CEEPR **Center for Energy and Environmental Policy Research**

Environmental Policy in Transition Economies: The Effectiveness of Pollution Charges

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99-006 WP **May 1999**

A Joint Center of the Department of Economics, Laboratory for Energy and the Environment, and Sloan School of Management

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* A shorter version of this paper was presented at the annual meeting of the Association for Evolutionary Economics, New York City, New York, January 2-5, 1999. Valuable comments from Marie Leigh Livingston are gratefully acknowledged. The arguments expressed in this paper and any remaining errors are, however, solely those of the author.

Abstract

Most economists and analysts claim that extended use of pollution charges in environmental policy will have substantial efficiency advantages in countries undergoing transition to market economies. Essentially this paper challenges this view and argues that the proposed policy presumes the existence of an already functioning institutional framework. By focusing on the Russian case, the paper identifies and discusses a number of reasons why it has become hard to implement pollution charges in an economic system where behavioral patterns and jurisdictions established in the past are still prevalent. Institutional obstacles both at the firm level and within Russian regulatory agencies are discussed. The paper concludes that it is probably more appropriate to view environmental problems in transition economies not as market imperfections per se, but as results of institutional inertia in the economic and political systems. As a consequence the choice of pollution control strategy becomes much more complex than is implied by economic theory. The paper ends with a discussion of command and control regulation and input taxes as alternative ways to control pollution in Russia.

Key words: Russia, Transition economies, Environmental policy, Pollution charges, Institutional impediments

1 Introduction

After the collapse of the Communist systems the countries in Central and Eastern Europe (CEE) have initiated a transition from command-based to market-oriented economies. As part of this process, the governments have liberalized prices and initiated the breakup and privatization of state-owned enterprises. However, as these countries struggle to address their economic problems, environmental problems must also be recognized. The transition has (among other things) led to a recognition of the broad-scale environmental degradation that took place during the Communist era,[1] and all countries in CEE are now seeking for ways to implement more efficient environmental polices. Here the typical advice from economists and policy analysts in the West has been to use economic incentives, such as pollution charges, more extensively in controlling pollution (e.g., Bluffstone and Larson 1997; Klarer 1994; Sand 1987). Steedman (1997, p. 92) notes for example;

> There are two factors which suggest that there is a particularly important role for the application of economic instruments to air pollution control in the economies in transition. First, the magnitude of the costs required to meet environmental objectives, and the substantial competing claims for limited resources, suggest that CEE governments might have to give more serious consideration to economic instruments than has been usual in Western Europe. Second, several countries, […], already impose, or have the legislation to impose, emission fees and fines on polluters.

Thus, pollution charges are claimed to have substantial efficiency advantages in CEE, and since many countries in the region have considerable experience of such instruments expanded implementation will, it is argued, be fairly easy. This notion has also been expressed in policy terms in the consultation among the European Ministers of the Environment. Essentially this paper challenges this widespread view and argues that this proposed policy presumes the existence of an already functioning institutional framework.

The advice that pollution charges be introduced as an important part of environmental policy in transition economies builds on the observation that economic instruments, *under the right conditions*, have a number of advantages over so-called command-and-control regulations.

First, there is strong evidence (both theoretical and empirical) that the former can obtain set standards of environmental quality at significantly lower costs than a regulatory regime (without the costs being known by the environmental authorities). The reason is that abatement costs normally differ between different sources. Moreover, if firms are made to pay a charge equal to the marginal environmental damage of their emissions, a socially efficient level of pollution will be achieved. Finally, pollution charges also provide continuing incentives to invest in cheaper pollution abatement technologies, rather than simply encouraging minimum compliance (e.g., Milliman and Prince 1989). However, in transition economies in general and in Russia in particular, the "right conditions" for this to work are most likely not present.

In other words, the principal theme of the analysis in this paper is that pollution charges probably will produce relatively few to no incentive effects in CEE until there is progress toward a fundamental change in economic and legal institutions.[2] The transition to a market economy cannot be achieved without the creation of a sustaining legal and institutional foundation, but the economic literature on environmental policy does little to fully address these issues. It should be noted that *institutions* consist not only of formal rules (laws, regulations), but also of informal constraints on human behavior, such as conventions and norms (North 1990). In other words, institutions also have cultural dimensions, which cannot be changed overnight.

