ALTERNATIVE POLICY OPTIONS FOR POLLUTION CONTROL: A DISCUSSION OF ECONOMIC INSTRUMENTS IN INDONESIA

David Sawyer[1]

1.0 Overview

In most Organization for Economic Co-operation and Development (OECD) countries, long established comanded and control regulations are increasingly being complimented by economic instrument (EI). [2]The realization of a society's environment quality objectives, therefore, is generally pursued by a two option approach consisting of direct regulation or CAC, and indirect approaches, or EI. Instead of dictating through CAC regulation a certain level of pollution that must be met or a certain type of technology or input that must be used, economic instruments seek to use market signals to influence the behavior of firm decision-makers. This is accomplished by providing firms with improved flexibility and incentives to seek innovative and cost-effective options to reduce pollution. As Michaelis (1992) states, the salient feature of economic instruments is their openness to individual flexibility in combination with financial incentives which channel the self-interest of the involved polluters in the socially desirable direction.

Two broad categories of EI exist; price based instruments such as taxes and subsidies, and transferable property rights such as discharge permits.

Price based instruments are corrective in nature because they seek to impose a tax on polluting activities equal to the amount of damage to society that a polluting activities causes. The more damage that causes by the activity or the more people that are affected, the higher the tax. The tax can be levied for the production and consumption of goods and services, emissions levels, as well for the use of natural resources such as water. Environmental subsidies are given for abatement activities. These are essentially incentives to promote the adoption of cleaner technologies or to influence firm behavior to adopt production inputs such as cleaner chemicals.

Figure 1
Environmental Economic Interaction

Resource Function: Environment provides raw material for inputs in production
crude oil, lumber

Discharge Function: Environment acts as a sink for by-productstions and consumption water and air pollution, hazardous waste

Public good function: Provides free goods which are directly consumedfish, air, scenic view

Location Function: Provides space and location for economic activities watershed, coastal are, site

[1] EMDI Economic Instruments Advisor
[2] Also refered to as market-Based Incentives (MBI)

Transferable property rights are characterized by the creation of markets for units of pollution, allowing firms to buy, sell, trade and redistribute pollution entitlement (Anderson 1991). These rights often assume the form of permits which grant the "right" to pollute to the holder of the permit. Granting rights for the use of environmental functions (Figure 1) is important since many polluting activities cause external damages (externalities) which are not accounted for in the price of product being produced or consumed. This lack of full cost accounting systems from market failure since many environmental goods and services are not bought and sold in a market and thus have no price. Without accurate pricing, these environmental functions will be over-utilized as there is no cost associated with usage of the resource. Transferable property right EI, aggregate levels of pollution are set with some spatial or sectoral distinction and firms are free to trade, sell and buy permits. Firms that are able to reduce emissions. Essentially, such charges require the polluter to equate the marginal cost of pollution abatement with the marginal benefit to society (as determined by the charge) of pollution abatement (Kosmos, 1989). The key point is that an aggregate level of pollution is set by the authority and firms are free to choose whether they will pay for the permit or reduce emissions and therefore escape the penalties associated with the permit.

2.0 Polluter Pays Principle

The central theme behind EI is the Polluter Pays Principle (PPP). According this theory, the full costs of environmental damage due to economic activities should be paid for by the polluter. Externalities are created when the costs of the degrading activity are not born by a polluter, and the social cost (private cost + externalities = social cost) of the activity is not accounted for. Instead, society pays for the individual/firms polluting activities, and therefore, the social cost is greater than the private cost of the activity. Based on the PPP, EI attempt to internalize the costs of pollution to those who are responsible for the damage. Ideally, the level of the EI is equal to the externality created by the polluting activity.[3]

The determination of the costs and benefits of pollution control is central to the determination of a viable EI regime. As discussed above, externalities are often created by economic activities. This is generally due to the inability of the natural environment to be priced in a market setting. In order for the true cost of environmental use to be internalized and thus born by the polluting firm, the amount of these costs must be quantified. If these costs are known, the EI can be set equal to the social cost of the pollution.

Resource valuation can be used to better understand the costs of pollution and the benefits of pollution control. With this approach, the level of the externality would be quantified (often called the damage cost function) by studying the impact of the polluting activity on the

[3] externality (EI level) = social cost - private cost

environment and other economic activities. Ideally, factors such as the degraded resources such as downstream raw material supplies, remediation measures such as the flushing of rivers and building of dikes, and the impacts on other economic activities due to changes, and the impacts on other economic activities due to changes in environmental productivity, would all be identified and quantified.

