U.S. Public Power Rating Criteria

Sector Criteria

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This report replaces criteria titled *U.S. Public Power Rating Criteria*, published April 9, 2021.

Scope

This criteria report details Fitch Ratings' methodology for assigning Issuer Default Ratings, (IDRs), Standalone Credit Profiles (SCPs) and issue- and obligation-specific ratings to U.S. public power utilities, including electric and gas systems that are municipally or federally owned, and electric cooperatives. This rating methodology also applies to certain municipally owned combined utility systems where electric or gas revenue accounts for the largest share of total revenue. The criteria apply to both new and surveillance ratings.

Thermal energy systems, community choice aggregators and competitive energy suppliers will be rated using Fitch's *Public Sector, Revenue-Supported Entities Rating Criteria*, but aspects of the analysis may be informed by these criteria.

Key Rating Drivers

Fitch explicitly does not weight the assessments of individual key rating drivers (KRDs) in coming to an overall rating conclusion. There is no standard formula to link the following inputs into an exact rating; the individual assessments inform but do not dictate the final rating outcome. The relationship between individual and aggregate qualitative and quantitative factors varies between entities in the sector, as well as over time.

Revenue Defensibility: This entails an assessment of a public power utility's exposure to demand volatility and the flexibility within its rate-setting framework to recover costs of service and maintain operating profitability.

Operating Risk: This entails an assessment of a public utility system's operating cost burden and operating cost flexibility, as well as its current capital spending and future capital requirements.

Financial Profile: Metrics are used to evaluate the issuer's leverage and liquidity profiles in the context of the issuer's overall risk profile. These metrics are evaluated on both a historical and forward-looking basis, which considers an individual utility's overall financial flexibility to withstand a stress scenario through a five-year horizon.

Asymmetric Additive Risk Factors: Risk factors such as debt structure, management and governance, and legal and regulatory risks are also considered when assigning a rating. These risk factors are not scaled, and only weaker-than-standard characteristics affect the final rating.

Related Criteria

Public Sector, Revenue-Supported Entities Rating Criteria (September 2021)

State Revolving Fund and Municipal Finance Pool Program Rating Criteria (September 2021)

U.S. Public Finance Tax-Supported Rating Criteria (May 2021)

Related Research

FAST Public Power - Fitch Analytical Stress Test (Description and Model Foundation Update) (April 2019)

FAST Public Power - Fitch Analytical Stress Test Tool V1.3 (April 2019)

General Credit Quality Reflected in IDR or SCP

Fitch will assign an IDR to public power utilities that are determined to be separate municipal entities for purposes of filing bankruptcy under Chapter 9 of the U.S. Bankruptcy Code, as well as an issue-specific rating for each Fitch-rated security. Utilities that are considered related to municipalities will instead be assessed a SCP. Determining IDRs and SCPs aligns default risk ratings in this sector to those assigned by other groups across Fitch's global rating platform. Conduit issuers, including issuers that benefit from balanced, pass-through contractual frameworks, as well as certain entities established solely or primarily for the purpose of financing or accounting for infrastructure or facilities, will generally not be assigned an IDR or assessed a SCP.

For more information on IDRs, SCPs and rating distinctions between specific securities, including circumstances where issue ratings may be capped or constrained by the credit quality of related municipalities, see Fitch's master criteria *Public Sector, Revenue-Supported Entities Rating Criteria* and *U.S. Public Finance Tax-Supported Rating Criteria*.

Sector Risk Profile

Monopoly Providers

The starting point for analysis of U.S. public power systems is recognition that the sector's business model and fundamental credit strengths reduce volatility of financial performance and mitigate the effects of macro events on the underlying system. These strengths include stable demand driven by the essentiality of electric and gas service, mandates to serve well-defined areas with monopolistic characteristics, strong contractual frameworks and considerable pricing flexibility provided through the sector's largely autonomous rate-setting authority.

Public power systems typically provide electric and/or gas service to end users within well-defined service areas. Whereas some utility systems may be subject to regulatory-imposed competitive pressures with respect to the supply of electricity or gas, most systems operate exempt from such provisions. Distribution and transmission services, in nearly all cases, are provided throughout well-defined service areas free from competitive pressure, further enhancing revenue stability.

Rate-Setting Autonomy

The overwhelming majority of Fitch's rated public power systems also possess the ability to autonomously determine their rates for service, free from the oversight of state and federal utility regulatory commissions. With such powerful pricing flexibility at hand, the governing board's actual use of its rate-making authority strongly influences revenue, profitability, operating liquidity and overall credit quality.

