Financial Mechanisms for Environmental Compliance in Infrastructure Projects

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John Reid

Photo: Ben Sutherland

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Summary

Environmental impact assessments (EIA) are the main regulatory tool governments use to balance the development and environmental values at stake in infrastructure development. Currently, however, project developers' incentive for environmental performance dissipates as soon as environmental approval and financing are secured. To really protect the environment, EIAs need to be accompanied by intelligently structured financial incentives.

Both governments and banks can provide these incentives. Governments must lead, because they control most of the decisions on the planning and implementation of infrastructure. Whether governments own projects or not, they establish the rules and provide the enforcement capacity needed to secure compliance. Banks, for their part, can use a blend of positive and negative incentives during the life of a given loan. Beyond the period of a loan, banks' most powerful incentive is conditioning future access to, or the price of, credit on past environmental performance.

Incentives should be scaled to be on par with the cost of environmental compliance and operate over the entire period of time in which a project's environmental risks are present, which may be longer than the project itself. They should also avoid pushing projects to less-demanding lenders, and aim for fair and politically feasible cost sharing between lenders, private companies, governments and recipients of environmental services.

Among the options presented in this paper, we highlight several for their promise:

- Performance bonds for avoidable impacts of projects, specified in each project's mitigation requirements.
- Up-front deposits for compensation of inevitable impacts, with funds earmarked for specific offsetting compensation in long-term habitat conservation or restoration.
- A carbon deposit-refund system would be a special case of the previous two points, providing an up-front deposit, a part of which could be refunded (like a bond), based on long-term avoidance of impacts.
- Accelerated depreciation in return for high compliance, with corresponding tax penalties for poor performance.
- Access to credit and public contracts conditioned on past environmental performance. At an extreme, any lapse in compliance would relegate developers to a list on which they had no access to credit (from banks participating in the rating scheme) or public bids. Another approach would be to include the environmental score in the overall rating of public bids and as a determinant of the interest rate charged.

We propose several other measures here, approaches that are already widely used, such as fines, and ones that are more exotic, such as variable interest rates. With the

right combination of targeted and timely incentives the coming wave of infrastructure development can be done in a way that's economically sound and conserves natural ecosystems.

1. Introduction

Energy and transportation infrastructure are building blocks of development. Energy is a key input to every industrial process, most agriculture and to the comfort of most people at all economic levels. Roads, railways and shipping permit trade, exploitation of comparative advantage and labor mobility. Governments, state banks and multilateral development banks play central roles in infrastructure projects, which have characteristics that deter free-market investment: long-term payoffs, substantial risk, natural monopolies and the notion that they provide services to which all people have a right, even if they cannot pay.

Infrastructure causes environmental problems by catalyzing the rapid and often chaotic conversion of biologically diverse natural environments to ones dominated by human activity. In light of the unfolding wave of global species extinctions, there is an emerging consensus around the notion that development projects should avoid any net loss of biological diversity. The principle is enshrined in the International Finance Corporation's Performance Standards and the Equator Principles, as well as many countries EIA policies (e.g., Colombia and Peru). Internalizing the full environmental costs of projects through both mitigation of avoidable impacts and compensation of inevitable ones provides an up-front incentive to choose investments with low environmental costs. To make it really work, however, the system needs financial guarantees that developers will actually follow through on their environmental responsibilities.

Environmental impact assessments (EIA) are the main regulatory tool governments use to balance the development and environmental values at stake in infrastructure development. In the 1990s development banks and governments began embracing the more comprehensive Strategic Environmental Assessment, which can look at projects' cumulative impacts, examine them in the context of other dynamics in a region and benefit from more public participation.[1] In theory, these assessments provide a technical framework to protect the environment. But experience to date has not been encouraging; EIAs have been a *pro forma* step on the way to approval of development projects. Material is liberally copied from past studies and mitigation recommendations are usually weak. Developers, on the other hand, see the EIA as a bureaucratic obstacle that allows any project to be delayed indefinitely, costing millions, whether there are legitimate environmental concerns or not. Environmental assessment quality is a readily solvable problem. To really protect the environment, however, they need to be accompanied by intelligently structured financial incentives.

[1] SEAs are valuable regional planning exercises but the individual project decisions usually are made by sector-specific agencies and the priorities of specific companies, not by master planners.

2. Financial incentives for environmental performance

Currently, project developers' incentive for environmental performance dissipates before they have had a chance to act on it. Once environmental approval and financing are secured, governments and lenders have limited tools to enforce promises made in the environmental assessment process. To solve this problem, governments and banks need to put in place a set of mechanisms that encourage project developers to deliver on environmental commitments, using the power of money.

