

Financial sustainability as a foundation for infrastructure development and management: best practices

Whether operating in a developed or developing country context, well-run utilities are founded on being financially sustainable. **ERIC ROTHSTEIN** and **DEBORAH GALARDI** set out some of the key principles representing best practices in this area, and provide examples drawn from the US, Egypt, eastern Europe and Asia.

Across the globe, the projected need for additional capital investment in water and wastewater systems is staggering. In developing countries, capital expenditure levels needed to meet the UN's Millennium Development Goals for expanding access to safe drinking water and basic sanitation may require more than doubling the roughly \$80 billion a year currently spent on new system construction, over the next 20 to 25 years (Winpenny, 2003).

In 2002, the US Environmental Protection Agency estimated needed increases in annual expenditures (for combined capital and operations) of \$14 billion (above then current levels of \$29.7 billion) for wastewater utilities, and from \$38.4 billion to \$51.4 billion for water utilities (Scharfenaker, 2002).

The need to strengthen financial planning and management as one of the strategies for addressing these challenges was highlighted recently at the 2006 World Water Forum in Mexico City. There, Jesus Campos, the chief official in charge of urban infrastructure for the Mexican National Water Commission, noted: 'The population will have to pay the cost of what it takes to put water in their house,' pointing to Mexico City's historical practice of not providing adequate funding for its water infrastructure (Malkin, 2006).

But raising tariffs is only part of the solution. As customer expectations will also increase as they are asked to pay more, so utilities will need to become more efficient and continue to explore ways to leverage local resources in

order to increase service levels for existing customers, while also expanding service to new customers.

Sustainable financial management

Across all stages of national development, effective financial management is critical for sustainable infrastructure development and management. A variety of considerations will typically govern the development of a financial management programme, and the specific activities and approaches included.

These considerations may relate to the availability and quality of data, the conduct of fundamental business processes and the institutional and regulatory framework within which tariffs are considered and enforced. For developing nations, a key institutional consideration is the prospective and ever-evolving nature of national and international support for sector development and reform.

Among developed nations, key considerations are increasingly oriented toward ensuring effective asset management and environmental stewardship. While these considerations may vary dramatically between countries, particularly developed and developing countries, there are a number of fundamental financial planning, management and tariff setting practices that are profoundly durable and important for achieving financial sustainability irrespective of institutional context.

Figure 1 illustrates key financial management activities that may be employed to sustain and enhance utility operations. Alone, each of these activities may prove useful for strengthening a utility's financial position; together, they offer an integrated approach to financial management designed to maximise financial and system performance.

At the core is development of the

financial plan. Developing a financial plan involves determining the most appropriate balance of projected cash flows – forecast system expenses and revenues – to meet utility objectives and comply with established financial policies or targeted metrics. This may involve planning a series of system-wide tariff increases to enhance revenue generation, or improving revenue collection efficiencies.

Similarly, adjustments (either positive or negative) to projected operation and maintenance expenses may be called for to ensure revenue sufficiency, and capital project investments may be accelerated, deferred or cancelled altogether depending on the availability of funds to finance capital improvements. Alternative tariff structures may be developed to support strategic utility objectives and ensure affordability of utility services for basic human health and sanitary needs. Irrespective of the economic maturation of the communities served, it is essential for water and wastewater utilities to develop a comprehensive financial programme to ensure financial sustainability.

Financial plan development

The typical and most intuitive approach for development of a financial plan is through the projection of annual cash flows over a multi-year forecast period, typically five to 10 years. Over the forecast period, revenues from all sources including tariffs, fees assessed to new connections, and other ancillary charges are added to establish total sources of funds for each year. Operation and maintenance expenses are then deducted from available sources of funds to determine the level of funds available for capital spending.

In the event that operating expenses exceed projected revenues, the difference between these projected amounts represents the deficit to be accrued in delivering utility services before consideration of capital financing requirements. If projected revenues, net of operating expenses, yield funds available for capital financing, the cash flow analysis may effectively articulate a capital-financing plan.

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Cost and revenue forecasting

Revenues from all sources including service revenues, fees assessed to new connections and other ancillary charges are added to establish total sources of funds for each year of the forecast period. Revenue projections may be developed through a variety of techniques ranging from extrapolations of historical collections to analyses of customer account and usage data by customer class. (More sophisticated techniques for revenue forecasting may also account for weather-induced variations, price elasticity of demand, and a variety of other factors.)