3.0 Primary Criteria for Choice of Economic Instrument

Although there are many types of economic instruments, the choice of the appropriate instruments for Indonesia to pursue at this time will be contingent upon a number of criteria. However, the principle criteria for the selection of instruments is ease of implementation. Given this consideration, three primary criteria are presented: Priority Industries: Compatibility with Existing CAC Programs; and Institutional Capacity and Administrative Feasibility.

3.1. Priority Industries

Priority industries should be targeted for EI development which are consistent with Indonesia's overall environmental quality objectives. The priority industries should be investigated to determine if opportunities for the application of EI are present. As well, existing information about the industries such as financial data, quality and quantity of pollution, cost of abatement and existing treatment facilities should be reviewed, and information gaps identified. For example, the industries listed in KEP-03/MENLH/II/1991 could be investigated for the possible development of an EI program.

3.2. Compatibility with Existing CAC Programs

Indonesia should develop an EI program which would complement existing priority command and control (CAC) regulations. Specifically, instruments should be identified which would expand the abatement options available to industry and which would allow for improvements in environmental quality to be achieved. This approach would promote priority environmental objectives by complementing existing CAC regulations.

EI in OECD countries are rarely implemented in isolation, but, instead seek to complement existing CAC regimes. However, in ASEAN countries, CAC structures that require strict compliance with orders given by the central authority are in danger of remaining largely unadapted and unenforced since control over remote communities or firms is weak (Michaelis, 1992). However, some forms of EI, such as presumptive effluent charges which set a tax rate set on presumed emissions and then require the firm to challenge the implied tax, may require less monitoring and enforcement than CAC regulations. In fact, unlike many OECD countries, EI in Indonesia could be used as a primary tool for environmental management until CAC capabilities are strengthened. As a result, EI can used as an alternative means to meet environmental quality objectives.

3.3. Institutional Capacity and Administrative Feasibility

Figure 2
Criteria for Economic Instruments

Priority Industries: Complement existing environmental objectives;

Existing CAC Regulation: Complement BAPEDAL command-and-control programs (PROKASIH);

Low administrative Requirements: Do not require strict enforcement and monitoring capabilities and administrative expertise.

The basic economic rational for many EI requires that a number of conditions be satisfied for the successful implementation of an EI program. Of, these, the institutional capacity of the implementing agency is critical. Indeed, much of the theoretical support for markets and emission taxes assumes that there is a reasonably sophisticated environmental control agency that can administer incentive-based programs (Hahn and Stavins, 1992). However, the constraints in applying OECD EI to ASEAN environmental problems are mainly due to the fact that some ASEAN countries are endowed with comparatively ineffective administrative and institutional capacities that facilitate only weak regulatory enforcement (Michaelis, 1992).

Given the relative infancy of environmental management institutions in Indonesia and subsequent institutional limitations, some EI, such as tradeable permits which have high start-up costs of emission charges based on performance standards that require a high degree of monitoring and enforcement, may be in appropriate for Indonesia to pursue. Instead, low administrative expertise, do not need extensive monitoring and enforcement, and which require minimal financial and administrative resources.

4.0 Secondary Criteria for Choice of Economic Instruments

4.1. Flexibility Under Uncertainty

The ability of the polluter to respond and adapt to the EI program will not be known at the outset of the program. As well, information about pollution costs and benefits will be missing. When information, such as abatement costs and environmental damage is unknown, the firm is assumed to have information the institution does not. As firm behavior is observed under the given EI program, and ambient quality monitored, changes in the EI regime will have to be made. In the case an emission tax, the tax would be implemented at a low level given uncertainty about the appropriate level, and as information is obtained about ambient quality, the tax would be gradually increased or phased in to reflect the true cost of the externality being created by the polluting activity. Since the EI framework will be developed under uncertainty, it must be able to adapt to changing situations and increasing information.

4.2. Cost effectiveness

Economic instruments (EI) allow ambient quality to be improved by allowing firms the choice between lowering emissions and the "Right" to pollute afforded by compliance with the chosen EI. Ambient quality is improved and cost-effectiveness enhanced as polluters with high abatement costs will comply with EI program, while other firms would choose to reduce emissions and be less affected by EI program. Thus, in order to reduce total abatement costs, polluters are not required to reduce emissions if other firms can do so at a lower cost. Sources will choose abatement is less than the EI penalty. If the costs of compliance are above the tax rate, firms will pay the penalty imposed by the EI.