This paper focuses solely on the largest and most important country in CEE, namely Russia. Some important institutional impediments to the introduction of pollution charges in Russian environmental policy are identified, both at the enterprise level as well as within the environmental authorities. Russia has been left with many legacies of the past that add to the difficulties associated with environmental policy. These include her administrative structures, political culture, and a prioritization of economic over environmental considerations as well as soft budget constraints at the firm level. The impacts of these legacies are also discussed in this paper.

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[1] For a review of the environmental problems in the FSU, see Feshbach (1995) and Yablokov (1995).

[2] Even though this paper focuses on pollution charges, the same conclusions apply to the use of tradeable permit schemes. Both instruments internalize externalities by imposing an implicit price on emissions. Even if there is a difference with respect to the establishment of the price, the incentive effects are (at least in theory) basically the same.

Although the paper deals with the Russian case alone, many of the conclusions drawn here are likely to be valid for other transition economies as well, including countries outside CEE. Countries in Latin America and Asia Pacific, out of which many undergo rapid industrialization or a transformation to market economies, have recently expressed interest in the application of economic incentive regimes for pollution control. However, also here institutional constraints have limited the effective implementation of these instruments.[3]

The paper proceeds as follows. Since the historical heritage of the old socialist system plays an important role in determining present behavior, the next section discusses the role of prices and taxes in the Former Soviet Union (FSU). Section three assesses the institutional obstacles of introducing pollution charges in Russia both at the firm level and within regulatory agencies. Finally section four provides some concluding remarks and policy implications.

2 The Role of Prices and Taxes in the Former Soviet Union

In the administrative-command system of the FSU, practically no attention was given to the efficiency implications of pricing and taxation, and accordingly these had very little effect on economic outcomes (Gregory 1993). Even if the socialist planners had wished to be able to use prices in order to affect enterprise behavior, this effort would be doomed to fail in an economy where all essential inputs were allocated administratively. Plant managers were constrained not by financial, but by physical flows or administratively allocated resources, and accordingly they faced so-called soft budget constraints (Kornai 1980). In other words, the budget constraint of the socialist enterprise was not an effective behavioral constraint on the demand for inputs, but existed only as "an accounting relationship". As a consequence, rather than price signals agents instead responded to quantity signals such as information and observations about stocks, orders, waiting times and queue lengths.

Although the price system had very few incentive effects in the socialist economy, it did however play an integral role in the rapid expansion of industrial output, as the planners set minimal (or no) prices on inputs in order to stimulate the production of heavy industrial goods. For example, in Russia the wholesale prices of most natural resources were held constant (!) at

[3] See, for example, Mendelsohn and Shaw (1994) (Asia Pacific) and Huber et al. (1998) (Latin America).

very low levels, and did thus not reflect changing scarcity relations, from 1967 to 1982 (Goldman 1985). The ideological justification for this policy derives from the Marxian labor theory of value, which states that only labor imparts value, and natural resources must be considered free goods since no labor has been used in creating them.[4] Taxes and charges were also designed to gather revenue and not to induce producers or consumers to behave in a rational manner. This suggests that there is little support for the view that the FSU's earlier experience of pollution charges will facilitate the increased use of economic instruments in the country today.

In the 1970s, when the increased scarcity of the country's natural resources became more and more apparent, proposals to charge for resource use were put forward. These policies were generally opposed on the grounds that they would violate the above-mentioned Marxist principles, but especially since their "introduction would aversely affect important political and economic interests" (Kramer 1973, p. 373). Still, charges for the use of water and other resources were introduced in the late 1970s and in the 1980s.[5] With the 1991 Law on Environmental Protection Russia introduced an extensive pollution charge system throughout the country. The new system represents a combination of emission standards and emission charges, and the way in which it has been introduced is closely tied to the structure of past state planning (Kozeltsev and Markandya 1997).[6]

For each enterprise the environmental authorities define standards in terms of permitted volumes of emissions. For emissions below the firm-specific standard, one specific charge level is imposed. Under the Communist regime, this was regarded as an ordinary operating cost for which enterprises could request compensation from the central authorities. Different charge levels (five times the base rate) are levied on pollution above the standards, and during the command-economy era these had to be paid out of enterprises' "surplus".[7] The result is a system

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[4] For example, the Soviet Principles of Water Legislation declared that water use should be free of charge (Kramer 1973).

