

Technology Transfer and National Capacity Enhancement

By Katsuo Seiki*

Up to now, *Environmental Technology Transfer* has shown slower progress than expected, in spite of the global consensus on its importance.

Whatever the environmental issues we face today, it is widely recognized that promoting worldwide application of environmental technologies can be the answer to such issues. For example, the wider application of energy efficient technologies and desulfurization and denitrification technologies available in developed countries may significantly advance the mitigation measures for global warming or acid rain which require immediate world-wide action. The actual deed, however, does not follow the recognition. What can be done to quicken the transition from recognition to implementation?

At the Rio Summit in 1992, the following two issues drew special attention in Agenda 21 discussion on technological cooperation.

First was the provision of preferential and concessional financial assistance offered from the developed countries to the developing countries. Second was the compulsory acquisition of intellectual property rights. In actual debate, the pros and cons of each issue stimulated great contentions between the parties and no clear consensus was reached in spite of heated discussions that continued for more than three days.

It could be that the platform of issues was not really productive. To discuss contentious issues where there are always winners and losers may not be as constructive as the discussion of issues where a win-win situation is possible. An important thing may be that we must not limit the discussion to what roles national governments can take, but rather to consider other stakeholders of environmental issues such as local administrations, international institutions, private sectors, and NGO, and the extent to which they can contribute to the promotion of environmental technology transfers.

Following the Rio Summit, the discussion of environmental technology transfer was conducted on a much broader scope.

First of all, BCSD published the book entitled *Changing Course* around the time of the Rio Summit, stressing its view that cooperation between private businesses through direct investments would be significant in promoting environmental technology transfer. The World Bank and GEF, also, emphasized the importance of market transformation initiatives in recipient countries. TERI's continued efforts have been embodied in its key proposals focused on capacity building in recipient countries. One example of such work with a new viewpoint was the report entitled "Missing Link" jointly prepared by WRI and GISPRI in 1993. It listed the following five items as *fast action initiatives*.

1. Establish a forum for dialogue on technology cooperation,
2. Promote voluntary international standards for environment

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- management and technology cooperation,
3. Expand technology cooperation via networks of globalizing enterprises,
4. Establish innovative intermediation to support technology cooperation,
5. Demonstrate technical and environment capacity building through comprehensive model projects.

These five fast action initiatives may need some elaborating today. But, as premises for effective technology transfers, the following consenses are developing through various studies on environmental technology transfers (cooperation).

First, environmental technology transfers (cooperation) can be implemented in a form of mutual cooperation between private businesses acting as a donor and a recipient. In this case, the key players are in the private sector. The public sector, mainly national governments, takes on a supportive role by facilitating such transactions.

Second, in the financial aspects of environmental technology transfers, the private sector can also take a greater role than the public sector, as its amount of direct investment and other capital investment is many times greater than that from the public sector, such as ODA. Public funds can be seed-money to direct the flow of private sector funds, for example, or more appropriately to finance the areas where it is difficult for private capital to reach.

Third, it is widely recognized that transferable technology needs to be extremely site-specific. Not many of technologies prevailing in the donor's market have established themselves in the recipient's market in the same form. The key point is that the transferring technology must be adaptable to the recipient's market situation, its infrastructure, and distribution of capital and resources. This is the basis of so-called "appropriate technology." Such reasoning has not yet been fully developed, but the only way to determine the adaptability of a certain technology is to examine it, sector by sector and site by site.

Fourth, mere transfer of technology itself will be worthless unless it is packaged with the building of capacities to utilize such technology in recipient countries. One quite convincing argument is that what is transferred through technology transfer is not only the technology itself but the capacity to use it. For the past several years, MITI of Japan has implemented several initiatives for environmental technology transfers exemplified by the so-called "Green Aid Plan." The objective of this plan is to realize the transfer of R&D capacity through the joint development of appropriate technology, as example, in the case of joint research on a simple desulfurization system carried on with the Chinese government. The ultimate goal of National Capacity Enhancement can be the nurturing of local environmental industries. Of course, R&D capacity building itself is not sufficient to meet the ultimate goal. The critical issue can be the commercialization of technologies, leading to the development of local industries in the recipient countries.

Fifth, to build a structure of national regulation and systems in recipient countries it is vital to utilize environmental technology transfers commercially feasible in recipient countries. Sufficient market demand for such technologies and products should be promoted in the recipient market. It is often the case, however, that the demand is suppressed in

the recipient market by low energy prices, lenient enforcement of environmental regulations, and less priority placed on environmental issues among policies and measures. The recipient countries may have already introduced the initiative to transform a market with corrective measures in a particular case. Nonetheless, the extremely important matter is that the recipient countries and their industries will work on these issues of industrialization and capacity building, and present some form of commitment to introduce initiatives and time-tables in the future.