Although largely exempt from rate regulation, public power utilities remain subject to a myriad of state and federal regulations related to asset and resource planning, fuel handling and procurement, and environmental emissions standards. Changes in market dynamics, regulatory initiatives, political influence or the competitive framework, whether implemented or expected, can affect both revenue defensibility and operating risk throughout the sector as a whole, and may introduce positive or negative rating pressure for specific credits.

Not-for-Profit Business Model

Public power systems are unique from their investor-owned counterparts. In nearly all cases, public power systems operate on a not-for-profit basis and with the fundamental mission of providing safe, reliable and affordable electric service. Excess cash flow is typically retained and used to build financial cushion, fund capital investment or reduce borrowings. Although a portion of net revenues may be returned to host municipalities and member/owners through transfers or distributions, such transfers are typically restricted to varying degrees by state law or municipal charter. Efforts within the sector to diversify into operations with higher business risk or compete in competitive markets are rare and generally limited by enabling legislation, legal statute or regulatory authorities.

Given the balance of these fundamentals, ratings in this sector, in most cases, range from 'AA+' to 'A–' (with a current median rating of 'A+'), denoting high credit quality. However, individual issuers can be assigned lower, even speculative-grade ('BB' and below), ratings due to specific credit features or issues. This sector risk profile range does not establish a rating floor or ceiling, and does not simply replicate the range of existing ratings in the sector. Rather, the range emerges from the core features common to U.S. public power systems.

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Functional Responsibilities Establish Foundation

Although the public power sector enjoys a strong overall business risk profile, Fitch believes the assessment of issuer-specific risks and credit quality begins with a solid understanding of the issuer's functional responsibilities. The public power sector is highly segmented. While some issuers are engaged in all aspects of the supply, transmission and distribution of electricity or natural gas, others may have functional responsibilities that are limited to individual roles. For example, some issuers may be solely responsible for the distribution of electricity or natural gas to end users, purchasing their supply requirements from a third party, while others may only be responsible for generating or procuring wholesale supplies for delivery by other systems. Fitch considers both the statutory and contractual obligations of each issuer, as well as the degree to which risks are shared or mitigated, to establish the framework under which rating factors are assessed.

Retail Systems

Retail electric systems primarily distribute electricity to residential, commercial and industrial (including irrigation customers) end users. Retail natural gas systems primarily distribute natural gas to residential, commercial and industrial end users. While some systems are independent entities, many are owned by the municipalities they serve and operate as closely integrated enterprise funds of the local government. Moreover, municipal electric and gas systems may be operated as part of a combined utility system that provides other services, including retail water and wastewater. Electric distribution cooperatives are similarly owned and governed by the end users they serve, but rarely provide other utility services.

When evaluating retail systems, Fitch considers how the system's supply requirements are met. Some retail systems are vertically integrated and manage their own supply needs through the ownership and operation of electric generating or gas supply facilities, and/or the execution of individual supply purchase contracts. Others receive all-requirements contractual supply from wholesale systems. Fitch considers the risks, benefits and financial obligations of both approaches in its analysis.

Wholesale Suppliers

Fitch's evaluation of wholesale electric and gas suppliers is rooted in its analysis of the contractual responsibilities and obligations of the supplier and its purchasers. Most wholesale suppliers are organized by municipally owned retail power systems as joint action agencies or joint power authorities (together JAAs), or by cooperatively-owned systems as generation and transmission cooperatives (G&Ts) to provide all or a portion of their members' power requirements pursuant to long-term contracts. Fitch considers the terms, tenor and conditionality of the contractual obligations (i.e. take-or-pay, take-and-pay) to understand the risks borne by each party and to determine the context for assessing the rating factors.

Fitch also considers the counterparty risks associated with the contract structure in its evaluation, factoring the operational interdependency and governance relationship between the wholesale supplier and its purchasers, in addition to purchaser credit quality. In some contractual frameworks, where revenues and costs are largely balanced via pass-through to purchasers and debt service coverage is typically sum sufficient, purchaser credit quality may be more of a consideration in the final rating than the issuer's financial profile (see *Appendix B*).

The Key Rating Drivers

Fitch's KRDs are revenue defensibility, operating risk and financial profile.