To design incentives right, we start with a few guidelines:

- Scale the incentives to the cost of environmental protection. Incentives that are too small are unlikely to reduce damage. Akella and Cannon (2004) show that the expected cost of fines in Brazil is too low to persuade people to incur the expense of avoiding environmental damage – for example, by not logging valuable timber in a legal reserve. It works the same way with positive incentives; a $5 subsidy for environmentally positive behavior that costs $10 will be ignored. On the other hand, oversized positive incentives needlessly expend financial resources, "overpaying" for performance, while Draconian negative ones can cause a backlash.
- Keep incentives in place during the same time period as the environmental risk is present. In the case of a road, the critical period may be during construction and the first decade or two thereafter, when the heaviest wave of deforestation usually takes place. Maintaining ecological flows downstream of a dam is needed for the entire lifetime of the project, until the dam is removed.
- Avoid pushing projects to lower-quality lenders. If only punitive incentives are used, projects may seek financing from sources with lower environmental standards, or a lower likelihood of enforcement. Incentives should be structured so as to make the overall cost of capital lower for an environmentally sound project than for an irresponsible one.
- Aim for fair and politically feasible cost sharing between lenders, private companies, governments and recipients of environmental services. Strictly speaking, there is no "correct" answer to whom should pay for avoided pollution (Coase 1960). It depends on a politically and culturally determined assignment of property rights to the environmental service and must be worked out to be both equitable and practical.

3. What Governments Can Do

Governments control most of the decisions on the planning and implementation of infrastructure and therefore must lead in providing green incentives. Whether

governments own projects, finance them or merely control environmental and operational approval, they establish the rules and provide the enforcement capacity needed to secure compliance.

Governments must integrate environmental responsibility fully into the sector agency promoting a given development project, as well as into planning and development agencies that may influence decisions across a range of sectors. Risks and duties for the involved agencies need to be clearly delineated and reasonably allocated given each agency's powers and competencies. That means, for example, that a roads agency assumes a financial exposure to the deforestation so often induced by better transportation, rather than leaving a poorly funded environmental agency with the task. While the expert mitigation work may have to be done by people outside the roads department, the funding must be guaranteed through a deposit, bond, insurance or contribution to a trust fund.

Here is a description of incentives governments can deploy to encourage environmental performance:

Performance bonds: A widely used mechanism to ensure compliance with environmental or other agreements is a performance bond. The bond is posted by the project developer and forfeited if the developer fails to perform. The bond is returned with interest if the developer fulfills his obligations. This mechanism is best suited to address direct impacts within the short- to medium-term. Developers would be reluctant to risk a bond for impact over which they have limited control, or to have the bond indefinitely committed. The performance bond is a generic tool of which the carbon deposit proposal is a special case (see below). As with most of the mechanisms presented here, the clear terms and obligations are essential to avoid costly legal disputes.

A variation on the bond is performance insurance. An insurer can write a policy against the risk that the developer will fail to comply with environmental agreements. While the developer's short-term loss in the case of non-compliance would be limited to the premium, rather than a presumably much larger bond, access to future insurance would be compromised, or made more expensive, by causing the insurer to pay a claim.

Financial assurances such as performance bonds and insurance are used in the United States in a variety of cases, including landfills, transportation and treatment of hazardous materials, offshore oil and gas operations, underground fuel tanks, nuclear facilities and mines. Boyd (2001) stresses the importance of up-front financial commitments, pointing to the hundreds of millions of dollars in publicly-funded cleanups needed annually because private companies declare bankruptcy to avoid cleanup obligations.

Ecological Compensation and Mitigation Deposits: In the previous section we noted the usefulness of bonds to ensure short-term environmental compliance with obligations under the developers' control. A different approach is needed where the environmental impacts are largely outside the control or competence of the project developer or last for such a long time that a bond would have to be posted permanently. In these cases, developers need to commit, up-front, adequate funds to pay for mitigation and compensation, sometimes in perpetuity. There are several different generic approaches to these up front payments. The approach exemplified by Brazil imposes a fee equal to a percentage of the project's capital cost, paid into a dedicated environmental fund. At the federal level, the ceiling is 0.5%. The environmental investment has little relationship to the environmental damage caused by the industrial activity and the payment varies only slightly under the cap, depending on the proximity of the project to sensitive or protected areas. Some Brazilian states use the same approach but allow higher percentages; Pará's law has a range from 0-2%. The advantage of this arrangement is that companies and agencies are not saddled with environmental management tasks outside their expertise and alien to their own financial interests. Funds flow to an agency with an interest and capacity aligned with environmental conservation, and the financial commitment is made up front.