Expense projections will reflect anticipated operational requirements, and include adjustments for general price inflation. For many financial plans, these expenses are simply forecast by application of a general escalation rate to historical budgeted or actual expenditures.

In certain circumstances, general projections of operation and maintenance expenses will be appended with projections of anticipated extraordinary expenses. These may be one-time costs or reflect increases in general operational requirements from, for example, the commissioning of new facilities.

In developing projections of annual operations and maintenance expenses, it may be useful to assess expenses that vary with the number of connections served, and those that vary with the volume of water delivered or wastewater managed. To the extent that the number of customers (by class) is projected to change at rates that differ from assumed general escalation rates for operation and maintenance, projections of customer service related costs may need to be adjusted.

Similarly, forecast volumes may elicit adjustments to projections of, for example, electricity and chemical costs. These cost items in particular typically also warrant special review insofar as they represent a substantial share of non-personnel operating costs and they are based on rates that often change in ways that diverge from other operating expenses.

Capital planning and financing

The capital-intensive nature of water and wastewater utilities places capital financing at the heart of the development of sustainable utility financial plans. A number of instruments are available to finance needed capital improvements, ranging from use of current year revenues to various forms of long-term debt to external grants. Use of current year revenues is most appropriate for annual or regularly recurring, and relatively

small, capital expenses.

For major system improvements, the relative magnitude and long useful lives of these investments makes appropriate the use of long-term debt financing such as revenue bonds and loans from governmental agencies. Additionally, many utilities in the US require developers to make capital contributions of assets required to extend services to their properties.

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Finally, many utilities have benefited from governmental and International Funding Institution (IFI) grant programmes, which have enabled delivery of major capital projects without requiring tariff revenue support for repayment of investments. Self-sufficient water and wastewater utilities recover adequate revenues to support operations, finance all capital investment needs, and provide for adequate renewal and replacement of system assets.

Financial policies and procedures

Financial policy development is a key aspect of effective utility financial management, establishing parameters for financial plan development and tariff design. Financial policies may define the extent that the utility will rely on various revenue sources (tariffs, connection fees, debt, and so on) to meet system expenses, how long-term debt will be structured and repaid, and the extent that cash reserves will be planned and maintained among other things.

The achievement of financial policies may be supported by the development of financial procedures that prescribe how certain financial activities will be performed (Kavanagh, 2004). Effective procedures related to billing and collection practices are particularly important in the context of sustainable financial planning, as these practices must be culturally sensitive,

yet ensure needed revenue collections.

Development of financial policies and procedures can benefit a utility in a number of ways, for instance by providing a means to benchmark performance and promoting accountability throughout the organisation, including elected officials. Adoption of effective financial policies and procedures can also enhance access to financial markets or lending agencies, demonstrating that the utility is committed to continued viable operation and maintenance of the system.

Tariff design and affordability

Tariff design considerations afford sector utilities and regulators opportunities to advance utility strategic objectives, ranging from ensuring the affordability of services for basic human health and sanitary needs to the promotion of water conservation. Tariff structures may range from system-wide application of charges to customers on the basis of water usage, meter size, or some other measure.

More complex tariff forms may be developed to achieve greater equity, as in the case of cost-of-service structures that enable development of charges by customer class, reflecting the water or wastewater characteristics of each class.

A growing area of practice in the US, particularly portions of the arid south and west, are tariff structures that encourage efficient use of resources. To some extent, merely pricing utility services at their true cost and then assessing charges based on actual use will elicit some conservation response. However, more complex rate forms are also used by many utilities to target specific use levels or seasons (for example, outdoor irrigation use). Inclining block rates and seasonal period rates are examples of these tariff forms.

As utility rates increase, concerns about the affordability of service, in particular for low-income and other potentially vulnerable populations (senior citizens and the disabled), are prevalent. However, the question of affordability is particularly difficult to address in the context of establishing system-wide or customer class rates. Low-income customers are generally not readily identifiable from customer billing records and therefore are generally not segregated into separate customer classes. In some utilities, the

Figure 1
Financial management activities



provision of affordable service has been attempted through under-pricing of low-volume use. While this may help ensure the affordability of minimum usage, it may run counter to other goals related to conservation and equity. Prior to developing any rate form it is necessary to consider all of the utility's policies and objectives, as well as data availability and billing capabilities.

