

WATER AND WASTEWATER UTILITIES, PROJECTS, AND CONCESSIONS

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Introduction

Standard & Poor's rating criteria for the water industry is applicable across a wide range of utilities and concessions. The criteria also has been designed to cover different ownership structures, regulatory regimes, levels of government involvement, and macroeconomic operating environments. Water industry structures are evolving differently around the world, and Standard & Poor's rating criteria addresses the diversity of credit risks inherent within each structure. This comment provides a description of the rating methodology for water and wastewater utility companies, and for non- or limited-recourse water and wastewater projects.

Utility Companies

The water and wastewater rating methodology incorporates two basic components—business profile (qualitative analysis) and financial profile (quantitative analysis). Table 1 illustrates the basic matrix. The analysis of a company's business profile provides the context for assessing the company's financial condition.

For a given rating category, expected levels of financial ratios vary with the business or operating risk profile of a company.

Business Profile

Standard & Poor's analysis of a water/wastewater utility's business profile is independent of how it is financed. This analysis of the utility's fundamental creditworthiness focuses on the following criteria:

- Regulation,
- Markets,
- Operations,
- Competitiveness, and
- Management.

Overlaying these factors is the entity's ownership structure. Many water utilities, especially government-owned utilities, benefit from both implicit and explicit support from what is often a higher-rated and supportive parent.

Conversely, the credit rating of a fundamentally strong water utility might be restricted by a cash-strapped owner, who might use the water utility to support other business activities. The impact of the utility's ownership arrangements is factored in after the stand-alone quality is assessed.

Regulation. The regulatory environment and industry structure in which a water operates are key rating considerations. The analysis encompasses the efficiency, adequacy, and supportiveness of the regulatory, industry, and legal structures to the extent that they impact the revenue-raising ability of the utility.

Standard & Poor's analyzes the transparency of regulatory policies and the length of time that the regulatory framework has been in place. Clearly, a transparent system that requires legislative action to modify is viewed more favorably than one subject more to the whim of a ministerial discretion, as in some Asian countries, or by a politically minded "independent" regulator. Regulation in the water and wastewater sector in many emerging countries is newer than it is for the power sector, and untested. To be viewed positively, regulatory treatment should be timely and allow consistent, predictable performance from period to period, given the importance of financial stability as a rating consideration. The forthcoming price review in the U.K., which is set to introduce a one-off price reduction of 13.7% on average to offset past outperformance against efficiency targets—coupled with the windfall tax on utilities in 1997—shows how regulatory regimes can be subject to political interference from time to time.

Many water utilities, as regulated monopolies, historically have benefited from rate-setting mechanisms based on a cost-plus formula. This is changing in many systems, such as in the U.K. and New South Wales, Australia where performance- or incentive-based ratemaking regimes have been introduced. These are increasingly preferred over the cost-plus regime, which lacks a strong incentive for utilities to control and

Table 1

Water Utility Indicative Ratings				
Rating Matrix				
	Weak	A	BBB	BB
Financial Profile	Average	AA	A	BBB
	Strong	AAA	AA	A
		Strong	Average	Weak
	Business Profile			

reduce costs. Under cost-plus ratemaking, utilities may be rewarded more for justifying costs than for containing them. While a utility may be largely protected from business risk under cost-based rates, the responsiveness of the rate-setting process to changes in a utility's cost structure or to discrepancies between allowed and actual revenues influences the business pressures on the company.

Standard & Poor's believes that performance-based ratemaking will become an increasingly popular form of price setting, as it has in the electricity sector. A move to performance-based pricing generally will have a negative effect on a water utility's credit quality. Performance-based pricing systems are inherently more risky than cost-based systems because they are based on the regulator's views on the efficiency gains the utility should achieve. The ultimate effect will depend on Standard & Poor's assessment on the harshness and achievability of the performance targets, and the extent to which a prudently managed utility can manage the risks. Flexible plans incorporating performance-based rewards or penalties could include market-based rates, price caps, revenue caps, index-based prices or other yardstick measures, and rates premised on the value of customer service.

Environmental regulations, which can be particularly stringent for water utilities, impact credit quality. Mandatory compliance with environmental legislation is often quite capital intensive. This is particularly so in the areas of wastewater discharge and drinking water quality. In most jurisdictions observed by Standard & Poor's, pressures from environmental standards is likely to increase. High compliance costs can impact a water utility's creditworthiness if their financing is up-front and their recovery is over a long period, potentially putting stress on the financial profile in the short term.

