Improving the Performance of China’s Urban Water Utilities

In the 1990s, China’s water supply infrastructure was in a very poor state. Municipal wastewater treatment was almost nonexistent. Public utilities were inefficient. Prices for water were unsustainably low. Since then, large investments have been made in water supply and wastewater infrastructure, and tariffs for water and wastewater have increased. China’s national ministries and agencies have issued directives on water pricing, utility regulation, wastewater treatment, private sector participation, and other reforms. Chinese and international companies are now active in the sector. However, many complex financial, institutional, and technical challenges lie ahead. China’s water supplies are limited, its rivers are among the most polluted in the world, and its coastal waters are on the brink of ecological collapse.

What is to be done?

A vision for the water sector in 2020

China’s water challenges are addressed in a national vision for the sector in 2020. Four points figure prominently:

Responding to rapid urbanization. China’s urban population increased from 300 million in 1990 to 550 million in 2005 and will approach 900 million by 2020. Urban water services must be provided to these new residents, while utilities adjust to new spatial patterns of urban development.

Dealing with urban diversity. Different types of cities pose different economic and environmental issues. The study divides China’s cities into two groups to help facilitate policy analysis. In 2005, 150 “high-capacity cities” had a total population of 200 million. Included in that category are cities with per capita GDP of more than RMB 24,000 ($3,000), and those with a population of at least 500,000 people and a per capita GDP of more than RMB 12,000 ($1,500). Low-capacity cities are all other cities and towns in China, with a total population of around 400 million. The concept of high- and low-capacity cities, devised to facilitate policy discussion, underscores that some cities can aspire now to standards of urban water services enjoyed by high-income countries, whereas others face constraints typical of lower-middle income countries around the world.

Meeting investment demands. Growth in urban population and efforts to improve the quality of water services require an accelerated capital works program. Investment needs for 2006–10 are approximately equal to investments over the last 15 years.

Confronting water scarcity and degradation. Water scarcity affects China’s northern basins (Hai, Huai, and Huang), where per capita water availability is well below the 1,000 m³/year standard for water stress. In 2003, 40 percent of China’s rivers were

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classified as severely polluted. China’s coastal waters have widespread eutrophication.

Achieving the 2020 vision would bring considerable benefits in environmental protection, public health, economic efficiency, and equity. Progress has been made on some fronts, indicating the possibility of much greater gains down the road. For example, pollutants from industrial and domestic sources decreased from 22 million tons of chemical oxygen demand in 1995 to 13 million in 2004. By 2020, total industrial and domestic pollution could be reduced to 3 million tons. Improving the efficiency of capital investments in water operations could bring savings of RMB 100 billion ($12.5 billion). And adopting measures to compensate for inequities in for urban water services would help alleviate social tensions.

**Performance challenges**

Improving the quality of service and operating efficiency of China’s water utilities poses particular challenges. Presently, most Chinese utilities operate below the average for advanced industrial countries, but there is wide distribution of performance. Practices of well-performing utilities could be adopted by other cities, an effort that would be aided by more complete reporting of performance data.

One in four utilities is unable to provide adequate water pressure to more than 40 percent of its service area. Around 60 percent of China’s 661 cities face seasonal water shortages, and more than 100 have severe water constraints. On average, 20 percent of water produced at water treatment plants is lost through leaky distribution pipes. Expansion and renovation of wastewater collection networks has lagged behind treatment plant construction. Inadequate collection systems in many cities result in excessive stormwater inflow and groundwater infiltration into drainage pipes, and in overflows of untreated wastewater into receiving water bodies.

Operating revenues do not meet costs in many cases. In 2004, 60 percent of water supply utilities in China reported negative net incomes. Despite increases in water supply tariffs since 1998 and imposition of wastewater tariffs in 1990, revenues still do not cover full operating, maintenance, and capital costs. Utilities rely on equity contributions from municipal governments to finance a significant portion of investments. But government transfers are not sufficient to cover all costs, especially for wastewater. Utilities cope by deferring asset renewal and expansion, not servicing debts, or by cutting back maintenance and operations, which can lead to a downward spiral in which service quality, reliability, efficiency, and revenue all decline.

**Recommendations for progress in the water sector**

In the past, in China’s planned economy, performance was measured in progress toward physical targets, such as kilometers of pipeline or treatment plant capacity. The focus for the future should be on utility performance to achieve China’s goals—improving the environment, protecting public health, and providing good service to all at a reasonable cost. The following steps are needed to move toward goal-based governance for the sector:

**Coordinate national policy**

Six national agencies have a role in the urban water sector. The State Council issues key national policy statements, but the specialized agencies issue opinions and policies that can be inconsistent, contradictory, or contested by other agencies. The State Council should establish an interministerial water and sanitation committee composed of representatives from existing national agencies and other stakeholder groups, under a deputy prime minister.