Case studies

The fundamental importance of effective financial planning and tariff setting that balances affordability considerations with requirements for financially-sustainable operations and investment practices is demonstrated by two recent successes in countries with vastly different institutional settings.

Department of Watershed Management, City of Atlanta, Georgia, US

In 2001, the City of Atlanta's newly elected mayor sought to address a broad spectrum of challenges related to water utility service delivery and water resource management. Seeking to promote a holistic approach, the Department of Watershed Management was created in October 2002 to treat 'all things water' through a single overarching entity rather than as separate municipal departments governing stormwater, drinking water and wastewater.

Atlanta's Department of Watershed Management is one of the first municipal utilities in the US to establish a governance structure, consistent with recent US EPA regulatory trends, that recognises the interconnectivity an area's water resources – from green space to impervious surfaces, from rainwater to sewage.

Atlanta's embracing of an integrated utility governance model was, in part, a response to an acute set of challenges including the need to fund expenditures in excess of \$3.9 billion. The city is also recovering from a plagued contract for private operation of its water system that was dissolved in 2001, and is reinitiating efforts to establish a stormwater utility after an earlier fee assessment was successfully challenged.

Clean Water Atlanta is the mayor's comprehensive, multi-programme initiative to improve water quality in Atlanta through capital construction and enhanced operation of the city's drinking and wastewater systems. In January 2004, the city adopted a five-year 189% system-wide water and wastewater rate increase.

However, through subsequent passage of a 1% municipal option sales tax (MOST), with projected revenues

in excess of \$80 million, the scheduled 45% rate increase was reduced to 1% in 2005. However, significant rate increases in the range of 10 to 15% per annum are contemplated in the city's financial plan to 2010 despite the availability of MOST revenues.

Recognising the potential impacts of these rate increases, programme schedule relief on the basis of affordability considerations has been requested of the US EPA and, perhaps more importantly, the city has established low-income bill assistance programmes.

Following traditional revenue bond issues of over \$600 million in 2001 and nearly \$800 million in 2004, capital project implementation has been supported by the implementation of a Tax-Exempt Commercial Paper (TECP) programme that provides the Department with a \$1.2 billion line of credit. While this programme effectively enables cash flow project financing, it involves considerably more active debt management than with the previously employed traditional revenue bonds.

Though mandated projects have imposed a major financial and managerial challenge for the department, it is recognised that these regulatory requirements must be addressed in the context of enhancements to utility business systems and needed renewal and rehabilitation of system facilities.

Accordingly, the Department has implemented a strategic planning process and restructured its capital improvement planning and prioritisation processes. Resumption of a public water service has been highlighted by fundamental enhancements to revenue billing and collection practices and customer service functions.

Ministry of Housing, Utilities and Urban Development, Government of Egypt

Through the Ministry of Housing, Utilities and Urban Development (MHUUD), the Government of Egypt has established a new governance structure to facilitate the reform and development of the country's water and wastewater sector. The MHUUD drafted decrees, promulgated by the president of the republic in April 2004, which established the Egyptian Water Regulatory Agency (EWRA) as well as a national water sector holding company, and transformed the 14 largest utilities in the country into subsidiaries of that holding company.

EWRA has responsibility for establishing and enforcing the nation's regulatory structure, including reviewing utility financial performance and tariff approval. The Holding

Company for Water and Wastewater has responsibility for development and implementation of best management practices by the subsidiary utilities.

Critical levels of accumulated water utility debt and operating deficit led government to initiate this reform. It is expected that steps taken will reduce reliance on IFI support, result in more rational utility tariff structures and thus enable financial sustainability of the country's water and wastewater utilities.

Historically, these organisations have been characterised by poor management, overstaffing, inconsistent revenue billing and collection practices, limited financial monitoring and planning, and deficit spending. Revenue collections have been insufficient to fully fund water and wastewater operations, requiring government subsidy. Water and wastewater infrastructure investments have traditionally been handled by a separate government agency and planning and coordination with utilities has been sub-optimal.

The recent governance structure changes have been implemented in the context of benchmark tariff increases that have signalled a commitment to the sector's financial sustainability. Tariff increases were implemented in Alexandria in January 2003 and Cairo in September 2004.

In addition, with USAID support, financial planning tools have been developed and employed by all subsidiary utilities. These financial planning tools are structured to facilitate accurate revenue forecasting and demonstrate implications of improved revenue recovery; they facilitate the development of multi-year cash flow analyses and support development of alternative tariff designs.