Calculating the amount of the fee in such a system involves a tradeoff. A fee based on a fixed percentage of capital investment is simple, keeps transaction costs low and avoids disputes over the appropriate level of payments. However, the relationship between capital investment and environmental damage is anything but linear. Certain dams may have huge up-front costs and do relatively little damage, compared to roads, where maintenance costs are a greater share of total costs, and damage can be orders of magnitude greater. At the other extreme, a precise and complete estimate of environmental costs for every project be a very costly research undertaking.

One possible compromise between simplicity and specificity is an index that would generally make higher-impact projects more expensive, but would not purport to actually estimate environmental costs. Criteria could include Table 4's first two in the simplest system, and those shaded in a more detailed index:

Table 1 – Index for flat compensation fees	
Type of project	Urban road, rural road, storage dam, run-of-river dam, navigation locks, powerline, pipeline, airport, etc.
Capacity	Lanes, MW installed, area flooded, tons cargo/day, Kv, volume of oil, gas or water, flights, etc.
Population displaced	Number of people
Type of ecosystem affected	Already altered, intact natural forest, intact grassland, intact wetland, etc. Modified v. natural v. critical habitats.

Source: Author

Another practical solution is to base developers' financial commitment on the costs of "replacement" of the damaged ecosystem. Actual compensation sites would be identified for conservation or restoration work. Colombia uses this sort of system requiring that a multiple between 4-10 be used to calculate the extent of the compensation site. The long-term costs of protecting or restoring the compensation site would be put in escrow and the environmental work undertaken by the developer or a competent third party, who could be a public or private organization. The financial mechanism used here would also apply to mitigation of certain long-term avoidable impacts, such as deforestation indirectly induced by road projects.

Carbon deposits: A variant on the *permanent* funding for road-induced deforestation avoidance is a *long-term* bond of sorts. Deforestation can release hundreds of tons of carbon per hectare. Typical road-induced deforestation can be projected based on spatial models and easily measured *ex post*, presenting an opportunity for a carbon-based incentive. Emission reduction credits in the amount of road-induced deforestation would be added to the construction budget and purchased by the road agency before construction. At five-year intervals after the road is inaugurated, the agency could sell any credits in excess of those needed to cover deforestation actually induced by the road project.

For example, suppose that 100,000 hectares of forest would usually be cleared over a 20-year period as the result of a project, with net carbon emissions of 10 million tons of carbon dioxide. The road agency would initially have to hold 10 million one-ton credits. At the end of each five year period, the agency could sell the quantity of credits corresponding to avoided deforestation in that period, at prevailing market prices. At the end of the period the agency would have to continue holding enough credits to cover the total deforestation covered by the project, six million in our example.

Table 2 – Carbon emission deposit for road projects

Years	1-5	6-10	11-15	16-20	Total
Expected deforestation (ha)	40,000	30,000	20,000	10,000	100,000
Actual deforestation (ha)	25,000	15,000	10,000	10,000	60,000
Avoided deforestation (ha)	15,000	15,000	10,000	0	40,000
Avoided emissions	1.5 million	1.5 million	1 million	0	4 million

(tons C)					
Credits held at end of period	8.5 million	7 million	6 million	6 million	

Source: Author

There are many possible variations on this idea, and obviously a need to consider the nature of markets that may eventually exist from emissions reductions from forests. One key feature in any such mechanism is the initial deposit by the road developer against projected emissions. If credits were awarded for avoided deforestation without the up-front payment, carbon credits would provide a perverse incentive for more road building. Likewise, there must be an ongoing incentive to reduce emissions. Because road builders and operators have little authority over land use, a government agency is the logical depositor and holder of credits. One possibly controversial aspect of this proposal is that it places the cost of carbon emissions on the government whose road-building causes them. This assignment of responsibility runs into the ever-difficult issue of who is responsible for curbing global warming. Some cost-sharing (through a discounted emission credit price, for example) among rich countries and the country in question would attenuate this problem.

Carbon payments are less applicable to hydroelectric dams. Dams cause greenhouse gas emissions by flooding and/or removing vegetation and may avoid emissions from other energy sources. Whatever the net effect, the dam builder and operator's ability to change the level of emissions based on management decisions is very limited. Access roads and other infrastructure associated with dam sites are big contributors to deforestation and could be handled in the same way as pure road projects.

