Development of National Wastewater Tariff Guidelines for China

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Abstract National wastewater tariff guidelines have been prepared in draft form, encompassing calculation methodologies supported by institutional, legal and regulatory policy recommendations. These are based on evaluations of wastewater management in 4 Case Study Cities in China, and a review of international best practices in 7 countries. Key policy recommendations include: user charges to be increased progressively to full cost recovery, subject to affordability and local circumstances; wastewater charges to be based on the volume of metered public water supply or self-supplied groundwater; all water supply customers can be charged as beneficiaries before receiving wastewater service, to finance phased development of the wastewater service area; and prohibition of exemptions, discounts or delays in payment for politically-well-connected industries or institutions. Over time, major industrial polluters may be charged on a two-part tariff based on volume of wastewater and pollution load (BOD, COD or SS). Collection of wastewater fees on a single bill with water supply is preferred. Application of the tariff guidelines in the 4 Case Study Cities found the combination of water supply and wastewater fees would be affordable, at 1.5% to 2.9% of income for the average household, and at 2.2% to 3.6% of income for poor households.

Keywords China, financing, public/private partnerships, rate setting, urban infrastructure, wastewater.

Introduction

Draft national guidelines on wastewater tariffs have been developed under a technical assistance study funded by the Asian Development Bank (ADB) and sponsored by the Ministry of Construction (MOC) of the Peoples Republic of China (PRC). The draft guidelines, and supporting institutional, legal, and regulatory policy recommendations, are based on detailed evaluation of wastewater management in four Case Study Cities - Chongqing, Changzhou, Tangshan, and Zhangjiakou – that provided a good perspective for the formulation of the guidelines. Full documentation of the guidelines and study reports are available on the ADB web page1. The views expressed are those of the authors, and are not necessarily those of either ADB or MOC.

Financing of wastewater systems is a significant issue in China, which faces the need for large capital investments in water pollution control required by the rapid urbanization of China, the shortage of water resources (particularly in northern China), the heavily polluted state of most lakes and rivers, and economic restructuring which places more financial responsibility in the hands of local government and utility service providers. Capital investment in urban wastewater facilities has been running at a level of about 15 billion Yuan annually in recent years. Cities need tariff revenue both to cover operations and maintenance costs, and a portion of the initial capital costs to develop new wastewater systems.

The focus of the study is to promote financial sustainability of municipal wastewater management agencies/enterprises in China, through proposed tariff structures that will provide assured cost recovery through revenue obtained from the users and beneficiaries of the wastewater systems. This strengthened revenue source would be an improvement over the politically uncertain funding and subsidies available from municipal budgets. Wastewater tariff reforms are part of much broader economic and structural reforms taking place within China.

The study, conducted in 2002-2003, took place during rapid development of municipal wastewater systems in China, which can be illustrated by comparing national statistics for the years 2001 and 2004. In just 3 years, the

1 http://www.adb.org/Projects/Wastewater-Tariffs/

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number of municipal treatment plants increased from 452 to 708; the cities served increased from about 200 to 364 (out of 661 cities in China); and the percentage of wastewater receiving treatment increased from 35% to 45%. This is 7 to 9 times more than the percentage treated a decade earlier. The total annual municipal wastewater volume has declined, from 42.8 to 35.6 billion cubic meters, of which industry generates about half. This reduction is attributed in part to demand elasticity responding to higher prices for water supply and wastewater; and in part to improvements in water efficiency and water restrictions imposed on industry. The number of cities that charge wastewater tariffs has increased from approximately 300 to 475; the remaining cities are being urged to implement tariff systems as their wastewater treatment projects are approved and implemented.

Methods
A review of the wastewater sector in China was undertaken, to identify potential improvements in tariff structures and institutional arrangements. The review also provided a perspective on the needs and status of water pollution control, and current plans and targets for municipal wastewater collection and treatment. The review paid detailed attention to the existing institutional and legal framework, and the existing regulations that govern the setting, approval and collection of wastewater tariffs. Typically, wastewater companies were formed to provide a commercial utility service, but their financial autonomy was hampered by institutional arrangements: their revenue was collected by water supply companies, transferred to municipal finance bureaus, and only sufficient money to pay actual cash expenses was received by the wastewater company. Tariff levels were often established by Price Bureaus in a political process that resulted in insufficient revenues and a need for subsidies from the municipality.