**Strengthen provincial government oversight**

Provincial agencies have important responsibilities in the water sector. They supervise utilities, approve municipal tariffs, channel national financial transfers, oversee compliance with environmental and other standards, and approve construction projects. The budgets of the provincial water agencies should be increased to permit them to raise their capacity for performing their present responsibilities and to allow them to improve coordination among agencies related to water and sanitation.
Set appropriate water supply and wastewater standards

Service standards, particularly national standards, are set at levels equal to or above those of the industrialized countries and may be beyond the capacity of many of China’s cities. China would benefit from adopting transitional wastewater standards for low-capacity cities and from managing water quality from a watershed perspective. Standards should be affordable, enforceable, and efficient. Affordable standards help ensure that service is financially sustainable. Enforceable standards mean that regulators can compel compliance. Efficient standards enable policy objectives to be met in a least-cost manner.

Cities and towns that cannot afford high levels of wastewater treatment could still ensure full collection of wastewater and simple wastewater treatment. Provincial governments could determine which cities and towns should be subject to transitional standards, develop economically efficient water quality improvement plans, and ensure adequate administrative and financial mechanisms for implementing high-priority pollution-control measures, such as abating agricultural and urban stormwater runoff.

China’s updated 2007 drinking water standards have features that make them both flexible and achievable. Forty-two items in the standards apply to the whole country and are not open to the exercise of local discretion. The remaining 64 items apply only to cities that meet certain criteria. The provincial government therefore has some flexibility on how to apply the standards.

Improve municipal utility governance and structure

High-capacity cities should experiment with streamlined utility governance structures, such as water boards or multi-sector public utilities commissions. Lower-capacity cities should make an effort to coordinate the government agencies that oversee water utilities.

Municipal governments should empower utilities to take more responsibility for key corporate functions such as master planning, capital improvement plans, financing strategies, cost-recovery strategies, human resource development, and monitoring and regulatory compliance.

National, provincial, and city governments should nurture a culture of commitment to transparency, customer orientation, comparative assessment of performance, and judicious use of private sector expertise. Professional organizations and research institutes could help foster this new culture.

Municipal governments should explore options for integrating wastewater treatment with drainage service and recovering the costs of collection from users, using one of several available options. In one, a single utility company owns and manages all drainage network and treatment plant assets. In another, the treatment company enters into a lease contract for the drainage network. In a third, the treatment company enters into management contracts with government drainage bureaus. In a fourth, a new “wastewater group” puts all organizations under a single management team.

Pursue opportunities for aggregating urban water services

Aggregating services across administrative jurisdictions or functions, rather than having cities address water problems independently, can generate benefits from economies of scale, better management, and improved access to finance. Provincial and municipal governments should extend urban water infrastructure to suburban towns and create regional water utilities to service multiple towns and cities.

Move toward financial sustainability

The path to sustainability includes these steps:

**Recover costs from user fees.** Efforts at setting new tariffs and collecting them efficiently must be based on local circumstances.

**Make greater use of debt financing.** Chinese cities should transform financially stressed utilities into creditworthy enterprises that can fund appropriate shares of capital programs through commercial debt. The national government could facilitate access to debt financing by allowing
bank loans of longer maturity and by providing greater latitude to water utilities to issue enterprise bonds.

**Create incentive-based concessional finance programs.** The national and provincial governments should consider restructuring concessional finance programs for the urban water sector. The following principles should guide the reforms:

- Increased national funding for the urban water sector, especially in low-capacity cities and towns.
- Provincial government responsibility for design and administration of concessional finance programs.
- Carefully designed eligibility criteria, appraisal procedures, and monitoring and evaluation activities to ensure that programs provide the right incentives.
- A range of financing instruments: loans, grants, revolving loan programs, credit enhancements, and output-based aid.

**Use the private sector to help improve municipal utilities**

Municipal governments and utilities should cooperate with private companies as part of an overall reform process. Noninvestment models could be employed, including management contracts, asset agreements, leases, and design-build-operate arrangements.

**Improve capital planning to lower costs**

The urban water business is capital intensive, so good decisions on infrastructure investment can lower costs and improve service. Water supply planning needs to become more sophisticated and participatory to address water shortages using the full range of available approaches. Proper planning of investments in upgrading and expanding water supply and wastewater pipes and pumping stations offers huge potential for savings.