A key rating consideration is the extent of the link between a water utility's legislated environmental standards and its rate-setting mechanism. Stringent environmental rules requiring expensive upgrade and compliance costs are not necessarily a negative rating factor, so long as the utility has a flexible and transparent process for passing the costs through to consumers, and these consumers are willing and able to bear these costs. Standard & Poor's considers whether the environmental and economic regulators are acting in isolation, or perhaps have different constituencies. This has been a subject

of debate in the U.K. and in the U.S. In the U.K., tough environmental obligations have been forcing up prices by 45% in real terms during the past 10 years. Recently announced pricing resets in the U.K. will lead to flatter real increases in the next five years after a first-year price reduction, facilitated partly by assumed greater efficiency and lower capital spending.

In assessing how environmental standards might move in the future, Standard & Poor's consider how the current standards compare with other jurisdictions around the world. That is not to say that all environmental regimes will be common, but that they will tend to move in that direction. Also important is which sector of the industry bears the risk. For instance, in Melbourne, there is a vertically disaggregated structure whereby the wholesaler, Melbourne Water Corp., is responsible for water quality and effluent discharge quality, and the three retailers do not have exposure to environmental risk. Following some water quality problems in 1998, Sydney, too, is moving towards a disaggregated structure by creating a new catchment authority to focus on water headworks and catchments. The same applies to Watercare Services Ltd., the wholesaler in Auckland, New Zealand, which is currently planning a significant wastewater system upgrade to meet environmental requirements. Ultimately, the consumer will pay for the service, but the wholesaler is the entity held to the standards. In the case where a concession to operate a water or wastewater system has been awarded, Standard & Poor's reviews the concession structure to ascertain where the environmental risks lie.

Markets. The market into which a water utility or concession sells its services is central in the credit rating assessment. Water sales are less prone to fluctuations with the economic cycle than, for example, electricity or gas sales. They are, however, more susceptible to weather patterns, particularly in warmer climates, where a higher proportion of water is used outside.

Despite the relative insensitivity of household and firm level water consumption, prospects for the stable growth of revenues and cash flow are ultimately related to the strength of the local macro-economy. Assessment of a water utility's markets begins with the economic and demographic evaluation of the area in which water services are provided. Strength of long-term demand is examined from a macroeconomic perspective, which enables Standard & Poor's to measure trends in investment, income, and

employment as indicators of economic change within the service area. Standard & Poor's studies trends in usage to determine the sensitivity of the system to economic cycles and future capital needs. With the availability of an ample source of water and excess treatment plant capacity, growing demand can be advantageous, by providing additional revenues through rates and connection charges. On the other hand, rapid economic expansion makes planning difficult and can place a great burden on a utility to upgrade system capacity and bear potentially significant additional operating and capital costs.

Depending on the level of revenue earned from a volumetric (per liter or gallon) charge versus fixed connection charge, customer growth is important for water utilities. The sustainability of increasing demand is analyzed. Many emerging economies go through periods of very rapid growth followed by severe contractions. This volatility can contribute to significant and unhealthy swings in a utility's revenues. Other relevant factors include income levels and trends in population, employment, per capita income, and, particularly in developing countries, the affordability of water and customers' ability and willingness to pay their bills.

A significant problem for many water utilities is the high level of unaccounted-for water (or nonrevenue water), which can be 60% and even higher in emerging economies. This represents water that leaves the storage or treatment facility, but for which the customer is not billed. While physical losses are often a large part of this loss, commercial losses (such as theft, poor or nonexistent meter reading, inadequate billing systems) tend to be significant contributors to the loss.

The characteristics of the water utility's customer base are assessed. If a particular customer plays a dominant role in the economic base of the service area, there is cause for credit concern. Care is taken to assess any one customer responsible for more than 5% of revenues to determine that customer's stability, commitment to the service area, and contribution to the bottom line. If the top-10 users account for more than 10%-15% of revenues, the system tends to be more susceptible to fluctuations, especially if these are similar industries. Similar concerns arise if the local economy is dependent on a particular industry or a small number of key customers. In this case, the potential loss of water revenue from the declining fortunes of that industry is probably secondary to the

broader impact on the local economy and its prospects.