For retail systems, the KRDs are assessed using the following guidance, which outlines general expectations for a given rating category. Guidance related to wholesale suppliers, including JAAs, G&Ts and other government-owned systems, is provided in *Appendix B*.

The subfactors in each case highlight the components most critical to making the assessment. All assessments are grounded in borrower-specific historical data and qualitative analysis to support a forward-looking view on the expectation for future performance, rather than at a single point in time. KRD and subfactor assessments may therefore reflect the consideration of metrics based on historical averages, estimates and trends. Moreover, assessments may on occasion differ from what the metrics imply based on the analyst's knowledge of other facts and circumstances.

Key Rating Factors — Retail Systems

Revenue Defensibility	aa	a	bbb	bb
Revenue Source Characteristics	Very strong. Nearly all revenue is derived from services or business lines exhibiting monopoly characteristics. Reliance on revenue from competitive sources is insignificant.	Strong. A significant portion of total revenue is derived from services or business lines exhibiting monopoly characteristics. Reliance on revenue from competitive sources is manageable.	Midrange. A majority of total revenue is derived from services or business lines exhibiting monopoly characteristics. Reliance on revenue from competitive sources is meaningful.	Weak. Less than 50% of total revenue is derived from services or business lines exhibiting monopoly characteristics. Reliance on revenue from competitive sources is significant.
Service Area Characteristics	Very favorable demographic trends generally characterized by strong customer growth, above-average income levels and low unemployment rates.	Favorable demographic trends generally characterized by average customer growth, with average income levels and average unemployment rates.	Midrange demographic trends generally characterized by little or no customer growth, and below-average income or above-average unemployment rates.	Weak demographic trends generally characterized by a declining customer base, well below-average wealth levels and high unemployment.
Rate Flexibility	Independent legal ability to increase service rates without external approval.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation of operating and capital costs being recovered on a timely basis is strong.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation that operating and capital costs may not be recovered on a full or timely basis.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation that operating and capital cost recovery will be neither full nor timely.
	Average retail rates are solidly below the state average.	Average retail rates reasonably approximate the state average.	Average retail rates are solidly above the state average.	Average retail rates are well above the state average.
	Service cost affordability is very high.	Service cost affordability is high.	Service cost affordability is midrange.	Service cost affordability is low.
Asymmetric Rating Factor Considerations	The analysis of an issuer's revenue defensibility also considers the effect of customer concentration, customer mix, industry concentration, wholesale contract structure and counterparty risk on the utility's revenue defensibility.			
Operating Risk				
Operating Cost Burden	Very low operating cost burden.	Low operating cost burden.	Midrange operating cost burden.	High operating cost burden.
Operating Cost Flexibility (Asymmetric Risk Factor)	The analysis of an issuer's operating cost flexibility is an asymmetric risk factor, where weaker elements can constrain the overall assessment of operating risk. Fitch will consider available reserve margin, regional energy markets, fuel concentration, asset concentration, environmental standards, regulatory restrictions and contract structure.			
Capital Planning and Management	Moderate lifecycle investment needs supported by adequate historical and manageable planned capital investment.	Elevated lifecycle investment needs and supported by adequate historical and manageable planned capital investment.	High lifecycle investment needs that are adequately addressed by planned capital investment.	High lifecycle investment needs inadequately addressed by planned capital investment.
Other Asymmetric Rating Factor Consideration	Resource management, project completion risk and counterparty risks can also constrain the assessment.			
Financial Profile				
Leverage Profile	Very Strong: Refer to the *Rating Positioning* table on page 17.	Strong: Refer to the *Rating Positioning* table on page 17.	Midrange: Refer to the *Rating Positioning* table on page 17.	Weak: Refer to the *Rating Positioning* table on page 17.
Liquidity Profile	Liquidity profile is based on coverage of full obligations and liquidity cushion. A weaker liquidity profile can constrain the financial profile assessment.			
Asymmetric Additive Risk Factors				
Risk Considerations	Debt structure, management and governance, legal and regulatory, and information quality may constrain the final rating.			

Fitch explicitly does not assign standard weightings to the assessments of individual factors in determining the key rating driver assessments or coming to an overall rating conclusion. As a general guideline, where a material factor is significantly weaker or stronger than others, this factor tends to attract a greater emphasis in the overall analysis.

