) (Benedick 1998). At the ninth MoP, developing countries noted that they might not make the switch to the new MDIs quickly, unless they were able to license the new technology at reasonable prices (UNEP 2003). As the end of ODS-based MDIs did not drive the market to substitutes, the threat for MeBr phaseout has not been sufficient to force innovation from producers nor move users to other substances.

Both the temporary stay of execution for ODS represented by EUEs and bans on ODS have the effect of granting some form of regulatory blessing. This blessing can take place on two scales – at the level of firms and internationally. Firms that have developed substitutes for ODS are granted access to markets (both domestically and internationally), while old ODS technologies are excluded.

Regarding technology, developing and industrialized countries were at cross-purposes during negotiations. The former wanted affordable access to new technologies, while the latter's firms wanted to control new markets and thus sought to preserve patent protection (Hunter et al. 2002, p. 551). An early cost estimate by the Open Ended Working Group gingerly (and perhaps disingenuously) linked financial support and technology transfer, saying that technology transfer "may also require direct purchase of technology from the private sector in the developed countries" (Markandya 1990). Thus, the need for technology transfer loomed large in the MP and its subsequent revisions.

Also, fear of establishing precedent for the upcoming Rio summit made negotiations about funding difficult; in the end, the agreement specifically stated that it was not to influence future multilateral environmental agreements (Hunter et al. 2002, p. 550). In considering their position during the negotiations, developing countries foresaw the following economic problems: 1) increasing price for ODS as their supply dwindled, 2) substitute chemicals likely to be more expensive, 3) costly licensing fees for new technologies, and 4) capital costs to upgrade or replace old equipment (Benedick 1998, p. 149).

Indeed, developing countries did not wish to forgo technologies that had benefited the industrialized countries, nor did they wish to pay for more expensive substitute technologies - especially since the firms that would profit were those that had started the problem (Hunter et al. 2002, p. 550). The World Intellectual Property Organization found that governments usually only able to force their constituents to give up intellectual property rights in times of war (Andersen & Sarma 2002, p. 118). The Indian Environment Minister claimed that industrialized country governments were not powerless to force a technology transfer; other developing countries feared that being a technology-taking state would guarantee them outrageous prices and "environmental colonialism" (Benedick 1998, p. 189).

Although the agreement reached did not match the demands of "preferential and non-commercial transfer", as had been requested by Mexico (Benedick 1998, p. 157), the agreement regarding technology transfer was not binding: it called for parties to take all "practicable" steps to transfer technology "fairly and most favorably." However, this

agreement was notable, for it was the first in which industrialized countries acknowledged that protecting the environment would require assisting developing countries (Hunter et al. 2002, p. 551). This vague language to encourage technology transfer has persisted in MoP decisions. Decision I/4 called for good faith efforts, VII/4 recognized the importance of financial assistance and technology transfer, and VII/26, VIII/7, and IX/14 all require parties to take steps to make technology transfer better (UNEP 2003, p. 165, 250+). As of 2002, though, there were indications that non-patented, not-in-kind substitutes have been more important than originally anticipated, but that it was still not clear if all countries would have access to competitive markets for ODS substitutes (Andersen & Sarma 2002, p. 231).

At the 1992 Copenhagen MoP, in which MeBr first appeared on the agenda, the "powerful" agricultural interests threw their weight around. Furthermore, although NGOs, the media, and the public made ozone a hot topic in the years leading up to MP negotiations, by the early 1990s, the public's attention was being divided amongst other issues, many of which were addressed in 1992 at Rio.

The US was world's biggest producer and user of MeBr, and the Clean Air Act required the EPA to ban manufacture and import of any substance within seven years of determining its ODP to exceed 0.2 (Benedick 1998). To prevent a competitive disadvantage to US agriculture, US negotiators were aiming for a 2000 phaseout of MeBr (Benedick 1998). Though it was widely regarded as indispensable, the Netherlands had banned MeBr due to worry about toxicity in soil and groundwater, and its agricultural industry had not suffered (Benedick 1998). Within the US, the USDA and industry

opposed MeBr controls (Parson 2003). The two other MeBr producing countries worked against its control as well; Israel rallied support amongst the developing countries and France weakened the EC's stance. Unlike previous negotiations, agricultural interests in France and the US split with their government positions to sow opposition to MeBr controls (Benedick 1998). Countries that used MeBr, meanwhile, united to delay action, pointing out scientific uncertainties (e.g., although it was generally agreed that MeBr's steady state and long-term ODP was 0.7, and 5-7, some estimates were as low as 0.09) (Benedick 1998).