The customer count is disaggregated into residential, commercial, and industrial classes to better discern the importance of one type of user to the system. A balance between the three categories provides the most stable and efficient operating profile. For example, while more residentially concentrated systems may experience less cyclical demand during recessions, the gap between average and peak daily use tends to be wider than with more industrial systems, thus requiring greater capital investment. While it is not typical for a water utility to have a significant portion of its revenue from a small number of customers, the utility's largest customers are identified to determine their stability and relevance to the bottom line.

Many jurisdictions are moving toward more cost-based pricing, with more emphasis on volumetric charges. Standard & Poor's examines the pricing structure and the elasticity of demand for water to ascertain whether increased revenue risk is being taken on. In the U.K., the introduction of metering and other water conservation measures has led to flat, or sometimes slightly negative, consumption growth. In South Africa, tariff adjustments are actively used as economic measure to reduce consumption in periods of low rainfall. The impact this has on revenues of companies such as Rand Water can be quite dramatic in any one year.

In analyzing the rates charged to customers, Standard & Poor's focuses on a number of important factors, when applicable:

- Rates compared with neighboring communities or similar systems;
- Rates in relation to the service area's economic wealth and income levels; and
- The rate-setting process.

The competitiveness of rates compared with neighboring communities can be an important aspect of users' willingness to pay current bills and accept further rate adjustments.

Operations. The focus of Standard & Poor's operational review is on capacity, quality, and efficiency of service. The operation of water and wastewater systems generally involve less-complex technology than electric utilities and, therefore, is generally less risky (with the possible exception of large dam and complex water and wastewater treatment projects). However, the assets tend to be of greater value and longer useful life, so the planning of augmentation and replacement is crucial.

Standard & Poor's assesses the available safe yield of the water and wastewater systems, in terms of both water storage capacity and production capacity of treatment plants, and the adequacy of the delivery systems, in relation to the usage demands of customers. Historical usage trends are examined to ascertain likely peak usage levels, not just long-term averages. A dependable water yield can be affected by water rights, aquifer depletion and saltwater intrusion, and commitments for wholesale delivery. Significant excess capacity may indicate overbuilding and heavy carrying costs for the current user base. Alternatively, the need for capital spending is apparent if a system experiences, or is forecast to experience, a shortfall in supply or treatment and distribution capacity. Standard & Poor's applies the same criteria to evaluating wastewater systems—peak and average customer flows as compared with the collection and treatment plant capacity.

Having adequate treated water storage facilities has become important in recent years and has helped many systems meet demands during peak summer periods. This is especially so in areas such as California, where water allocations are being reduced, particularly since recent droughts and environmental issues have created alarm. In addition to the adequacy of the physical supply, the legal ability of the utility to access that water is also important. In most regimes, the utility requires a permit to extract water, and this has proven to be a problem for some U.S. and U.K. utilities.

Water utilities are under increasing pressure to optimize their use of resources and efficiency of their operations. If utilities are not cost effective in meeting service standards, stronger regulatory or competitive pressures are likely. In addition, the status of utility plant investment is reviewed by Standard & Poor's, with regard to reliability and utilization, as well as for compliance with existing and contemplated environmental and other regulatory standards.

The record of unaccounted-for water, burst mains, sewer overflows, inflow/infiltration measures, and capacity utilization are examined. Important considerations include the projected capital improvements necessary to provide high-quality and reliable service. Additionally, unique operating challenges that impact costs to a degree where credit quality is impacted could be present. Examples of operating challenges include harsh climates, changes in the level and location of rainfall, and difficult ter-

rain. The same is true for Rand Water in South Africa, which operates in a region of highly erratic rainfall and, as a result, has to compensate by having sufficient storage facilities to withstand prolonged periods of drought. The general condition of the assets and how well such assets are maintained is also an important evaluation consideration. So too is the flexibility of the water and wastewater networks to manage blockages and outages (such as through the ability to divert flows through unaffected parts of the system).

For a water retail utility, Standard & Poor's will examine any risk borne as a result of inconsistent contract terms—between the wholesale purchase contract and the retail sales arrangements. For example, a utility with mainly fixed charges in its bulk water agreement, but with variable or volumetric charges to its consumers, is at risk of volume fluctuations. A further risk is where the wholesale and retail price-setting mechanisms are controlled by different regulators and are in danger of being out of step.