Fines: The simplest negative financial incentive is the fine. And while fines are culturally accepted, they often fail to deliver results. Sometimes that's because they are lower than the cost of environmental compliance. In most instances, the "expected value" of the fine is much lower than the stated value because violators do not expect the government to collect the fines in full or in every case (Akella and Cannon 2004). Collection is easier where the government is the violator, or has a payment stream to the violator that can be interrupted (payments from a public utility to a power station, for example). Fines will likely remain as a standard management tool for governments to encourage environmental performance, but they have not proved effective on their own, especially where violators have recourse to a weak judicial system.

Suspension of construction/operation: Another sort of financial penalty, which can be easier to enforce, is a suspension in construction or operation of a project until environmental compliance is achieved. Lost revenue, disruption in supply chains, problems with vendors, mounting interest payments and continued payment of fixed costs are at least as compelling to a project developer as a simple fine. This is more politically feasible during construction than during operation, particularly if a vital service such as energy, water or transportation is at stake (which it usually is). The high

cost and disruptiveness of this measure makes it both potentially very effective and also unreliable as a stand-alone measure; it will work extremely well in the cases where officials are bold enough to use it. It is perhaps best suited to large hydro projects, where other power sources can be relied upon for short periods of time and where there's a revenue stream that would be interrupted (in contrast to non-toll roads).

Accelerated depreciation: Governments can permit accelerated depreciation for long-lasting assets such as roads, bridges, power lines, pipelines and dams – as long as environmental conditions are met during construction and operation. In countries with corporate income taxes, depreciating assets early reduces a company's tax liability in the short run, deferring some taxes until later and thus reducing the present value of the overall payments. Once assets are fully depreciated, other incentives, such as tax penalties, could be used.

Contractor bonuses: Another way of accomplishing the same end as accelerated depreciation is to simply provide the contractor with a fixed bonus for environmental performance during construction, in the same way that bonuses are given for early delivery.

Preference in bidding: Governments can include a rating of developers' past environmental performance as a criterion in evaluating bids for current projects. Such as system would encourage developers to sustain environmental compliance over time. It would, however, require that several firms bid on every project and that the environmental rating be a sufficiently highly-weighted variable. This environmental rating system is revisited in the next section, on banks.

4. What Banks Can Do

Currently, a bank's leverage for environmental performance is based on withholding money until a borrower agrees to and/or complies with certain terms, including environmental ones. This indirect influence over environmental outcomes evaporates entirely if a bank is unwilling to impose consequences for non-compliance, or extend additional rewards for good performance. The Equator Principles language on enforcement is unimpressive, if understandable, in its vagueness:

> Where a client is not in compliance with its environmental and social covenants, the EPFI [Equator Principles Financial Institution] will work with the client on remedial actions to bring the Project back into compliance to the extent feasible. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, as considered appropriate. (Equator Principles Association, 2013)

As a first step, therefore, banks should institutionalize a blend of the incentives presented here during the life of a given loan. Beyond the period of a loan, banks' most powerful incentive is conditioning future access to credit on past environmental performance. This policy can be absolute, extending credit only to borrowers with no outstanding environmental obligations, or incremental, basing the cost of credit on an environmental rating.

Development banks' leverage is based on their ability to provide capital on terms more attractive than those offered by competitors. Competitors include private banks, private equity investors, export credit agencies and construction companies. In the past, development banks' tolerance for the risk of default gave them a large role in public investments in developing countries. That advantage has dissipated due to the advances in economic development and fiscal discipline in many developing countries.

Development banks can remain competitive due to the large value they add as research and grant-making institutions and through low interest rates. And, by combining both positive and negative environmental incentives, banks can minimize or eliminate the need to further subsidize credit to attract borrowers to environmentally demanding loans.

The first three of the options below involve adjustments to loan terms during the life of the loan, based on environmental performance. We realize that these proposals introduce uncertainty that is unlikely to be accepted by private banks. They also propose an environmental determinant of the price of capital that is not reflected in the cost banks face in obtaining money. In other words, they cannot pass the cost on to investors. Nonetheless, we present these ideas with an eye to government and international development banks, funded by taxpayers and able to price public goods into credit. The last two ideas should be feasible for all banks.

Variable interest rates: One way to internalize environmental costs into a project is through the borrowing cost. Interest rates on debt-financed projects are traditionally a function of the level of risk involved in the business, the creditworthiness of the borrower and lending policies of the bank in question. Environmental (or social) performance does not come into the equation. Because interest is paid over the lifetime of the project loan, it represents a mechanism to induce sustained environmental performance by the borrower.

