

REGULATION IN THE INFORMATION AGE

Indonesian Public Information Program for Environmental Management

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I. INTRODUCTION

The forces of the “information age” are expected to change our lives, but in ways that are as yet difficult to predict. A salient feature of the new age is far greater capacity to collect, process and disseminate information. This technological change is effectively disintegrating many geographical, political, and organizational boundaries, creating fertile ground for new forms of human organization.

In this paper, we argue that regulation should change fundamentally in the new information age. Governments should allocate fewer resources to setting rules that impose standards of behavior, and more to collecting and disseminating appropriate information. Such information will enable individuals, communities, market agents and regulators to interact in ways which promote socially desirable patterns of production and consumption. This new view of regulation moves well beyond traditional prescriptions, which are based on ‘optimal’ activity levels or narrowly defined behavioral targets for regulated activity. It puts much more weight on the *process* that leads to efficient levels of consumption and production.

How can this new approach be operationalized? One promising approach is a Public Performance Audit (PPA) System, which analyzes, rates, and publicly discloses the performance of government agencies, public utilities or private firms. Performance indicators, once publicly disclosed, can provide powerful incentives for reducing negative externalities from private activities. Public scrutiny and review also encourage public managers to improve the performance of their agencies. PPA systems can increase both the transparency and accountability of public institutions, and make it feasible for the public to assess the government’s use of their taxes.

A well-designed PPA can increase the efficiency of resource allocation by mobilizing the power of reputation to reduce transactions costs and encourage socially-desirable behavior. It can induce improvements from poor performers which would otherwise require costly litigation. Moreover, public recognition can encourage performance which exceeds legally-required standards.

In this paper, we illustrate the PPA concept with a system recently adopted by Indonesia’s Environmental Impact Management Agency (BAPEDAL) for controlling industrial pollution. To motivate our example, we use Section II to discuss current thinking about appropriate pollution control instruments. Section III provides a rationale for greater use of public information in

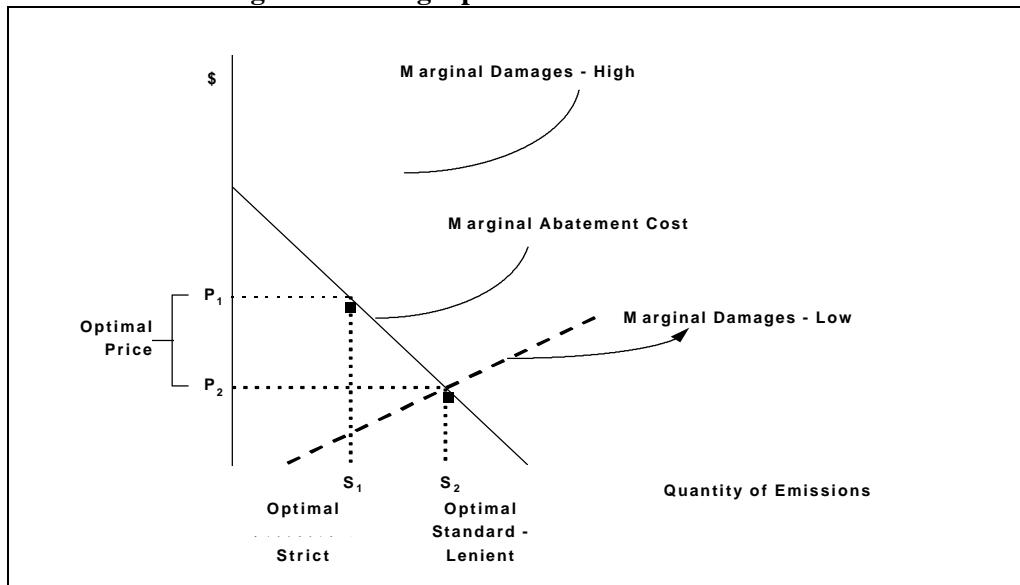
regulation, while Section IV discusses the Indonesian program and its impact since its introduction in June 1995. In the concluding section, we briefly discuss the broader relevance of PPA systems for public sector management and highlight their main implications for public policy reform.