When reviewing a company with a water concession, Standard & Poor's would examine the concession agreement and other key documents defining the rights and obligations of the concessionaire, and the term of the contract. In early 1999, Standard & Poor's assigned its first water concession rating—a 'BBB-' rating to Aguas Argentinas SA (Aguas). Aguas has a 30-year exclusive concession to operate the largest water and sewerage systems in Argentina, serving a densely populated area of approximately 9.5 million people in the city of Buenos Aires and 17 districts of the greater Buenos Aires area. The rating incorporates the challenges related to operating an enterprise system in the Argentine economic and political environment, and an aggressive capital investment program that affects the company's financial flexibility. However, these risks are offset by a number of strengths, including the 30-year exclusive concession; the vast and proven experience of the company's technical operator, Suez Lyonnais des Eaux (A+); the government's support; and a solid base of rate-paying customers.

In Asia, water concessions have also proven to be popular. For instance, in Manila there are two separate concessionaires—consortiums of United Utilities/Bechtel/Ayala Corp. and Suez Lyonnaise des Eaux/Benpres—that provide both water supply and wastewater services for 25 years. They have operational and investment responsibilities, while the government has

retained ownership of fixed assets. While the concessionaires have the right to existing water sources, they are responsible for the development of new sources. Concessions such as these are often eligible for fiscal incentives from the host government.

In Adelaide, Australia there is a less involved arrangement than the other examples whereby the concessionaire (a consortium of Vivendi/Thames Water/Kinhill) has a 15-year contract to operate and maintain the water and wastewater system. Unlike in Manila, the Adelaide concession is a management contract where financing and investment responsibility remains with the government utility. Importantly, revenue risk remains with the government utility and does not transfer to the concessionaire.

Competitiveness. Competitive pressures in the water industry are quite limited by virtue of what is generally a natural monopoly. In many jurisdictions, the monopoly is enshrined in legislation or an operating license. This limited competition is a major factor in the strong business profile assessment for a water utility. Franchise monopolies are significant barriers to entry by competitors. Where there are nonexclusive franchises, other barriers to competitors exist, such as the extent of investment required and the difficulty involved with obtaining right of way easements, which reinforce the monopoly position.

In addition, product substitution risk for water is virtually nonexistent—with perhaps the exception of increased water reuse programs. For instance, the recycling of wastewater for outside water use is a potential threat, although the economics of these programs means they are not currently feasible. The main competitive pressure for water utilities is competition by comparison (that is, the striving by management to be at least as good as the utility's peers). Many benchmarking studies are undertaken worldwide, which facilitate this comparison.

Genuine competition in the water industry is rare. In the U.K., there has been a small number of cases to date of a customer being poached by another supplier, although these contracts are only for small volumes. Companies in the U.K. are allowed to pitch for water supply contracts in new green field developments on the boundaries of their service area. These “so called” inset appointments have to be approved by the regulator and, so far, have proved very time consuming to gain approval. While it is theoret-

ically possible in some jurisdictions like Australia for retailers to obtain third-party access to monopoly networks, this is a minor threat to the incumbents because they will receive the water transport charge regardless of who retails the product.

Management. Owing to the safety net provided by regulation, evaluation of management is less critical for tightly regulated water utilities than for other companies operating in a very competitive environment. Still, assessing management remains significant since management's abilities and decisions affect all areas of a company's operations. Also, management can forge relationships with regulators, which may influence regulatory outcomes. Important considerations include strengths and weakness of key members of management, depth and stability of top management, and recent and prospective management changes. Management strategies are also a material determinant in differentiating utilities and in establishing where companies are on the business profile spectrum. Standard & Poor's will assess financial policies, corporate goals, strategies, tactics, and plans for both regulated and diversified businesses, as well as analyze how effectively they are implemented.

Key financial policy considerations include management's ability to achieve cost-effective operations and, of utmost importance, management's relative commitment to credit quality. This can be assessed by evaluating accounting and financing practices, capitalization and common dividend objectives, and the company's philosophy regarding growth and risk taking.

Financial Profile

Given the essentiality of the commodity provided—which allows for no substitutes, lower ‘fuel’ and technological risks, and limited competition—Standard & Poor's considers water utilities to be the lowest-risk utility sector. As a consequence, financial ratios and flexibility can be lower for these entities, relative to like rated utilities in the gas or electric sectors.