Based on these views, many studies are being carried on today. GISPRI is undertaking a joint study with Japanese experts to develop practical measures for the promotion of environmental technology transfers in the Asia-Pacific region, and hopes to publish the result by July of this year. With the COP III being held in Kyoto this December, the immediate prevailing issue of importance is the progress in implementation of the so-called Climate Technology Initiative. While the conclusion of our study remains to be seen, I would like to propose four areas that require further study.

First is the function of information intermediary. Recently, several important action plans received attention in the provision of environmental technology information, such as Green House Gas TIEs of IEA, and database formulation at UNEP/IETC. Also, in April of 1997, APEC Virtual Center will be opened as a source for environmental technology databases giving easy access to highly professional and specialized information. Regarding the supply of environmental technology information, the field study demonstrated a greater need for "information for proven, established, reliable, and low cost technology" and "information to access relevant technologies." The obstacles in conventional information supply initiatives include inconveniences in accessing information. Furthermore, many issues must be addressed in order to use environmental technology information effectively. Examples include: the accumulation of information necessary for project analysis, such as cost-benefit information and know-how in carrying out projects; the introduction of query and reference functions and consulting services; and the aid to build communication infrastructure in recipient countries.

Second, finance. As I already mentioned, it is necessary to introduce some form of regulatory reform to allow the utilization of multilateral public funds such as ODA and GEF as seed-money to focus the private sector's direct investment.

Another issue in fund procurement is the difficulty of directing funds to the environmental investment of small to medium businesses in developing countries (such as TVEs of China). For this, so called two-step loans such as Japan's Yen Loan can be considered as an effective instrument. Recent examples include around a 5 billion yen loan advanced to the Development Bank of Philippines (DBP) for the prevention of industrial pollution. Based on this loan, DBP offers loans in Philippine pesos as a part of national financial assistance system. Similar measures are planned for other Asian countries. This can be an effective instrument in utilizing public funds.

From a different perspective, there are international mechanisms, such as Joint Implementation, under development through the process of implementing the Convention on Climate Change Mitigation. Joint Implementation can be instrumental as a new channel to increase the flow of funds

in environmental technology transfers. Allowances such as emission rights can be a form of asset for recipient countries, and may induce a new flow of funds based on such assets. Various institutions are conducting studies on this issue in order to determine the most viable emission trading system. There is a compelling need to construct an effective system.

Third, capacity building, especially the issues of education and training. Although many training centers are in operation today, most of their training courses are more generalized training, and focused less on specialized or factory-based training. The Japanese system of national certification examination for pollution control managers may present a valuable insight to this issue.

Environmental management at factories tends to deal with rather site-specific and trivial daily matters. Thus, the right course to take will be the education and training of pollution control managers at factories. Ever since the start of the national examination system to certify pollution control managers, the Japanese government has nurtured such managers and leaders. Today, about four hundred thousand people have already received certification as pollution control managers. As demonstrated in such a system, it will be necessary to tailor the training and education to accommodate the need for trained factory managers.

Finally, the establishment of institutions to provide information access, financial assistance, consulting services, etc., for regions and parties to which environmental technology transfers may be hard to realize if left solely to cooperation between private firms in the area. From Japan's experience, the supportive work introduced by the Japan Environmental Corporation was instrumental in preventing pollution from small to medium firms. It has been pointed out that it is important to establish this type of institution, although various proposals have been made already. (Example: Report of Workshop on *Stimulating Sustainable Markets for Renewable Energy Technologies in Asia/Pacific Region*, 16-18 April 1996). There have been some attempts to establish such intermediary institutions, e.g., the Asia-Pacific Center in India. The important issue is to work for the establishment of such institutions.

Conclusion

The measures I have presented so far are not necessarily exhaustive. The list of action plans can be limitless, by sectors and players. What we actually need is a forum with a certain standing for the Asia-Pacific region to study the measures of promoting environmental technology transfers. In addition to the conventional flow of ODAs from North to South, comprehensive measures of aid and cooperation, including those from South to South are required today. Players involved can be varied, also, from national governments, to private firms, NGOs, international institutions, local administrations, capital market institutions, research institutions, etc. Another matter is that each of these players must tackle issues piecemeal without joining some regional coalition. What we need today is to implement comprehensive measures through a coalition of countries and various players in the countries. Lack of a coordinating forum may be the largest obstacle for the rapid progress of environmental technology transfers. What I would like to propose here is to build such a broader system of coalition.