The institutional arrangements and tariff structures developed during the study took into account a review of international best practices and experience in USA, Canada, UK, Germany, Singapore, Australia and Japan, adapted to the circumstances found in China. In each foreign country several cities were considered, such as Los Angeles and Boston in the USA. Wastewater service providers included public agencies such as the Massachusetts Water Resources Authority in Boston, and private companies such as Thames Water Co serving the London region in the UK.

Relevant policies, objectives and structures for wastewater tariffs were identified as essential to the development of national guidelines. Financial, social and administrative factors or criteria for the policies and objectives were spelled out in relation to: financial sustainability and full cost recovery; economic efficiency; price equity in accordance with the Polluter Pays principle; administrative efficiency and good governance; and affordability and universal access. In general, the study involved the development of sufficient detail on each topic to provide guidance to cities, as a supplement to existing policies and regulations that generally lacked sufficient detail.

The study benefited from the active participation of representatives from four Case Study Cities, and from MOC, State Environmental Protection Administration (SEPA), National Development and Reform Commission, Ministry of Finance, and the legislative committee of the Peoples Congress. Interim results from the study were reviewed by these agencies and ADB representatives, and discussed at 3 workshops. The resulting feedback and review comments were incorporated into the final results of the study.

Results and Discussion
The thrust of the tariff guidelines is to support the evolution of wastewater agencies in becoming self-sustained commercially-based autonomous enterprises, and of Government in becoming a service regulator rather than a micro-managing service provider. Such improvements in tariff structures and institutional arrangements will also lay the foundation for future private/public partnerships, as the need for additional sources of capital, expertise, and management efficiency become recognized by the municipalities.

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Draft guidelines were the key result from the study. Key policies incorporated into the tariff guidelines include: adoption of the principles of “the polluter pays” and “the beneficiary contributes”; user charges to be increased progressively to full cost recovery, subject to affordability and local circumstances; wastewater charges to be based on the volume of metered public water supply or metered self-supplied groundwater; wastewater charges can be imposed for a longer period (three years) than at present, before completion of initial-phase wastewater facilities, to aid in financing of construction; all customers of an urban water supply company can be charged for wastewater, whether or not their wastewater is collected and treated (so that tariff levels can be increased gradually as the wastewater service area grows in phases); legal classification of wastewater charges to exempt them from VAT; prohibitions against exemptions, discounts, or delays in payment of arrears by politically-well-connected industries or institutions.

In the past, industries owned by the cities or higher levels of government were willing to pay 2 or 3 times the residential price. As market forces on industry have taken hold, industries have become less willing to subsidize domestic users, and in fact would prefer a concessionary rate to improve their market competitiveness. There has been a noticeable movement over the last 10 years toward charging the same prices to all users, whether domestic, commercial or institutional. The tariff guidelines give preference to a tariff structure that is based on the actual costs incurred for each type of customer, rather than cross-subsidies between customers.

The tariff guidelines propose that cities should, over time, consider wastewater charges to major industries that would consist of a two-part tariff, based on volume of wastewater and pollution load (COD, BOD or SS). However, the portion of the tariff associated with the pollution load was found to be relatively small compared to the volumetric charge, for several of the Case Study Cities. Hence a volume-based tariff is considered to be an equitable basis for cost recovery. It was concluded that another type of two-part tariff, consisting of a fixed charge per household and a variable charge based on metered volumes, would have disadvantages in China: the high fixed charge would discriminate against the poorer customers; the reduced volume charge would be less effective in encouraging water conservation; and (as in other countries) a more complex tariff structure would create difficulties in understanding and acceptance by the customers. Collection of wastewater fees on a single bill with water supply is also recommended in the tariff guidelines, to improve the percentage of billed revenue that is collected, since customers in arrears want to avoid being disconnected from the water supply system.