The methodology used to evaluate the financial postures of water companies mirrors that applied to electric utilities. Factors reviewed include:

- Profitability,
- Capital structure,
- Cash flow analysis, and
- Financial flexibility.

As with electric utilities, the overarching measure of a water utilities' financial capacity is its

ability to generate consistent cash flow to service its debt, finance its operations, and fund investments. Standard & Poor's evaluates this capacity through a review of a utility's financial results for the past five years and pro forma five-year projections.

The relative financial performance of all utilities is quantified through a ratio analysis. As Standard & Poor's global ratings reach has extended, the distortions caused by vastly differing asset valuation practices and depreciation policies around the world has reduced the appropriateness of comparing certain leverage and earnings ratios. As a consequence, Standard & Poor's focuses on real stocks and flows, namely, levels of debt, cash, and cash flow. Financial parameters that are viewed as particularly relevant and reliable are coverage of fixed financial charges by cash flow and cash flow from operations to total debt. Less comparable measures, such as shareholders' equity, leverage, and reported earnings, also are reviewed but de-emphasized.

An in-depth description of the key components incorporated into the analysis of power utilities' financial strength is included in this publication in the article "Global Methodology for Global Power Utilities". The following section gives a brief overview of these measures and identifies the differences applicable to water utilities.

Profitability. Profit potential is one element in credit protection. A company that generates higher profits has greater ability to internally finance capital expenditures, attract capital externally, and withstand business adversity. Still, profit is subject to accounting conventions, which vary substantially. This is particularly true for water utilities that are more capital intensive than other types of utilities. As a consequence, the treatment of depreciation expenses greatly influences reported earnings. In some countries, such as New Zealand and the U.K., infrastructure intrarenewal charges are incorporated as an additional form of depreciation to recognize the necessity of major maintenance and the replacement of delivery systems. This noncash item requires additional analytical adjustments to allow interutility comparisons. Operating margins provide some insight to profitability prior to depreciation, capital charges (including foreign exchange effects), reserves/provisions, goodwill, and extraordinary items.

The more important profitability measures considered are:

- Return on average equity,
- Pretax interest coverage,
- Pretax return on average capital, and
- Operating margins.

Capital structure. The principal capital structure ratio analyzed is total debt to total debt plus equity. Again, water utilities tend to be capital intensive, both owing to the high cost of water and wastewater treatment plants and underground delivery systems and the relatively low cost of operational inputs (that is, the cost of water supply is much lower than fuel, the main operational cost of an electric company). Analyzing debt leverage goes beyond the balance sheet and covers quasi debt items and elements of hidden financial leverage. A portion of non-capitalized leases and the fixed obligations associated with the purchase of treatment plant capacity via build-operate-transfer and other such schemes are reflected as debt in calculating capital structure ratios. Also, Standard & Poor's considers fixed costs associated with the purchase of water supply to be contingent liabilities.

Short-term debt is considered part of permanent capital. Given the long life of water utilities' assets, short-term debt exposes these companies to interest-rate volatility, remarketing risk, bank line back up risk, and regulatory exposure that cannot be readily offset. Also important is the structure of a water company's debt. Amortizing debt is less risky than bullet maturities. Sizable single-year maturities are considered a significant credit risk, particularly for companies in emerging markets.

Knowing the true values to assign to a company's assets is important to capital structure analysis. It is also important as the type of asset valuation can directly impact a utility's profitability and cash flow due to the regulatory definition of rate of return. Asset valuation practices differ from country to country, resulting in differences in both a company's reported equity base and its depreciation expense. These distortions may be greatest for water companies whose assets have 40- to 100-year useful lives; the employment of current versus historical asset valuation practices lead to greater valuation disparities among water utilities than others. Water utilities that employ current valuation methods will appear to be much less leveraged than similar companies that utilize historical asset valuation policies. There is no easy way to compare companies that revalue their assets with those that do not. In discussions with management, Standard & Poor's analysts endeavor

to gain an appreciation of the realizable values of a company's assets under reasonably conservative assumption.