II. TRADITIONAL REGULATION AND ITS PROBLEMS

A significant portion of the literature in environmental economics has focused on the identification of optimal levels of pollution, and the comparative analysis of the various means for reaching given levels of environmental quality or pollution abatement. As shown in Figure 1, optimality requires that polluters face standards or prices that are specific to their own characteristics, both in terms of their pollution control costs and the damages from their emissions. *Ceteris paribus*, a polluter whose emissions cause serious damage should face a more stringent standard and / or a higher charge, as shown by the point (S_1, P_1) in Figure 1, compared to a less-damaging polluter (S_2, P_2).^[Note 1]

While optimal standards and prices are valid concepts for the regulation of pollution, their implementation requires precise knowledge of both pollution control costs and the value of

Figure 1: Setting Optimal Standards and Prices



damages at the margin. Since this information is seldom available, regulators often set targets which match the capabilities of currently-available technologies.

The debate over *command-and-control* regulation and *market-based instruments* (such as pollution taxes or tradable permits) concerns the proper instrument to achieve the determined target. While regulators have generally preferred the imposition of uniform standards for sub-groups of polluters that share certain characteristics,^[Note 2] economists have typically advocated instruments which use market forces to induce pollution abatement. Both approaches, however, share a common problem of implementation. *Monitoring* the behavior of polluters and *enforcing* compliance with regulations have proven very difficult in both developed and developing countries.^[Note 3] For example, O'Connor (1994) cites the experience of East Asia:

In several of the countries studied here,^[Note 4] the monitoring problem is compounded by weak enforcement. In short, when violators of standards are detected, if penalised at all they often face only weak sanctions. (...) polluters are exempted from fines either on grounds of financial hardship or because the violators wield undue political influence. Perhaps the most pervasive problem is that, even when fines are levied, they are frequently so low in real terms that they have little if any deterrent value. (p. 94)

While we do not wish to argue that the East Asian experience is directly comparable with that of North America, a number of similarities are apparent. For example, Deily and Gray (1991) have found that US regulators are more lenient with financially-strapped steel mills, apparently because they do not want to precipitate closure. They appear to target plants that have a greater capacity to invest in pollution control or to pay fines for non-compliance. The US EPA has recently found that some of the largest industrial states are not enforcing federal laws covering air and water pollution:

Environmental Protection Agency officials say they have found that Pennsylvania and some other big industrial states are reporting only a handful of major pollution violations, suggesting that inspectors in those states may be turning a blind eye to pollution problems. (*New York Times*, December 15, 1996)

In Canada, the courts have proven willing to accept many ‘extra-legal’ justifications for leniency with polluters (e.g., the accused is a small company; has expressed remorse and the desire to avoid similar offenses in the future; has a strong sense of community pride; or may have to shut down if strict penalties are enforced, with severe financial consequences for local workers (Canada, 1988)).

There has also been growing concern that monitoring and enforcement activities performed by the regulator may not have created sufficient incentives for pollution control.^[Note 5] Since the early 1990’s, regulators have been experimenting with a number of alternative instruments to strengthen those incentives. It is in this context that we perceive a new importance for public information in regulation.

III. PUBLIC INFORMATION AND REGULATION

The USEPA has argued for some time that information provision should be included among its operations:

EPA's job should grow from primarily the "enforcer" to include greater emphasis on helping citizens make informed choices in their daily lives. (EPA, 1991)

Why should information have this newly-important role? As their access to information becomes easier, both communities and market agents (consumers and investors) naturally generate more powerful incentives for pollution control. For example, recent evidence from Asia, Latin America and North America suggests that pressure from neighboring communities can have a powerful influence on polluters' environmental performance.^[Note 6] Recent studies from the OECD and developing countries have shown that environmental reputation matters for firms whose expected costs and / or revenues are affected by judgments of environmental performance by customers, suppliers, and stockholders. The reaction of investors to the public release of environmental performance information is the object of increasing interest by researchers.^[Note 7] Most of these analyses show a reduction in the market value of poor performers when information on their performance is released.