Here's how it could work: An interest rate band of, say, 3-8% could be established in the loan agreement. The midpoint would correspond to basic compliance with provisions of an environmental assessment and environmental regulations. Performance above and beyond those regulations during a certain period would cause an interest rate drop for the following period, while violations would result in an increased rate.

There are some practical considerations. First, the lender and borrower have exactly opposite interests, so adjustments in the rate represent a zero-sum game. An outside arbiter of environmental performance would have to be selected at random from a qualified pool, and paid from an escrow account set up for the project. Second, as the outstanding principal declines, so does the interest portion of loan payments. For interest payments to continue to influence behavior, the band around the central rate would have to widen as the loan matured. Further, the application of this mechanism is obviously limited where debt represents a small fraction of project financing. Dams and toll roads may be funded with private capital. Projects in general may be funded straight from government budgets. Finally, rates have to vary enough to influence behavior, but not so much as to introduce intolerable uncertainty.

Interest rates based on environmental performance could be feasible for all sorts of infrastructure, but care should be taken to establish performance criteria over which the borrower can exert control. This mechanism likely would need to be combined with others, in view of the limitations noted.

Extended grace and payment periods: Long grace periods and extended payment periods are common features of public lending in developing countries, where governments wish to encourage investments in sectors such as agriculture that are risky and have long payback periods. In the United States, federal education loans provide a grace period lasting until the borrower has completed his or her degree. Low-income students receive an interest subsidy during this period. The same principle could be applied to environmental performance. Grace and payment periods could be extended where environmental standards have been met or exceeded during construction. Continued performance during operation could be a condition of maintaining the long payment period. As with variable interest rates, changes in the payment period would have to strike a balance between providing a significant incentive and keeping uncertainty within bounds. Further there are limits on delaying payments, as the bank's own cash flow depends on revenues generated by the investments it finances.

Interest during construction rebates: Interest during construction (IDC) can be a significant cost of large projects with long construction periods. Large dams are often built with construction loans and then refinanced for operation. A $2 billion project with an annual IDC rate of 10% and a five-year construction schedule can accumulate $244 million in interest due at refinancing. In the dam example, a major impact during construction is that on the people who must be resettled to make way for the project. Resettlement and compensation have seldom been adequate (World Commission on Dams 2000). If resettlement was done according to a consensual process with affected people, the dam developer could be provided an IDC rebate. Clearly there is a cost involved for the bank, but there are also benefits in the form of reduced risk of conflict and of project delays that can keep the construction loan on the bank's books.

Conditionality of future borrowing: Leading development banks like Andean Development Corporation (CAF) the Brazilian Development Bank (BNDES), the World Bank, and various other regional development lenders can have a large positive impact on compliance by making future loan eligibility contingent on environmental performance during the entire period of a current loan. This is perhaps the simplest and most powerful incentive banks have to encourage environmental excellence. To exploit this tool, the first step is to include environmental conditions in all infrastructure loans. Then the link between current performance and future access to credit must become bank policy, rather than a matter of discretion. The policy would not be confined to borrowing governments; contractors supplying services to governments would also have to have environmental credentials in order.

Environmental rating of borrower: A more nuanced approach, for borrowers that meet minimal standards of performance, is an environmental rating system, akin to bond ratings, that would determine the interest rate at which a borrower has access to development bank funding. This solution has advantages over the mid-project adjustment of interest rates in that there is more predictability for the borrower. Also the borrowing cost reflects a longer track record of performance. Issues of subjective judgment remain. And, changes in corporate or governmental culture and standards are slower to show benefits for the firm or agency, because past sins will slow a borrower's access to cheaper debt. In the case of governments, one administration has limited incentive to preserve a good rating for the next.

4. Making incentives work: practical considerations

Implementing such reforms presents practical challenges. First, many performance-based measures require judgment. An impartial third party must make these judgments. We suggest that this role be played by experts selected at random from a pool of accredited consultants and paid from an escrow account funded by the project. To make the system more robust, the scope for subjective judgment must be minimized. For example, in the case of a hydroelectric dam, one appropriate criterion for assessing performance would be maintenance of an agreed level ecologically acceptable minimum flows downstream. It is easily measurable, requiring no qualitative judgment.