Cash flow. Cash flow analysis is critical to all credit rating decisions. Interest or principal obligations cannot be serviced out of earnings, which is just an accounting concept. Payment must be made with cash. Many transactions and accounting entries can affect earnings but not cash, and vice versa. Since both common and preferred dividend payments are important to maintaining capital market access, Standard & Poor's looks at cash flow measures both before and after dividends are paid.

There are three cash flow-related nuances that distinguish water utilities. First, given the long lives of their plant, water utilities tend to be more cash generative than their asset bases would imply, especially in the absence of a recent revaluation. Second, the concept and practice of customer contributions is more prevalent in the water industry. In some cases, these "donated assets" are immediately counted as revenues and incorporated into PP&E, while, in others, they are brought onto the income statement and balance sheet gradually. In all instances, these noncash items must be excluded from funds flow from operations. Lastly, the availability of cash flow throughout the fiscal year must be considered. Often, water utilities' cash flow is more lumpy as customers are billed quarterly versus the monthly tariffs levied against electric utility users. Similarly, water usage tends to exhibit greater seasonality, especially in more arid regions such as that covered by Rand Water of South Africa, also increasing the volatility of cash flow.

Some of the specific ratios considered include:

- Funds from operations interest coverage;
- Funds from operations to average total debt (adjusted for excess liquidity and off-balance-sheet liabilities);
- Funds from operations minus dividends to capital expenditures; and
- Capital expenditures to average total capital (debt plus equity).

Because of the capital-intensive nature of water utilities, these companies require extensive and flexible capital planning systems. The ability to limit the use of debt also depends on a utility's skill in managing construction projects and completing any new facilities on schedule and within cost estimates. Accordingly, Standard & Poor's reviews capital priorities for the next five years and beyond under varying assumptions.

Financial flexibility. The analysis of financial flexibility focuses on a utility's ability to accomplish its financing program without damaging creditworthiness. The evaluation incorporates the entity's financing needs, plans, and alternatives. External funding capability complements internal cash flow, especially since utilities' capital needs are so heavy. A company's demonstrated ability to tap capital markets on an ongoing basis must be considered. Relationships with banks and the availability of bank lines also are taken into account.

Standard & Poor's reviews indenture and bank loan covenants. Particularly for concessions and project financings, certain restrictions, such as a limit on the ability to issue additional debt, provide some comfort, as do provisions (such as interest coverage tests) that restrict the distribution of dividends.

The outright privatization of water companies has lagged that of other utility types in all countries except the U.K., France, and some other European countries. Even in regions, such as Latin America, where private ownership of electric companies is becoming the norm, public ownership continues to prevail. As mentioned earlier in this piece, governmental ownership can provide the advantage of both implicit and explicit support from what might be a more creditworthy and supportive parent. To evaluate if this relationship enhances financial flexibility, Standard & Poor's analyzes past governmental actions such as capital injections or the foregoing of dividends during periods of stress.

For investor-owned utilities, Standard & Poor's assesses a company's capacity and willingness to issue common equity. This is affected by various factors, including stock price, dividend policy, and any regulatory restrictions regarding the composition of the capital structure.

Global Water and Wastewater Project Criteria

The following is structured around Standard & Poor's established, seven-point project rating criteria. It also touches upon other key issues pertinent to global project analysis (the "pyramid"), such as institutional risk, sovereign risk, currency risk, and credit enhancement. The criteria is adapted for global water and wastewater projects and includes additional research and information gathered from project sponsors active in the field of build, operate, and transfer (BOT) projects worldwide.

Revenue Structure

BOT projects in the water and wastewater sector typically rely on purchase contracts with a sole (usually municipal or sovereign) purchaser for offtake revenues. The offtake contract (equivalent to a PPA in the power sector) covers the principal elements determining the project's ultimate cash flows such as tariff levels, escalation and indexation, and fixed and variable cost reimbursements. These contracts are usually long term. For example, the Stirling Water Seafield wastewater project in Scotland ('AAA' insured), sponsored by Thames Water, has a contract life of 30 years. However, such long contractual revenues streams are normally exposed to performance related conditionality, as well as to varying degrees of counterparty credit risk (see "Purchase Credit Strength").