Hence, for reputationally-sensitive companies, public certification of good or bad performance may translate to large expected gains or losses over time. Knowing this may induce firms to invest in more pollution abatement. For example, Konar and Cohen (1997) have recently found that firms with the largest stock price decline on the annual day of release of the Toxics Release Inventory are also those which show the largest reduction in pollution emissions following the publication of the Inventory.^[Note 8] Such information leads investors to reassess the long-term profitability of firms, which may respond by investing in pollution control when they had previously failed to do so.^[Note 9]

Incentives provided by the impact of disclosure on reputation will in all likelihood generate a different pattern of responses than either pollution charges or command-and-control, and could even generate the greatest overall abatement. Under command-and-control, since polluters in the same regulatory class are all required to meet the same standard regardless of their abatement costs, there is generally convergence to the standard (which may not yield the desired ambient outcome), and great divergence in the marginal cost of abatement across plants. Under pollution charges, or more generally market-based instruments, polluters will tend toward abatement at equivalent marginal cost, but there will be great divergence in abatement practice. In a regime where environmental reputation matters, and is effectively used by the regulator to induce further

abatement, polluters will abate to the point where the marginal cost of abatement is equal to the expected marginal gain in reputational value. Where reputation has no value, polluters may choose not to abate at all. However, polluters in sectors, communities or markets where reputation has very high value may choose to abate more than under either command-and-control or market-based instruments. If these polluters are large facilities in pollution-intensive sectors, the result could be overall performance which is also better than under traditional tools of intervention.

The power of public information in regulation depends on the degree to which polluters internalize reputation effects. If these are important, then market agents and communities, *once properly and accurately informed*, can interact with firms to establish jointly-optimal levels of consumption and production. The regulator's role certainly does not vanish in this system. However, it evolves from pure adoption and policing of rules towards empowerment of other agents through provision of appropriate information. In circumstances where agents' interactions cannot produce satisfactory environmental results, the regulator must retain its traditional enforcement role.

While information is posed to play a much broader role than might have been expected even a decade ago, its appearance onstage raises a number of new questions: about the *process* that generates the information used by the regulator to assess environmental performance; the *reliability* of the information that is revealed; and the *nature of the revelation mechanism*. In the next section, we discuss these issues in the context of Indonesia's public disclosure program, which is called PROPER PROKASIH.

IV. PROPER PROKASIH

The monitoring and enforcement of formal regulation in Indonesia is currently weak, and the modest size of BAPEDAL's budget assures that this weakness will persist in the near future. However, manufacturing is growing at over 10% annually, and the Indonesian Government recognizes the mounting risk of severe pollution damage. Under these conditions, the Environment Ministry has decided that a large-scale public disclosure program may induce significant pollution abatement while the formal regulatory system is further developed and strengthened. BAPEDAL hopes that pressure on factories from public disclosure will provide a low-cost substitute for formal enforcement of the regulations, and create incentives for the adoption of cleaner technologies.

NATURE OF THE REVELATION MECHANISM

Since the purpose of PROPER PROKASIH is to publicly reveal the environmental performance of a variety of polluters, the revelation mechanism has been a primary focus of attention. When the program was developed, certain problems had to be confronted. *First*, the grading system adopted by the Agency should accommodate polluters with widely different characteristics. *Second*, the grading system should be simple and its implications easily understood by the public. A few commonly understood categories are easy to process, so it quickly became clear that grading should have a modest number of dimensions. In this context, continuous numerical ratings in many dimensions are generally suboptimal, both because they may not be clearly understood and because their incremental precision does not add value commensurate with the extra costs of providing it. Moreover, categorical ratings (grades) are easily understood because they are omnipresent in public and private evaluation systems. Some grading systems are dichotomous (e.g. pass / fail) while others have several categories (e.g. A, B, C, D, F). *Third*, the grading system should discriminate between firms in compliance with the regulations and those out of compliance. *Finally*, it should provide incentives for firms to comply with the regulations, but also inducements for them to exceed the regulatory requirements. In late 1993, BAPEDAL settled on the five-color scheme shown in Table 1.