[5] The introduction of these new charges meant of course a fundamental change from the earlier ideology. Satre-Ahlander (1994) points out, however, that during the 1980s the interpretation of Marxist principles changed and now "Soviet resource economists long persisted in the view that charges were compatible with Marxist theory if they were based on the labor expenditure necessary to restore a particular resource to its original state," (p. 91).

[6] Similar pollution charge systems exist in most CEE countries (Bluffstone and Larson 1997).

[7] For plant managers in the socialist system, it was better to pay these charges rather than to adhere to the pollution control standards and run the risk of not being able to meet production plans. In fact, in order to pay the charges some enterprises increased production, something that led to more pollution.

of charges for different pollutants, such as sulfur dioxide, nitrogen oxides, carbon monoxide lead, dust and others. However, for a number of sectors of the Russian economy (e.g., energy, agricultural products, transport and communications, housing construction etc.) the new system puts upper limits on the cost of pollution charges. The limits are set in terms of maximum percentage of profit that pollution charges can constitute.[8] For example, companies with zero profits pay no pollution charges. A large part of the poor charge collection rate of the Ministry of Environment can be explained by the lack of profits reported by enterprises in the privileged sectors (ibid.).

It is important to note that also the current pollution charge system is motivated in large part by the need to raise revenues for environmental protection projects. Cost effectiveness has not been an important motivation (Vincent and Farrow 1997). It has thus been difficult for Russian authorities to accept the notion that prices and taxes should be considered in terms of their effects on economic efficiency. Ninety per cent of the revenues from the pollution charges are allocated to an Ecological Fund, out of which the major part (60 percent) should be spent on different environmental projects at the local level.

A number of studies show that the new Russian pollution charge system has not induced investment in abatement technologies, and the effects on emission levels have been negligible (e.g., Golub and Strukova 1994). As noted above, the ineffectiveness of the same system to gather revenue has also been documented. Typically this outcome is attributed to the lack of enforcement. It is also noted that taxes and fines have not been adjusted to inflation and the weakening currency. Russia has had huge problems with price increases during the transition period (Table 1), and since there are always some lags in the collection of taxes, many of the payments have become purely symbolic. Still, indexation of pollution charges has been frequently undertaken in the country. For example, in 1993 the above-standard charges were raised 25 times (whereas the within-standard charges were increased less often). Golub and Strukova (1994) estimate that in 1994 total pollution charges had been raised by 150 times since 1991. Still, given the high inflation rates during the period (Table 1), the total impact of the charges decreased dramatically.

[8] Regional authorities can also adjust the charge levels to take into account specific local circumstances.

Table 1. Russian Annual Inflation Rates 1992-1998 (by percent)

	1992	1993	1994	1995	1996	1997	1998
Annual Average Rate	1354	875	307	197	48	15	28

Source: International Monetary Fund (1999).

However, even if insufficient enforcement and low real charge levels provide a partial explanation to the failure of the Russian pollution charge scheme, such explanations disregard the roots of these problems; the problems of changing enterprise behavior and the inertia of the political system. It is towards these issues that we now turn our attention.

3 Institutional Impediments to the Use of Pollution Charges in Russia

3.1 The Firm Level

It is often argued that recent reforms of the enterprise and government sectors are resulting in a hardening of budget constraints and an improvement in resource utilization, which would make it feasible to consider the application of cost effective economic instruments. For example, Bluffstone and Larson (1997, p. *xx-xxi*) note that;

> [T]he prospects of a more cost-effective environmental policy [in Central and Eastern Europe] appeared better than elsewhere. The fact that the former command economies were familiar with pollution 'charges' and 'permits' has helped, as did the fact that economic reforms that promote privatization and competition alone began to give these instruments some 'bite'.

However, since the Russian privatization program for political reasons was primarily shaped to favor the "insiders" (ministries, plant managers, local authorities etc.), most elements of the centrally planned economy continue to exist. In other words, market reforms in Russia have been privatizing former state property to shareholder associations in such a way that the majority of shares essentially belong to the same ministries, committees, and managers. And "they are linked to each other through networks of personal contracts and mutual services, as

well as by a system of natural commodity exchanges between their enterprises" (Mirovitskaya and Soroos 1995, p. 99).[9]

Different authors provide varying explanations to why the privatization process took such a turn in the Former Soviet Union. Winiecki (1996) notes that the mid-level managers in the Soviet system embodied human capital that was system specific. Accordingly these actors would be worse off under fundamentally different institutional arrangements. Unfortunately for the rulers, the execution of the reforms was in the hands of these same mid-level managers. Boycko et al. (1995) and Hedlund and Sundström (1996), on the other hand, suggest that in order to make the privatization program politically acceptable the rulers themselves had to offer benefits to insiders. Whatever the case, it is probably safe to conclude that the privatization process in Russia has primarily been driven by political rather than by economic efficiency motives.