In addition, the holding company has developed a utility performance monitoring system that requires quarterly reports on management, technical and financial indicators.

Additional examples from literature

Financial planning: Eastern Europe, Caucasus and Central Asia (EECCA)

In the policy brief, 'Feasible financing strategies for environmentally related infrastructure' (2003), the acute financial challenges of EECCA¹ countries are discussed along with financing strategies. The countries examined face the pressing need to strengthen financial support of existing system facilities, where deteriorating levels of service drive increases in operation and maintenance costs and threaten customers' willingness to pay, and to address longer-term system expansion needs.

Solutions are being developed through application of a computerised financial planning and decision tool called FEASIBLE (Financing for Environmental, Affordable and Strategic Investments that Bring on Large-scale Expenditure).

Application of this planning tool in EECCA countries has highlighted a number of areas where the previously-outlined financial programme activities can be used to help organisations meet infrastructure maintenance and development goals.

Possibilities for revenue enhancement exist through strengthening tariff billing and collection procedures, addressing service deficiencies and inefficiencies to improve customer satisfaction, and benchmarking tariffs with international guidelines on affordability (generally 3 to 5% of household income) to ensure that customers are contributing at an optimal level. The use of targeted assistance programmes is also advocated as a way of minimising the subsidies needed. In addition, adoption of tariff structures based on actual water use is encouraged as a means to both reduce operating costs (such as power costs and chemicals), and provide customers with greater control over their bills.

Tariff design and affordability: Thailand and Southeast Asia

In the paper 'Environmental financing strategies: user charges in the wastewater sector in Thailand' (Simachaya 2003), the country's recent introduction of wastewater tariffs at a limited number of utilities following the 'polluter pays' principle is discussed. Under this approach, users are charged rates based on the volume used, as well as wastewater strength.

Customers are grouped into different classes with similar use characteristics (for instance residential, business, government, industry) and costs allocated and tariffs designed accordingly. This approach – which is used widely in the US for equity reasons – is also gaining favour in other countries, particularly as a means of addressing affordability concerns for lower impact on residential customers.

The use of tariff design as a means of addressing affordability is also highlighted in the report 'Regional assessment survey and workshop on full cost recovery for water utilities in Southeast Asia' (2005). In this case, increasing block water tariff design is suggested as a means of shifting greater cost recovery to larger system users, and targeting assistance for smaller users.

Conclusions

As demonstrated by the case studies and literature review, while

institutional structures and relative financial capacities of communities served may vary dramatically, effective financial planning, management and tariff setting practices are fundamental for financial sustainability of utility services.

Financial planning provides a basis for partnering with IFI's for long-term capital development or for leveraging financial resources through greater access to domestic financial markets, and provides a framework for prioritisation of capital improvements to appropriately balance investment in existing assets and system expansion.

Effective financial planning will demonstrate the extent to which utility tariffs and collection thereof are adequate to sustain water and wastewater operations and enable adequate capital investment. In general, potable water tariff structures based on actual consumption (applied uniformly or as increasing blocks) may both ensure the affordability of service for basic health and sanitary needs and encourage more efficient use of water. Similarly, wastewater rates that enforce a 'polluter pays' principle may shift costs to high impact users and thereby increase the capacity of utilities to expand service at an affordable tariff to lower impact users. In any event, irrespective of the economic capacity of the sector served, transition to water and wastewater tariffs that more accurately reflect the value of service provided is essential for long-term financial sustainability.

This pending movement to full cost pricing of water and wastewater services imposes a companion requirement on sector utilities and decision-makers to address the potential impacts on affordability and access to service. There are many options available. Those employed must be culturally sensitive, administratively practical and implemented with clear understanding of prospective impacts on revenue collections as well as targeted populations.

Alternative tariff structures generally are broad-brush in their impacts, with limited ability to target specific populations. In contrast, focused programmes targeting specific at-risk populations (such as fixed income or disabled customers) typically impose significant administrative requirements. Perhaps the most promising trend

internationally with respect to water and wastewater sector finance is the increasing recognition of the need to set tariffs to adequately cover sector costs and to ensure adequate collection of utility revenues. In some institutional settings, this may require policy enactment at central or regional government levels to empower local governments and utilities to develop and collect tariffs. In other cases, it may simply involve movement toward best management practices. ●

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¹EECCA countries include Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation, Ukraine, Turkmenistan, Tajikistan, Uzbekistan.