TEAP's 1994 assessment of MeBr alternatives was different from the first TEAP assessment of ODS alternatives: the panel included MeBr producers who were not planning to produce substitutes for their ozone-depleting product. There was acrimony amongst the group; this lack of good faith had been the reason for excluding ODS producers from the first ODS technical options meeting (Parson 2003). Even with this inside track, MeBr producers were active in promoting MeBr and lobbying TEAP, to the point that TEAP complained, "Persistent criticism of the science … by advocates of continued methyl bromide use discourages investment in alternatives" (Benedick 1998).

In 1995 negotiations, the introduction of a "critical agricultural use exemption" for MeBr helped to weaken developing country resistance to listing MeBr (Benedick 1998). The 1996 TEAP report evaluated the idea of critical use exemptions for agriculture, and found that MeBr merited such consideration because of its "peculiar uses and properties" that distinguished it from other ODS: it had uses in specific locations, as a backup if pests developed resistance to replacements, and emergency use in pest outbreaks (Benedick

1998). Indeed, the November 1994 TEAP report could not find alternatives to take MeBr use to below 10% of 1991 use (Parson 2003). At the seventh MoP in Vienna in 1995, the language of the parties' agreement seems to contain leeway for MeBr, asking TEAP to consider "Whether alternative practices or substitutes exist that are commercially available and efficacious" (UNEP 2003, Decision VII/29). The TEAP predicted that ongoing research, experience in countries like the Netherlands, and market forces would also help countries to realize that MeBr was not indispensable (Benedick 1998).

In the face of aligned opposition to MeBr controls, even the support of Mostafa Tolba could not break the laggards' united front; the final agreement included a hortatory agreement, a 25% reduction by 2000, and a "possible" phaseout date (Benedick 1998). However, as was the case with the MP, this adaptive approach to multilateral agreements may ultimately achieve its goal. Also, scientific evidence pointing towards the importance of controlling MeBr has mounted: The seventh meeting of the Scientific Assessment Panel identified MeBr controls as the "most environmentally beneficial potential approach to further lowering stratospheric chlorine and bromine abundance" (UNEP 2003, Decision IX/21). These factors suggest that MeBr controls will continue to be strengthened in future negotiations – as happened with other ODS.

At the ninth MoP in Montreal in 1997, the critical use of MeBr was defined. MeBr use would qualify as "critical" only if it is shown that: "(i) the specific use is critical because the lack of availability of methyl bromide for that use would result in a significant market disruption; and (ii) There are no technically and economically feasible alternatives or substitutes available to the user that are acceptable from the standpoint of

environment and health and are suitable to the crops and circumstances of the nomination" (UNEP 2003, Decision IX/6). The EUEs for ODS have been granted only in applications that fit the stringent definition of health, safety, or functioning of society outlined in Decision IV/25. In contrast, the criteria to grant CUEs are economic, and thus CUEs for MeBr have been applied much more indiscriminately, including seemingly non-critical applications such as pet treats and golf courses (DeCanio & Norman 2005). With these lenient criteria, CUE requests for MeBr are approved much more frequently than are EUEs. At the 2002 MoP, CUE approvals were for an amount about equal to 31% of 1991 MeBr use (DeCanio & Norman 2005). This is much larger than the fraction of pre-MP ODS use allowed by EUEs.

The case of MeBr highlights key points for multilateral agreements. The original ODS were reviled by the public, and thus legislation in the US was able to send a strong signal to industry, which then had a vested interest in ensuring regulations would be applied to its overseas competitors as well. The original TEAP meetings did not include representatives of industry; when included later, industry was cooperative. These two factors were not met for MeBr – public interest was spread across other issues, and there were no existing regulations to encourage US MeBr producers to lobby for international regulation. Included in the initial panel meetings, industry was uncooperative but faced little punishment, as the issue had faded from the public agenda. Such animosity is to be avoided, as government initiatives brought not in an adversarial but in a cooperative spirit, can remove barriers to industry innovation; indeed industry often recognizes the benefits of this innovation (Cook 1996). When control of MeBr was proposed, producers of the chemical quickly circled their wagons, having learned a lesson from watching the

ODS producers. The MeBr defenders questioned science and lined up support from other countries. They howled about the difficulty of cutbacks; however, past experience shows that such complaints should be taken with a grain of salt.

Nonetheless, the agreement to agree to future cuts in MeBr, coupled with stronger science pinpointing the dangers of MeBr bodes well. Experience with the other ODS in the MP indicates that further modifications to MeBr use will be in the direction of further restriction. Eventually, the market for MeBr will be too small and too uncertain for most users and producers, prompting them to switch to alternatives.

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