Revenue structure analysis in water projects must incorporate an assessment of the degree of flexibility afforded to BOT sponsors within the contract to raise the purchase price in a timely manner to mitigate the effect of a sudden rise in uncontrollable cost elements such as inflation or foreign exchange movements. There also should be adequate protection provided in the case of enforced added capital or operating costs, force majeure (especially drought), or the interruption of bulk water supply or effluent source by a third party (see "Legal and Financial Structure"). This type of risk-mitigation process is typical for all project revenue contracts (PPAs, concession, and franchise agreements), although there are several important differences for water and wastewater projects:

- Input supply and effluent source (both quality and quantity) are often not controllable by BOT sponsors and, as such, this risk should not be assumed.
- The ability to deal with changes in environmental legislation (determining output compliance) is limited.
- Water or wastewater facilities are capital intensive and are usually dedicated to perform specific functions that may be catchment dependent. This reduces asset flexibility and heightens their reliance on contractual specifications and protective contractual arrangements.

Take-or-pay (minimum guaranteed payment) or put-and-pay (minimum guaranteed volume) arrangements are preferable to lessen the project's exposure to demand risk. Where such arrangements do not exist, such as in the Scottish build, own, and operate (BOO) sector,

assumptions made about usage of plant and payment structure must be robust enough to withstand severe downside scenarios. This type of analysis was critical for the assignment of an investment grade underlying rating to the Stirling Water Seafield project in Scotland. A careful examination of contractual arrangements is required, especially where the level of take-or-pay reimbursements (where these exist) is below the expected usage of the plant during the period of the contract. The tariff mechanism, which compensates the plant for marginal usage, should be structured so that project creditors are not exposed to any potential mismatch between sudden and unexpected cost increases and payments. Usage payments also are sometimes subject to the project company meeting certain performance criteria. This may include stipulations requiring maintenance and efficiency investments, which, in essence, would transfer operating and obsolescence risk onto the project sponsors. These criteria and obligations under the contract should not be open to ambiguous legal interpretation, and mechanisms should be in place to prevent any arbitrary regulatory or political decisions adversely affecting the project's underlying economics.

A robust revenue structure that minimizes operational, regulatory, environmental, and socio-political risks is, therefore, a prerequisite for an investment-grade rating of a BOT project.

Technology and Operations

Technology risk in the water and wastewater sector is usually less acute than in some other infrastructure sectors. However, the rapidly evolving nature of water and wastewater processes and an increasingly competitive environment in developed countries means that sponsors are at times pushing the frontiers of new technology to win BOTs. The risks are also different in nature because of the acute consequences of malfunction or noncompliance. The supply of contaminated drinking water can lead to serious litigation, possible termination of contract and, more critically, a serious public health incident that could damage the sponsor's reputation beyond repair. This being said, some international water project sponsors are well experienced in building water and wastewater treatment facilities and are often at the cutting edge of new processes and technology. The most-active project sponsors—such as the French groups Suez Lyonnaise des Eaux (A+/Watch Neg) and Vivendi (BBB+/Watch Neg), or the British operators such as International

Water Ltd. (United Utilities and Bechtel Corp. joint venture), Hyder Investments (BBB+/Watch Neg), Thames Water International ('A+'), and Anglian Water International ('A-')—are all experienced in building and operating plants in their native countries.

Comparative Economics

Often, BOTs are tendered in countries where the regulatory framework and monopolistic nature of the industry is such that exclusive contractual arrangements can be entered into for the provision of perceived needs in the sector. However, several factors need to be addressed, such as the offtaker's ability and willingness to access alternative suppliers and whether this could potentially undermine the economics of the BOT project in future years. While this is not usually considered to be a great risk to projects at present, technology improvements in 10 to 20 years' time could distort the underlying economics of a plant and force an offtaker to look elsewhere.

Often, project sponsors, in the absence of strict take-or-pay arrangements with the offtaker, will be required to take on a degree of volume risk. In considering this risk from a creditor's perspective, it is important that the base line for debt service is set at a level that corresponds to conservative assumptions on demand and supply. Demand patterns for water services are unlike those found in the electricity sector. In a mature economies, demand will, at best, remain flat or may even show slight declines over time as consumers respond to conservation initiatives or to pricing signals brought about by the introduction of metering. In developing countries, on the other hand, historical high levels of consumption may be misleading, as they may indicate high levels of leakage, theft, or the inelasticity of demand to artificially low tariffs. The introduction of private-sector operators, which invariably leads to higher prices at the consumer end, can have a sharp effect on consumption levels, which the offtaker utility must recognize in its tariff base if it is to avoid financial stress and subsequently expose the BOT sponsors to default risk. Sharp tariff adjustments can lead to socio-political tensions, which could ultimately undermine any reasonable economic rationale for undertaking the project. Therefore, it is crucial to consider output price and demand considerations in a wider context than just the framework of the BOT contract.