Table 1: PROPER PROKASIH's five-color scheme

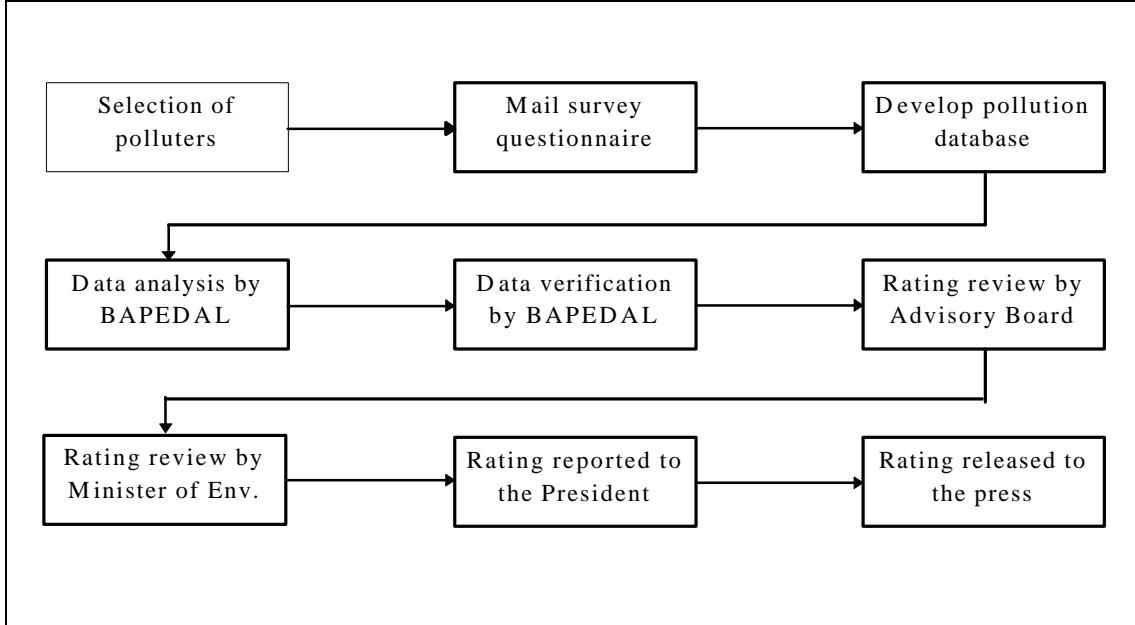
Compliance Status	Color Rating	Performance Criteria
Not in Compliance	Black	Polluter makes no effort to control pollution, and causes serious environmental damage.
	Red	Polluter makes some effort to control pollution, but not sufficiently to achieve compliance.
In Compliance	Blue	Polluter applies effort sufficient only to meet the standard.
	Green	Pollution level is significantly lower than the discharge standards. Polluter also ensures proper disposal of sludge; good housekeeping; accurate pollution records; and good maintenance of the waste water treatment system.
	Gold	All requirements of Green, plus similar levels of pollution control for air and hazardous waste. Polluter reaches high international standards by making extensive use of clean technology, waste minimization pollution prevention, recycling, etc.

THE EVALUATION PROCESS AND THE RELIABILITY OF INFORMATION

Existing environmental regulations in Indonesia cover hazardous wastes as well as air and water pollution. Their compliance requirements vary by type of polluter, generally classified as industrial or non-industrial, stationary or mobile, and point or non-point source. Regulation of hazardous waste and air pollution is very recent, with a Presidential Decree issued in 1994 for hazardous waste and a 1995 Ministerial Decree specifying air emissions standards for stationary sources. Regulation of water pollution has a significantly longer record of development and implementation experience. A 1991 Ministerial Decree (KEP/MEN/03/1991) specifies discharge standards, based on pollution loads for fourteen industries. For the remaining industries, Decree KEP/MEN/03/1991 specifies pollution concentration standards which vary according to water quality objectives in the receiving rivers.