Trial application of the tariff guidelines to the four Case Study Cities showed that the resulting tariffs would be affordable to average-income households (at average per capita water use) and low-income households (at lower levels of per capita water use). The guidelines propose that the combined bill for water supply and wastewater should be less than 5% of household income. Under the most stringent circumstances (the first year of operation, when debt service commences and billable volumes are lowest), the average household would pay 1.5% to 2.9% of income, while the poor household would pay 2.2% to 3.6%.

Strengthening of wastewater management in China requires, in addition to an improved tariff structure, a variety of improvements to the policy and legal framework. These include: increased commercialization and private-sector financing; water management on a catchment basis, to prioritize investments and to promote appropriate effluent reuse; improved regulatory and supervisory arrangements between municipal government and legally-incorporated wastewater companies; integrated wastewater management within municipalities, by eliminating district-level management of wastewater collection; strengthening of SEPA’s authority to monitor and regulate municipal wastewater treatment (in addition to industrial wastewater treatment); greater involvement by wastewater companies in industrial discharge permits and monitoring of pre-treatment for industrial discharges to municipal sewers; and provision of subsidies for the poor as part of the general welfare provisions of a city, rather than being given or paid directly by the wastewater company.

The study developed detailed recommendations on the issues related to wastewater tariff policies and structures. Financial sustainability and full cost recovery was proposed to encompass coverage of cash flow needs, debt service
costs, asset replacement or depreciation, and an 8% rate of return on net fixed assets. Price equity and application of the Polluter Pays Principle meant that the prices charged to each customer should be related to the actual expenses that can be traced to each customer, and that eventually major industrial polluters should pay based both on wastewater volume and pollution load, in accordance with the Mogden formula. Administrative efficiency and good governance require tariff structures that are clear and understandable to customers, simple to calculate, and easy to implement and operate. Affordability by households is to be assured by a combined bill for water supply and wastewater that is less than 5% of household income, for monthly water use of 14 m³ for an average-income household, and 9 m³ for a low-income household.

Wastewater management issues were also addressed under the study. China has instigated significant initiatives in environmental protection and wastewater management - monitoring, regulation, financing, private sector financing, river basin planning, and joint billing of water supply and wastewater charges. Areas identified for improvement include: integrated wastewater management (with a single agency responsible for wastewater collection at the district level, as well as wastewater treatment at the city-wide level); wastewater service provided by an incorporated commercial enterprise rather than a municipal department; facilitating greater private-sector involvement; and developing mechanisms for regulation of the prices and performance of public utilities (developing information systems, assuring transparency and stakeholder participation, developing a regulatory appeals process, and setting time limits (say, 6 months) for making decisions on setting wastewater tariffs.

Stakeholder discussion emphasized the need for the tariff guidelines to be practical and to give definitive advice. The agreed approach was to issue a total package of modular materials to local government that would be in more detail than those usually issued by the central organs of government in China. The Guidelines are a relatively brief document of 37 clauses, while the details, examples, and methodologies are given in a series of Annexes: Rationale and Explanations; Tariff Calculation Methodology, Model Agreement for Tariff Billing and Collection; Penalties and Administrative Remedies for Non-payment; and Model Contract for Industrial Discharges to Sewer Networks. The methodology for developing the wastewater tariff uses data obtained in the Case Study Cities in a generic financial model that includes the various financial projections that are required (water supply sales; the volumes of wastewater to be collected, pumped and treated; operating costs, investment costs, funding assumptions).

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Conclusions

The rapid economic development of China is reflected in extensive industrial and urban development, which have led to severe water pollution problems. China has undertaken an ambitious program in development of municipal wastewater systems, but much of the financial burden for building and operating these systems must be transferred to the users. The previous socialistic methods of setting prices for utility services are inadequate to the task, and an improved methodology for establishing equitable affordable tariffs is required. The draft national tariff guidelines developed under this study can fulfil this need, and can contribute significantly toward a cleaner urban and aquatic environment in China.
References

Use the web page address in Footnote 1 to obtain copies of 23 PDF files that contain all submittals made under the study.