A second point to keep in mind is the project developer's degree of control over performance criteria. A road agency, for instance, has a high level of control over keeping cut material out of streams. It has a moderate degree of control – through cooperation with other agencies – over induced deforestation. It has very little control over the extent of fires in an El Niño year. Criteria shouldn't necessarily be limited to those over which the developer has a high degree of control. In fact, one of the greatest advances governments need to achieve is the integration of infrastructure operation and ecosystem protection. Reasonable limits, however, need to be placed on the

developers' liability, just as they are in many other kinds of contracts. For instance, a government might commit to mitigate a road's damage by setting up a protected area. They should decree the area, resolve land-tenure issues, compensate affected people, install park infrastructure, hire staff and deposit funds in the country's environmental trust fund to cover recurrent costs. Doing all that would constitute good environmental performance, even if the park were adversely affected by storms, fires or other factors beyond their control. There's nothing new about environmental licensing agreements that entail some level of subjective judgment on performance. The difference in this case is that there would be real money at stake.

The final practical consideration worth noting is that some of the incentive tools proposed apply only to debt-financed projects. Equity investors have a more direct stake in the financial performance of the project and few are likely to add environmental costs not positively related to financial results. Table X shows which incentives could be applied in equity-funded projects.

5. Conclusion

This paper proposes that lasting financial incentives can improve the environmental performance of infrastructure investments. To improve environmental performance, banks and governments need not devise yet another generation of improved environmental assessments. The current ones just need to be taken seriously, for which financial incentives are a necessary condition.

Will it cost more to develop infrastructure as recommended in this paper? In financial terms, it sometimes will, but overall economic results will be better. First, there will be fewer conflict-driven delays. Second, low-environmental-cost sites are more likely to be chosen. Third, a more efficient overall level of environmental damage to public goods is likely to result. And finally, those extra costs that are incurred in environmental mitigation and compensation will effectively convert public economic costs into private financial ones, which, in most cases can (and should) be paid for by users of the infrastructure.

Table 3 – Summary of Financial Mechanisms for Greener Infrastructure			
	Works with equity projects	Comments	Who pays?
GOVERNMENTS			
Performance bond/insurance	Yes	Assures resources available for mitigating damage and provides	No one pays for bonds if developer performs. Developer pays for

		ongoing incentive for performance; downside: as stand-alone doesn't provide money to offset inevitable impacts (as compensation fee does)	insurance.
Mitigation/compensation fee (up front)	Yes	Assures resources for mitigation or compensation; implementation done by experts; downside: no ongoing incentive for performance	Developer pays flat fee for anticipated damage.
Carbon deposit	Yes	Carbon is quantifiable and representative of many forest values. Anticipates possible national forest carbon targets. Incentive active for every ton.	Developer/public works agency pays deposit and receives refund for all reductions in deforestation below expected amount. Cost of deposit and deforestation avoidance measures ultimately fall on taxpayers.
Fines	Yes	Probably part of any incentive toolbox but ineffective as stand-alone because evasion too easy	Developer pays for actual infractions.
Suspension of construction/operation	Yes	Suspension of construction more practical than of operation because infrastructure provides essential services; police power may be required; backlash against putting people out of work. Upside: a cost is imposed without the trouble of	Developer pays in the case of noncompliance. Consumers may also pay in the form of service interruption.

		a financial transaction (as in the case of a fine).	
Accelerated depreciation	Yes	Tested, financial exposure small relative to overall government revenues.	Government (taxpayers)
Contractor bonus	Yes	Discrete, foreseeable incentive for construction phase	Lender or government pays
Preference in bidding/licensing based on environmental rating	Yes	Advantages of previous two incentives apply; could be used in conjunction with the second, doubling the value of environmental achievement for firms.	Developer pays/benefits.
BANKS			
Variable interest rate	No	Wide rate band required for low-leverage projects, projects nearing payoff; unpredictable cash flows.	Developer pays or benefits depending on level of performance. No cost to lender if average rate is equal to current average rate.
Extended grace, payment period	No	Applies to high-leverage projects.	Lender pays.
Interest during construction rebate	No	Simple, discrete incentive for reducing construction impacts. Uncertainty limited in time.	Lender pays.
Future access to credit	Yes	Continual incentive provided both for builders and operators of infrastructure; applicable to public and private borrowers; no complex loan terms required; no transaction cost.	Developer pays in the case of noncompliance.
Price of future borrowing based on environmental rating	Yes	Advantages of previous incentive apply here; in contrast to cutting off	Developer pays/benefits. No cost to lender if the average

		credit, variable pricing more easily allows past failures to be rectified by good performance.	rate is equal to current average lending rate.

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