As a consequence, even though the societal model has changed in formal terms, in practice the basic structure of resource management remains virtually the same. In particular large enterprises, whose outputs are essential inputs to other sectors of the economy (e.g., the energy industry), can easily rely on their past connections and make claims on public funds. Soft-budget constraints, fixed prices, centrally granted investments, etc., still exist in important sectors of the national economy, and accordingly evidence of real changes in enterprise behavior is hard to find.

For example, in a case study of 27 Russian enterprises Ash and Hare (1994) conclude that the only real change was to be found in the supply of input material, which now has to be bought from new contacts. However, no changes in management, investment, product quality, and time horizon could be traced. Further, participation in the privatization program was mainly motivated by a desire to secure status quo, i.e., to assure that the present managers and the workers would remain in control of the company. Similar results are reported in Boycko et al. (1995), Clarke et al. (1994) and McFaul (1995). Here it is also important to note that during the Communist era the competence on how a market economy functions was entirely concentrated to the central bureaucracies that were responsible for all foreign trade in the country. Thus, companies today

[9] See Boycko et al. (1995) and Hedlund and Sundström (1996) for reviews of the Russian privatization program.

have no experience in these matters, and the above empirical results most likely reflect this situation.

In essence the above shows that an economy can be privatized without, at the same time, being able to implement a functioning market. If this is the case, as it appears to be in Russia, improvements in economic efficiency and/or enterprise behavior are unlikely to occur. Such changes require, in addition to privatization, *real* enterprise autonomy rather than simply a continuation of old bureaucratic networks between politicians and enterprises.

Furthermore, pollution charges will not have the desired effects unless enterprises can obtain the technical equipment and other physical resources needed for reducing emissions, which in turn requires that capital markets function well. However, in Russia these markets are not sufficiently developed or are too thin to provide financing of environmental projects and the banking sector lacks the experience in analyzing such projects. Moreover, the awareness among firms of the various technological options for pollution control and their associated costs is generally very low.[10] For these reasons little finance has been provided for environmental investments and, as was noted above, so far the Ecological Fund has been unable to fill this gap. Thus, for the same reasons that pollution charges have not secured the rational use of natural resources or of preventing pollution they have also not become an effective way of providing funds for environmental projects.

In sum, since most "private" enterprises in Russia still have few *reasons* as well as *opportunities* to seek to minimize their costs of complying with environmental requirements, pollution charges will most likely not generate a cost-effective distribution of abatement effort across polluters. In addition, a large part of the pollution charges is levied on public services (hot water, electricity etc.), which are not supplied by private companies. In these cases higher costs are often simply passed on to the central government.

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[10] Interestingly, the neoclassical economics literature recognizes that if such uncertainty about the marginal abatement cost function exists, the optimal choice between taxes and standards is not obvious. It will depend on the relative slopes of the marginal damage and the marginal cost functions (e.g., Adar and Griffin 1976). Uncertainty in the marginal damage function, on the other hand, has no effect on the choice of policy instrument, unless there is simultaneous correlated benefit and cost uncertainty (Stavins 1995). However, these results are seldom referred to in the policy debate.

3.2 The Regulatory Level

Institutional obstacles to the use of pollution charges also exist at the regulatory level. Here the main problem is shortage of information not only about the amount of environmental damage caused by different pollutants but also about these enterprises' business activities in general. Environmental taxation (as well as any type of taxation) requires that the government has some notion about firms' costs. However, because Russia lacks a proper (financial) accounting system, this is not the case. A lot of companies report incomes as production costs,[11] and corruption in government-business relationships has been very common (Kotov and Nikitina 1993).