Given its relative depth of experience with regulation of water pollution, BAPEDAL decided to focus on compliance with water regulations in the first phase of PROPER. While it had very limited information on air pollution or hazardous waste, the agency had considerable information on industrial water pollution from two sources: its Clean River Program (PROKASIH), which was introduced in 1989, and its regulatory monitoring and enforcement activity (JAGATIRTA) under KEP/MEN/03/1991. Combined with self-monitoring reports from polluters, these information sources were in most cases judged sufficient for a careful compliance assessment in Phase I of PROPER. As shown in Figure 2, existing information on polluters was

Figure 2: Process and Reliability of Information



complemented with a survey questionnaire sent to selected polluters, and with an inspection program by BAPEDAL to verify the validity of the data *on site*.

IMPACT OF PROPER PROKASIH

The program was introduced in June 1995 and was extensively covered in the national as well as the international press. In June 1995, five factories were publicly awarded the Green rating (no factories were rated Gold). Since it was the first time that a program of this nature was implemented in Indonesia, the reaction of neighboring communities towards those plants rated Black or Red was unknown. It was therefore decided in June 1995 that only the distribution of the 182 plants across the color scheme would be publicly disclosed. Plants rated Black or Red were privately notified of their ratings and were given until December 1995 to improve their performance before their name and rating be publicly disclosed. As shown in Table 2, the threat of disclosure was sufficient to prompt a group of 10 factories to invest in pollution abatement sufficiently to improve their rating to Red or Blue. We believe that the primary driving force behind these improvements are reputational incentives based on the expectations of strong responses from communities and markets.

Table 2: Impact of PROPER PROKASIH

RATINGS	SHORT-TERM IMPACT			MEDIUM-TERM IMPACT	
	Jun 1995	Dec 1995	% Change	Dec 95	Sep 96
Gold	--	--	--	--	--
Green	5	4		--	1
Blue	61	72	+18%	--	33
Red	115	108	-6%	115	80
Black	6	3	-50%	5	6

In December 1995, 120 factories were rated Black or Red. As shown in Table 2, by September 1996, 34 of these factories had progressed to Blue or Green increasing the compliance rate by nearly 29%. The reaction of plants between June 1995 and September 1996 provides strong evidence that PROPER is creating incentives for pollution control in Indonesia. While reputational incentives are obviously at work, it is interesting to note that in several cases, PROPER became the means by which owners of factories became aware of the environmental performance of their factories. Direct consultations that BAPEDAL had with owners of factories revealed that PROPER has an educational function by increasing the awareness level of employees and employers' about the regulations and their environmental performance.

It is also very interesting to note that the number of factories that volunteered their participation in PROPER increased from 11 in June 1995 to 23 by December 1995. As would be expected, we find that volunteers have on average a superior environmental performance than non-volunteers. Clearly, these factories saw some positive values from their environmental performance being publicly disclosed. Finally, we have anecdotal evidence that financial markets may create incentives for pollution control. In mid-1995, a factory wanted its shares to be traded on the stock market but was deeply concerned about the impact of its poor rating on the value of its shares. Within a period of 3 months, the firm invested in pollution control equipment, achieved a Blue rating, and then went public.

PROPER also has an important impact on BAPEDAL itself. In particular, the need for accuracy in the ratings has compelled BAPEDAL to increase the number of inspections it is conducting, and improve the quality and reliability of the data it is collecting. Moreover, the database provided through PROPER is currently used to identify priorities of action. The

information collected through PROPER also provides BAPEDAL with solid evidence of a factory's compliance status and can support stronger enforcement actions if desired.