The correspondence of business profile, financial profile and rating is presented in the *Rating Positioning* table on page 17. The ratings are not formulaic or model driven, but require qualitative judgment to place metrics in an overall context for each issuer. Fitch has not incorporated a 'aaa' key rating factor assessment table in this criteria, as public power issuers are generally exposed to operating risks and practical limitations on rate-setting that are rarely offset by their strong, monopolistic market position and rate-setting autonomy.

Revenue Defensibility

Fitch considers both demand and pricing characteristics in its assessment of revenue defensibility.

Public power systems have broadly stable demand characteristics, but exhibit some volatility across the typical economic and business cycle. Base demand for service is somewhat insensitive to external factors given the essentiality of service and absence of a competitive marketplace in most territories. However, demand fluctuation on the margin is sensitive to changes in regional economics and demographics, as well as weather conditions, the availability of alternative fuels or energy sources, and disruptive technologies.

In its assessment of revenue defensibility, Fitch analyzes the historical patterns of energy demand through economic and investment cycles, as well as growth trends over time, considering the utility's revenue mix, retail customer characteristics, contractual framework, the economic dynamics of the utility's service area and its capability to preserve revenue generation through rate increase or other measures. While weather is among the most significant factors driving variability in demand for electricity and natural gas, particularly for residential users, normal fluctuations in temperature and seasonality are considered in the context of an issuer's normal business cycle in Fitch's scenario analysis, and are unlikely to affect Fitch's assessment of revenue defensibility.

When evaluating combined utility systems, Fitch's assessment of revenue defensibility may be further informed by the characteristics, subfactor assessments and metrics attributable to the individual business lines contributing minority shares of total revenue.

Revenue Source Characteristics

Revenue Source Characteristics

Metrics to Support Assessment
• Fitch assesses operating revenue risk through an analysis of a utility's business lines and the related revenue relied on to support both operations and debt service. Retail utility systems that derive more than 95% of operating revenue from services or business lines exhibiting monopolistic characteristics have revenue source characteristics consistent with an 'aa' factor assessment; between 80% and 95%, 'a'; between 50% and 79%, 'bbb'; and less than 50%, 'bb'.
• Fitch may also consider in its assessment each business line's contribution to income and/or funds available for debts service using the thresholds outlined above.

A utility's operating revenue mix measures the percentage of operating revenue attributable to each of the services it provides and its individual business lines. Retail electric and natural gas systems typically exhibit strong revenue source characteristics, as the majority of their revenue is derived from monopolistic services — providing service to end users within single certified areas that are subject to little or no competitive pressures. Fitch views revenue derived from monopolistic business lines to be more durable, secure and supportive of revenue defensibility than revenue generated by competitive activities.

Combined utility systems may also derive revenues from the supply, transmission and delivery of a variety of essential utility services, including water and wastewater, which are similarly monopolistic. Wholesale activity designed solely to hedge price or supply a utility's retail demand, and wholesale sales provided pursuant to long-term contracts (minimum tenor of two years) with retail systems exhibiting monopolistic characteristics will also be deemed to exhibit monopolistic characteristics.

Utility systems may also derive operating revenue from non-utility services or less traditional business lines subject to competitive pressures on both demand and price. These services may include telecommunications service, propane sales, competitive energy supply and uncontracted or short-term (less than two-years) off-system sales.

Revenue defensibility risk to a utility can be affected by the degree to which the system relies on revenues and income from competitive business lines to meet its covenanted revenue requirements and debt service obligations. For example, utility systems with excess low-cost hydroelectric capacity may sell significant amounts of energy into the wholesale market. However, if prevailing retail rate-setting plans exclude anticipated margins for uncontracted off-system sales, revenue defensibility risk may be mitigated.

In cases where a retail system derives more than 20% of its revenue from contracted off-system sales, Fitch will also consider in its analysis the tenor, counterparty and terms of relevant contracts to assess the degree to which replacement funds — either from replacement contracts or retail rate increases — may be necessary to meet scheduled debt payments. Contracts with weak counterparties, tenors of less than two years and termination provisions may subject a utility to contract renewal risk or merchant risk, and lower revenue defensibility.

