

Reforming the Mode of Industrial Pollution Control through Interdisciplinary Collaboration

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China's industrial sector, which contributed 42.6% to national GDP in 2014, is a major pollution source and generates numerous regulatory obligations for environmental protection departments. For decades, China adopted command and control as the only regulation approach for industrial pollution, in which industrial polluters assumed responsibility for eliminating and controlling the pollution by themselves (see Figure 1a), and paid a fee for discharging pollutants. This mode, however, has proved to be inefficient in practice because of short-term economic reasons, inadequate supervision, and insufficient law enforcement. China is now developing a system of third party governance in industrial pollution control processes. Using a market-based approach, the key of this reform is to establish an active and standardized market trading industrial pollution control services (see Figure 1b), where polluters sign contracts with environmental companies who will operate, and if necessary, finance and construct pollution control facilities. Through this change, supervision burden of numerous industrial polluters will be transmitted to and concentrated on a relatively small number of service providers. Moreover, because the service is based on independent commercial businesses, their information about pollutant discharge will be more open to public, facilitating self-restraint and social supervision. For this idea to come to fruition, comprehensive measures need to be given by both government and market actors. Additionally, the reform will offer

opportunities for interdisciplinary research between the fields of environmental science, engineering, and social science.

The first step of this reform is to clearly understand and attribute liability. The major debate is whether the liability of environmental damage should be transferred to the service provider when they are contracted for the project, which creates a gray area of responsibility between the polluter and the service provider. A practical solution is that polluter shall bear legal liability and shall pay for the environmental damage and the cost to prevent it, while the service provider tasked with pollution control shall take corresponding responsibility for inappropriate activities. In return, the polluter shall obtain benefits like a cap and trade allowance or subsidies. This is in accordance with the polluter-pays principle and will encourage the polluter and the service provider into taking the responsibility and supervising each other, while also ensuring greater environmental concern.

The formation of service demand will then shape the market. Although stringent regulations and enforcement on industrial pollution can increase external pressure for polluters to increase environmental performance, price will drive them to translate the cost of compliance into market demand internally, particularly because China will double pollutant discharge fees in July 2015. Compared with the polluters, the professional services providers can save procurement costs because of an improved flow of information and services in the environmental industry; the service providers have scale and technical advantages regarding pollution control, which enable them to reduce cost of day-to-day operations, maintenance, and to more easily reach discharge standards for pollutants. Other policies such as a tiered penalty system can be designed for polluters to accelerate the outsourcing of pollution control service. With prices serving as leverage to guide the market behaviors, polluters will take greater initiative to purchase specialized services to reduce the expenditures on pollution treatment and discharge.

Following this, the environmental industry will need to upgrade to meet the demand. In the past, environmental companies were mainly material or equipment manufacturers or construction contractors, and now they will need to become service providers. The present service providers in the Chinese environmental service market primarily focus on public projects, like urban wastewater treatment plants or municipal waste disposal projects. Industrial pollution control, however, is more diversified and complicated. A prominent problem for current service providers is the lack of ability to provide

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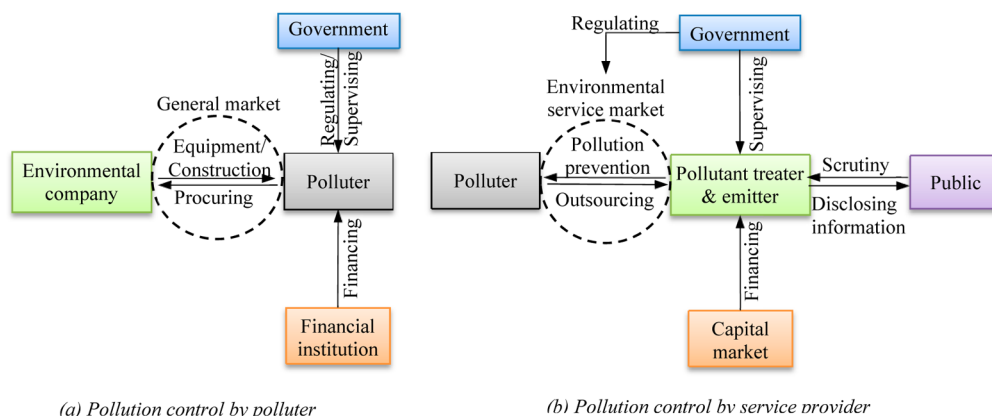


Figure 1. Modes of industrial pollution control by polluter and by service provider.

comprehensive and integrated services to industrial customers. In addition to individual research and development, setting up industry technology innovation alliances is a potential strategy to meet this challenge. On the basis of symbiotic theory, the alliance is an association of service providers with different strengths that will develop their collective ability to extend service scopes and develop technology criteria and service specifications. Economies of scale and an increase of scope created by the alliance will be shared by the members. Furthermore, the long-term and stable payment of service can attract additional capital from diversified financing channels to fill the funding gap, while stimulating growth and development of the environmental service industry.

Finally, the service model needs to be diversified and standardized. Although scientific and engineering information is necessary to identify quality levels, business owners are often critical when developing successful implementation models. When the contractor receives financial benefit, such as saving on discharge fee, income from subsidies or a cap and trade allowance with the polluters, the contractor can be further inspired to improve the pollution control effectiveness. It should be noted that the risk to the polluter's business may hinder the contract execution. Managing transaction exposure is an area that needs to be studied, especially when contractors finance the construction. During this reform, environmental performance-based service contracting will need more studies completed and practices developed which will integrate technical and economic expertise to inform the contractual arrangements to ensure that payment leads to measurable environmental objectives.

The aim of introducing a market factor into industrial pollution control is to improve the efficiency of facilities, plants operating, and the use of capital. The service provider will develop their capacity due to opportunity and pressure from the free market. To this end, interdisciplinary collaboration is needed to develop an innovative institutional context and integrated environmental solutions that will achieve three benefits: a reduction in industrial pollution, an improvement in industry supervision, and a more progressive environmental industry.

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Notes

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