V. CONCLUSIONS

A new approach to regulation in Indonesia is showing that local communities and market forces can be powerful allies in the struggle against excessive industrial pollution. PROPER's ratings are designed to reward good performance and call public attention to polluters who are not in compliance with the regulations. Armed with this information, local communities can negotiate better environmental arrangements with neighboring factories; firms with good performance can advertise their status and earn market rewards from their performance; investors can accurately assess environmental liabilities; and regulators can focus their limited resources on the worst performers. Moreover, transparency is increased because the environmental agency itself is opened to public scrutiny. By committing itself to a public disclosure strategy, it chooses to reveal its own ability to process information reliably and enforce the existing regulations.

During its first two years of operation, PROPER has proven quite effective in moving poor performers toward compliance, and motivating some firms to pursue higher ratings by abating beyond the requirements and investing in pollution prevention. Undeniably, public information is having an important impact on industrial pollution control in Indonesia. Inspired by this example of public information in action, the governments of Philippines, Colombia, Mexico and Brazil are now moving rapidly toward developing their own public disclosure programs.

To conclude, we must rethink the regulator's role in pollution management once we recognize that local communities, consumers, and investors may all provide incentives for pollution control if empowered to do so. In the information age, the regulator's role is no longer confined to producing and policing rules and standards. Instead, the regulator can gain important leverage through programs such as public disclosure, which harness the power of communities and markets. A broader implication is that one size no longer "fits all" for regulatory policy design. Optimal combinations of regulatory tools, including new information strategies, will depend on country-specific social, economic and institutional conditions.

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END NOTES

[Note 1] Similarly, other things being equal, a polluter with lower costs of pollution control should be facing a more stringent standard and / or a lower price than a polluter with high control costs.

[Note 2] For example, pollution standards are typically defined for a group of plants belonging to the same industrial sector.

[Note 3] We define monitoring as the set of activities aimed at verifying the regulatory compliance of a specific polluter. Among others, these activities include inspections of a polluter's facilities and effluent sampling (see Magat and Viscusi (1990) for a description of the various types of inspections undertaken by the US Environmental Protection Agency). We define enforcement as the set of actions which penalize non-compliance with regulations. Monitoring and enforcement together determine a polluter's expected penalty for non-compliance. A profit-maximizing firm will compare this expected penalty with the expected cost of abating pollution to determine the most profitable level of pollution control.

[Note 4] The countries studied are Japan, Korea, Taiwan, Thailand, and Indonesia.

[Note 5] Russell (1990) writes: "Efforts to monitor regulated behavior appear to have been inadequate to the task - a very difficult task in many instances - and typical enforcement practices appear to have been insufficiently rigorous." (p. 243; *italics ours*).

[Note 6] For evidence from Asia and North America, see Pargal and Wheeler (1996) and Hettige, Pargal, Singh and Wheeler (1996). Evidence from Brazil and Mexico can be found in Wheeler and Witzel (1996) and Hettige and Witzel (1996).

[Note 7] See Muoghalu and Robison (1992), Lanoie and Laplante (1994), Hamilton (1995), and Konar and Cohen (1997). For a survey of this literature, see Lanoie, Laplante and Roy (1997).

[Note 8] In 1986, the USEPA introduced the Toxics Release Inventory (TRI), a program which covers every manufacturing facility with 10 or more employees which emits at least one of 300 specified toxic substances above a given quantity. In TRI, these plants must report their annual releases of all 300 substances. The USEPA provides this information to the public through an easily-accessible database.

[Note 9] While this paper focuses on the role of public information in pollution regulation, the growing ease of access to information is also stimulating many other applications. For example, the medical license board of Massachusetts now gives the public access to the disciplinary records and malpractice history of physicians in the state. Recently, consumer

advocacy groups have argued that the airlines should give the public access to their safety records: number of crashes, safety violations, etc. The Government of Philippines is currently developing a Public Performance Audit System to disclose the performance of private concessionaires providing water to the various areas of Manila.