5.0 Recommended Instruments Given Priorities

Presented below is a discussion of the types of instruments that would be appropriate for Indonesia to pursue. Given the above mentioned constraint for the choice of EI for Indonesia, it is suggested that pollution taxes (retribution) and appropriate pricing policies provide opportunities for the development of a viable EI program. This is do to number of variables, but the predominant constraint is the relative infancy of environmental institution in Indonesia, and their ability to design, implement and deforce a complex EI program in the presence of incomplete and uncertain information.

5.1. Progressive and Presumptive Retribution

Using this approach, a certain level of emissions are assumed based on level of technology, type of industry, output, etc.. Responsibility is placed on the polluter to document the amount of emissions they are discharging into the environment. This approach discriminates against small firms who may not have the financial ability to dispute the presumed tax. However, a presumed retribution tax does not rely on the mature enforcement and monitoring capabilities of the implementation institution. As a result, a presumptive tax should be considered as an initial option that Indonesia could pursue.

PROKASIH data could be used as the basis for determining the initial retribution level. The progressive charge would be based on total loading (BOD, COD, or TSS) and would be provide incentives for industries to decrease discharge by assigning increasing costs for high loading. Firms would then be required, by permits conditions or HO acquirements, to submit self-monitoring information about effluent load for specified periods of time. Industries that were below the standards outlined in KEP-03/MENLH/II/1991 would still have to pay the retribution, however, their costs would be significantly lower than industries that were above the standard.

5.2. Appropriate Pricing

Figure 3
Potential economic Instruments

Progresive Presumptive Retribution: monitoring responsbility places on polluter and higher cost for increasing loading;

Appropriate Pricing: Set prices for use of resources equal to their social value.

Indonesia should first address existing policies which cause environmental distortions through inappropriate pricing signals. As Kosmo (1989) argues, the central theme in pollution control in developing countries should be founded on the precept that more efficient use of inputs and outputs can help to lessen industrial pollution, and that the same time enhance productivity and profitability. Known as "Getting the Prices Right", relevant agencies should identify those policies which impact input prices for renewable resources, such as water use, and subsequently promote environmentally degrading activities. The social cost of the use of the resource should be determined and the distortion removed to allow the marginal cost (or damage cost) caused by the use of the resource to be born by polluter. Appropriate market signals are conveyed when the full value for the use of a resource is present.

6.0 Conclusions and Recommendations

Economic Instruments are cost effective and useful policy tools for environmental management. They met with success in many OECD and developing countries, and are usually implemented in conjunction with CAC regimes. However, the basic assumptions underlying the success of these instruments may not be satisfied in Indonesia. Specifically, many EI rely on a strong institutions in Indonesia, it is recommended that Indonesia seek to develop EI which operate within existing programs and compliment industry priorities. Indonesia can then concentrate on the design and implementation of the program with the maximum amount of certainty and available information.

Bibliography

Eskeland, G., and Jimenez, E., (1991). *Choosing Policy Instruments for Pol lution Control.* Working Paper WPS 624, Country Economics Department, World Bank. Washington, D.C.

Hahn, R., and Stavins, R., (1992). *Economic Incentives for Environmen tal Protection: Integrating Theory and Practice.* AEA Papers and Proceedings. Vol 82 No.2.

Kosmo, M., (1989). *Economic Incen tives and Industrial Pollution in De veloping Countries.* World Bank Environment Deparment, Working Paper No. 1989-2.

Michaelis, P., (1992). *Environmental Policies in OECD Countries: Lessons for ASEAN.* ASEAN Economic Bulletin. November 1992.

Ruitenbeek, H.J., Cartier, C.M., and Djaja diningrat, S.T.,(1991), *Macroeconomic Policies and Economic Instruments for Environmental Management in Indonesia: Their Future Role in Economic Policy, Sectoral Planning and Regional Development.* EMDI-KLH Working Paper. Jakarta, Indonesia

Vincent, J., (1993). *Reducing Pollution While Raising Affluence: Water Pollution Abatement in Malaysia.* Harvard Institute for International Development. Cambridge, Mass.