Furthermore, the successful implementation of pollution charges relies heavily on the regulators' ability to monitor emissions. Nevertheless, because of insufficient funds, low staff levels and lack of competence, proper monitoring and enforcement is the exception. Thus, without significant investments in data gathering and the improvement of the environmental information network, an important precondition to the application of economic instruments will be missing. The regulators' tasks are also hampered by a general lack of legitimacy. There remains from the Communist system a rather casual regard of law as something that should look good on paper but not necessarily be firmly anchored in practice. According to Jurg Klarer (1994, p. 24):

> Society [in the FSU] was socialized in a system where behavioral rules, norms and possibilities were formed mostly in informal ways and had little to do with legal norms. Some polluters simply do not comply with the regulations because they believe they will be able to avoid suffering the consequences.

Enforcement difficulties associated with such mentalities are intensified both by the general decline in the legitimacy of government authorities in the country and the conflicting jurisdictions between different levels of power (e.g., local vs. federal). A survey of heavy polluters in five Russian cities showed that the directors did not believe they would be required to pay significant amounts of pollution charges (Bluffstone and Larson 1997, p. 140). Similar

[11] This is in sharp contrast with the situation during the Communist era, when the command economy created incentives for plant managers to overstate production. In many cases, even the firms themselves lack important

ignorance of the law can also be found at the regulatory level; especially local authorities often disregard environmental concerns (sometimes in return for bribes) in order to strengthen their own positions. It is likely that these tendencies will continue until property rights are clearly defined and reliable mechanisms for their enforcement are established.

Hedlund and Sundström (1996) note that the foundation to the above problems probably lies in the lack of a legitimate and *accepted* constitution. The Russian politicians have chosen not to regard the constitution as a contract spelling out the general rules that should govern the relationship between the federal government and the regional authorities. As a consequence, negotiations between the rulers in Moscow and the regions are often performed in an *ad hoc* manner, and "this has resulted in an extremely complex network of special arrangements, privileges and personal relations," (p. 84, my translation).

The Russian environmental legislation provides one example of the above ambiguity, and again this raises some concern about how environmental policy will be resolved in practice. Specifically, the Law on Environmental Protection allocates broad arrays of powers almost uniformly to the different levels of authority. For example, Basi (1995, p. 7) notes that "…although article 9 [in Section 1 of the Law] confers onto entities politically subordinate to the Russian Federation the power to act as a single coordinator for environmental authority, the same provision prevents consummation of a contract for natural resources utilization without an assessment based on federal approval." This ambiguity has, among other things, added to the problems of enforcement of environmental regulations.

Basi (1995) suggests therefore that *private* enforcement should be given a greater role in Russian environmental policy. This would also relieve the government from some of its financial stresses. Although the process is relatively complex, the 1991 Law gives organizations and individuals the right to file suits against violators of the environmental legislation. However, for many years people have been accustomed to solving their problems through administrative or bureaucratic mechanisms (e.g., the party executives and organizations) and informal relationships (the family, bribery etc.) rather than through claims and suit. Thus, before this

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information about their own activities. Gornaja et al. (1997, p. 72) provide an example of an Estonian enterprise that "says it has no records of what products it sold and how much."

situation has changed private enforcement is unlikely to play a substantial role in fighting pollution.[12]

3.3 Environmental Pollution in Russia: A Problem of Path Dependence

The analysts who advocate the use of economic instruments view the environmental problem in Russia as a failure by the former planners to provide the proper incentives, i.e., as a divergence from the Pareto efficiency criterion. In particular they argue that valuation problems were complicated by the adherence to the labor theory of value, which was prejudiced against charging for natural resources. However, as noted above, the Soviet system was not intended to react to price signals whatsoever. Natural resource use was to be determined by planning criteria alone. As a result, the combined effects of soft budget constraints and the high political priorities given to a rapid industrial expansion, primarily initiated during the Stalin era, are more likely to explain the deterioration of the environment in Russia than the labor theory of value.

Specifically, "if resource-allocation responsiveness depends on priority rather than on intensity of shortage, then a low priority to environmental protection suggests that the social costs for environmental disruption could remain above 'tolerance limits' for extended periods," (Satre-Ahlander 1994, p. 63). Furthermore, even if there at last is a change in the political priorities, the system has by then become so rigid that this change is unlikely to have any real effect on behavior.

This paper has identified and discussed a number of reasons why it has become hard to implement pollution charges in an economic system where behavioral patterns and jurisdictions established in the past are still prevalent. Thus, it probably makes more sense to view the pollution problems in Russia and in transition economies in general not as market imperfections per se, but as results of institutional inertia in the economic and political systems. As a consequence the choice of pollution control strategy becomes much more complex than is implied by economic theory.