Service Area Characteristics

Service Area Characteristics

Metrics to Support Assessment

- Strong economic, customer and demographic trends support strong revenue defensibility. Fitch analyzes customer growth rates, and service area unemployment rates and income levels relative to national averages.
  - Systems that experience a five-year compound average annual growth rate in customers of more than 1.5% exhibit stronger growth characteristics; 0.0%–1.5%, midrange; and less than 0.0%, weaker.
  - Service areas that report median household income in excess of 125% of the national median exhibit stronger income characteristics; 75%–125%, midrange; and less than 75%, weaker.
  - Service areas that report unemployment rates that are less than 75% of the national average exhibit stronger employment characteristics; 75%–125%, midrange; more than 125%, weaker.
- Markets that exhibit midrange retail customer growth and midrange demographic trends are considered favorable and consistent with factor assessments of at least 'a'. Markets that exhibit a greater number of stronger characteristics than weaker characteristics are typically assessed 'aa'. Markets that exhibit one more weaker characteristic than stronger characteristic are typically assessed as 'bbb'. Markets that exhibit two or more weaker characteristics than stronger characteristics are typically assessed as 'bb'.

A public power system's demand and pricing characteristics, as well as its overall revenue stability, will be highly influenced by its service area characteristics and demographic trends.

Retail customer growth, high income levels, a strong and diverse employer base, and low unemployment levels are all positive credit factors that influence both demand and pricing characteristics. Service areas characterized by strong employment metrics and income levels, or as regional economic centers, are likely to benefit from stronger demand driven by customer migration and organic growth.

Moreover, stronger income levels throughout an area are likely to result in more inelastic demand and rate flexibility during periods of economic weakness. Areas experiencing declining customers and employment are likely to experience lower demand.

Fitch reviews income and employment indices to help assess not only the prospects for stronger growth and more inelastic demand, but also the capacity of residential users to meet current obligations and absorb future rate increases. While income also provides some indication of an end user's ability to pay utility bills, Fitch observed that the essential nature of electric and natural gas service and the remedies available to most systems (i.e. shutoffs and liens) make payment delinquencies in the sector extremely low, regardless of income levels and other economic indicators. In cases where a utility service area extends across a broad geographic area and multiple counties, Fitch may base its analysis of the service area characteristics using the city or county in which the most customers are located.

When evaluating wholesale systems, the characteristics of the areas served by the supplier's member retail systems are reviewed (see *Appendix B* for details).

Rate Flexibility

The final component of the revenue defensibility assessment is a utility's rate flexibility, which considers both the system's independent legal ability to determine rates of service, and its rate competitiveness and affordability of service.

Assessing a utility's independent legal ability to determine rates and increase operating revenue involves consideration of any limits on the system's autonomy in this area, including requirements for approval from local government groups, state regulatory commissions or federal regulatory authorities. Fitch considers a utility system to have independent legal rate-raising ability as long as such action is at the discretion of the utility's governing body — be it a board of directors, local government council or both.

Issuers whose rates for service must be approved by an external regulatory authority are viewed as having less rate flexibility. Although issuers operating within a well-established and historically supportive regulatory regime may exhibit strong financial performance and credit quality, their revenues are nonetheless subject to scrutiny, regulatory lag and the potential for cost disallowance. Fitch will consider historical ratemaking decisions, methodologies and automatic recovery mechanisms in its assessment to determine the likelihood costs will be recovered in a timely manner. Limitations on rate increases that stem from legislative restrictions, self-imposed suspension of increases or similar actions will also likely limit the assessment of rate flexibility, notwithstanding the absence of external regulatory review.

A utility system's ability to independently set rates for service significantly enhances revenue defensibility, allowing the utility to increase revenue as necessary to offset the effects of lower unit sales or meet unanticipated cost increases. However, Fitch believes the relative competitiveness of rates and affordability of utility services, particularly at the retail level, can serve as practical limitations on rate flexibility and a utility's capability to sustain strong financial performance.

Rate competitiveness for retail systems is typically measured by comparing a system's average retail rate to comparable average retail rates for the state in which the system operates. Broader or narrower geographic comparisons, or residential rate comparisons may be reviewed when more informative in certain cases. Average rates are calculated as total revenue divided by total units delivered. Fitch measures affordability as the total annual cost of residential service (i.e. average residential consumption multiplied by the average unit rate) divided by median household income throughout the service area. Retail systems that possess the legal ability to determine rates and provide affordable electric service at rates that compare favorably with other systems are viewed as having ample rate flexibility.