Legal & Financial Structure

The legal structure of a BOT offtake contract should not expose project creditors to risks that are either uncontrollable, unsustainable on an economic basis, or subject to arbitrary decisions. As a general rule, Standard & Poor's will look to a risk-allocation matrix that matches the ability of project participants to assume or mitigate the risks in question. The legal analysis of water projects incorporates a thorough examination of key contracts to ensure the rights of creditors are sufficiently addressed within these documents. For example, an analysis is undertaken of the potential for enforced termination without reasonable step-in rights, cure periods, or compensation to project creditors. The terms of the asset transfer at the end of the contract period should be fair to all parties. In the case of the Scottish build-own-operate (BOO) contracts, the transfer payment mechanism leaves sponsors open to certain uncontrollable risks (*see Dec. 18, 1996 CreditWeek*). The tenor of rated debt should preferably be shorter than the contract length to ensure full and timely amortization of principal. A financial structure that entails the use of a nonrecourse special-purpose company for the issuance debt should meet Standard & Poor's criteria for such entities (*see Global Project Finance, September 1997*).

Purchaser Credit Strength

In itself, exposure of project sponsors to counterparty credit risk is not a unique phenomenon of BOTs. However, for water and wastewater projects, this exposure is invariably to municipal or governmental entities, which are often not rated and which generally operate in fragmented, politically sensitive contexts. These purchasers also may have huge environmental catch-up obligations, inefficient networks, high levels of leakage, and noneconomic tariff structures. For water BOTs, offtaker credit risk also is heightened as a result of: 1) the essential nature of the product, which can politicize contractual arrangements, and 2) the uncertain legal and regulatory frameworks in emerging markets, which govern the award of BOT contracts and the water and wastewater sector in general.

Often, as in the Scottish Stirling Water Seafield wastewater plant example, the critical requirement for a particular facility can drive the offtaker into entering into a long-term contract, which, at some later stage, it may live to

regret. While the protection provided by “hard” contractual arrangements should not be ignored, neither should the political and social pressures that can force municipalities to renege on their obligations. Experienced international water project sponsors typically assess these risks before entering into BOT contracts, especially in emerging markets. However, they also recognize that, where there are no existing credit ratings on the offtaker, this is a risk that is difficult to analyze with any degree of accuracy.

Some water utilities in developing countries have typically put BOT contracts out to tender because of a lack of own funding sources, while others have done so for a variety of reasons (such as the desire to improve efficiency, bring in outside expertise and technology, and project management skills). The BOT project itself may have a fair degree of local support, but in the grand scheme of the country’s infrastructure requirements, may be relatively insignificant. As such, should the offtaker default on its obligations (financial or otherwise), creditors should not assume that the sovereign government will step in to the rescue. Often, a sovereign guarantee may not be available, although partial credit enhancement may be sought from multilateral banks and agencies. As water services are viewed as critical to the improvement of public health and environmental standards in both developed and developing countries, supporting

BOTs has become a key priority for some development agencies.

Forecast Financial Results

Water projects typically display fairly standard operating cost profiles and predictable revenue streams. For this reason, financial profiles tend to display high levels of leverage (debt versus equity) and low coverage ratios. Nonetheless, operating margins should be sufficient to provide a cushion against an unexpected drop in demand or hike in operating or capital costs. The sizing of the margin should be a function of the level of protection offered by the revenue and legal structures, as well as the nature of the BOT. Wastewater plants are inherently more risky, operationally, than water plants, hence, a higher margin would be required. For the better-rated projects, minimum annual debt service coverage ratio should not fall below a range of between 1.2 times (x) to 1.5x over the life of the rated debt. Some projects can withstand lower coverage ratios depending on project structure and robustness to sensitivities. Again, for investment-grade projects, the proportion of equity should generally be at a minimum 15%-25%, depending on other project features. This equity may be made up in part by deeply subordinated debt, usually provided by the sponsors and should not be amortized in substantial preference to senior rated debt.