[12] Still, some cases of groups and individuals that have had legal successes in their 'fights' against polluters exist. See, for example, Davidova and Kibel (1994).

4 Policy Implications and Concluding Remarks

The above analysis suggests that without viable economic and social institutions, neither economic incentives nor any other type of control strategy will have much affect on the environmental degradation in Russia. Hence, economists' advice as well as international environmental aid might be better dedicated to educational and institution-building efforts, rather than be focused explicitly on environmental policy and technological alternatives.[13] Still, eventually, as new institutions gradually develop, pollution control policies will begin to "bite" also in the Russian system. It might therefore be wise to start by implementing some less complex regulation alternatives and to learn from these experiences. However, "the key question is how to draft legislation that ultimately assumes rational decision making on the part of decentralized enterprises while knowing there will possibly be a long transition period during which enterprise decision making cannot be trusted," (Gregory 1993, p. 546). Similarly, any attempt to implement an environmental policy regime in Russia must also take into account the institutional problems at the regulatory level.

Command and control instruments (e.g., technology standards) may provide the first opportunity to regulate polluters. Such measures can be relatively effective because of their administrative simplicity, something that is of vital importance for Russian policy (Basi 1995). The standards to be met must, to ensure enforceability, be relatively simple and transparent. Enforcement could also be made easier by restricting attention to the most important polluters.[14] Although most economists argue that command and control regulations will be more inefficient than pollution charges (since they do not take into account differences in compliance costs between enterprises), it should be clear by now that this argument has little support in Russia. However, for Russia one important disadvantage of these instruments is that no revenues to finance environmental projects will be generated.

Therefore, given the problematic state of monitoring and enforcing environmental compliance, consideration should be given to using input taxes instead of emission charges

[13] This is in contrast with the current international aid to environmental projects in the FSU, which tends to focus on technical assistance (Jancar-Webster 1994). There are also considerable funds earmarked for energy purposes that have environmental implications, such as nuclear safety. Still, however, international environmental aid constitutes a very small share of total environmental expenditure in the region.

[14] At present more attention is paid to a lot of small polluters than to a limited number of big ones.

(Bluffstone and Larson 1997). Taxes on inputs (fuels, chemicals etc.) levied at the point of distribution could be cheaper from an administrative viewpoint and generate some tax revenues as well. They could be set in percentage terms, thereby avoiding the problem of inflation. Again the argument that these charges would be less closely related to marginal damages or abatement costs than pollution charges has no foundation in Russia. The point here is that no one knows that, and for practical matters it may be better to opt for the former. Another problem with input taxes is that they remove the incentives for end-of-pipe cleanup. On the other hand, the current pollution charge system in Russia has so far have very few positive effects in this respect as well.

Eventually, as environmental agencies become capable (both with larger budgets, and in terms of competence) of enforcing stricter and more complicated environmental policies, and as market institutions gradually develop, pollution charges and/or tradeable permit schemes can be phased in.[15] When this will be possible is an open question. One should remember, though, that even though formal rules can be changed overnight, codes of conduct, norms and other informal constraints on human behavior are much more resistant to political decisions (North 1990).

For these reasons, the fastest path to industrial restructuring and cleaner production methods probably lies in the acquisition of state-of-the-art technologies from the West (Simpson and Toman 1995). Foreign investments will not only raise revenue for environmental reform and introduce cleaner technologies, but may also have positive institutional impacts.[16] For example, foreign investors can subject old managers to commercial rather than administrative standards, and improve quality control. However, for Russia to encourage more foreign investments, it is necessary that uncertainty regarding future regulations be reduced substantially. Transparency in regulations, including clear delineation of authority, is particularly important.

The main conclusion of this paper is that the problems of environmental policy implementation in Russia must be resolved through improved institutional capacity, both at the enterprise level and within regulatory authorities. Until this is achieved, the use of economic incentives will be neither effective in preventing pollution nor will they help in speeding up the

[15] It is worth noting that the developed market economies also started to experiment with environmental taxation only after several years of experience with quantitative regulations and input taxes.

[16] However, in the extractive sectors of the Russian economy (including forestry), some foreign investments have also had detrimental effects on the environment (e.g., Newell and Wilson 1996).

pace of institutional development. It is equally important to recognize, however, that improved environmental policy is also linked to efforts to democratize Russian society. Indeed, only if there is a clearly expressed public demand for environmental improvement will pollution control policies be credible.

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