Affordability and Rate Competitiveness

Metrics to Support Assessment

- Fitch compares a system's average retail rate with the average retail rate in the state in which the utility operates. Public power systems with rates higher than the state average have lower rate flexibility compared with systems with below-average rates. Utility systems with retail rates less than 90% of the state average have rate flexibility characteristics consistent with an 'aa' factor assessment; 90%–120%, 'a'; 121%–150%, 'bbb'; and greater than 150%, 'bb'.
- Fitch calculates an affordability ratio to determine the percentage of median household income necessary to cover residential electric charges. Electric systems with a ratio that is less than 2.5% exhibit affordability that is very high; 2.5%–3.5%, high; 3.6%–4.5%, midrange; and above 4.5%, low.
- Fitch calculates an affordability ratio to determine the percentage of median household income necessary to cover residential gas charges. Gas systems with a ratio that is less than 1.5% exhibit affordability that is very high; 1.5%–2.5%, high; 2.6%–3.5%, midrange; and above 3.5%, low.

Fitch considers both retail rate competitiveness and wholesale rate competitiveness in its assessment of rate flexibility for wholesale systems (see *Appendix B* for details).

Asymmetric Rating Factor Considerations — Revenue Defensibility

In addition to the aforementioned considerations, the assessment of revenue defensibility can be constrained by revenue source concentration or where revenues are monopolistic but

deemed nonessential. Fitch evaluates a utility's vulnerability to sudden drops in demand and the impact on revenue defensibility by assessing the degree to which demand and revenue rely on a particular customer, industry or commercial segment, or services that do not share the same essentiality as electric, natural gas and water.

Customer concentration is assessed by reviewing the revenue contribution from a system's largest retail customers. Systems that derive more than 10% of total revenue from their largest customer or more than 25% of total revenue from their 10 largest retail customers exhibit meaningful customer concentration. Systems exhibiting customer concentration will be further evaluated to determine whether such concentration detracts from revenue stability. In cases where additional operating and financial risk are introduced, these factors may further constrain the rating.

Fitch further evaluates an issuer's sales mix (the percentage of its unit sales and revenue attributable to the principal customer segments: residential, commercial and industrial), its 10 largest customers and the service area's largest employers to identify industry or commercial segment concentration and the potential for an unanticipated decline in demand due to a fundamental shift in an industry's competitive profile. Residential revenue below 35% of total retail revenue indicates some degree of commercial and industrial concentration and could compromise an issuer's revenue defensibility (if sales mix is measured by unit sales, residential sales below 25% indicate concentration). Similarly, revenue attributable to a single industry or commercial segment in excess of 20% of total retail revenue indicates concentration.

Operating Risk

The second KRD is operating risk, which focuses on operating cost burden, operating cost flexibility, and capital planning and management. A public power system's ability to generate adequate margin while maintaining competitive rates and preserving affordability is largely a function of its ability to effectively manage operating and capital expenses, including commodity costs. Long-term investment in property, plant and equipment is necessary to ensure sectorwide resource adequacy, regulatory compliance, accurate revenue recognition, reliability and efficient operations. While capex may limit financial flexibility in the near term, investment is essential for ensuring strong system performance over the long term.

When evaluating combined utility systems, Fitch's assessment of operating risk may be further informed by the characteristics, subfactor assessments and metrics attributable to the individual business lines contributing minority shares of total revenue.

Operating Cost Burden

Fitch believes public power systems with a high operating cost burden are subject to a higher degree of overall operating risk. The measurement of total operating costs reflects the wide range of individual costs associated with the supply and delivery of electricity and natural gas. These include fuel, purchased power and natural gas, labor, administration, maintenance and fixed assets (as measured by depreciation). Fitch also includes transfer payments and other regular distributions in its calculation of operating costs. Overall, Fitch believes the benefits and challenges related to operating decisions, as well as the effect of regional differences, macroeconomic factors and external restrictions on operations, are most commonly captured in operating costs.

For the vast majority of electric and gas systems, fuel, purchased power and purchased gas represent the largest expense categories. Fuel costs are most prevalent for electric systems that directly own generation, and are inherently variable, driven by commodity prices and production volumes. Sizable purchased power and gas costs are particularly prevalent for retail systems that entered into all-requirements contracts with JAA or G&T suppliers. Contract costs for purchasing utilities will typically encompass all costs borne directly by the supplier, including fuel, purchased resources and capital costs, and will be sensitive to variability in commodity prices and purchase volumes. Utilities that own generation may also purchase power pursuant to bilateral or joint resource contracts. Depending on a utility system's resource mix and supply arrangement, fuel and purchased power can account for 50%–75% of total operating costs.

Depreciation expense is highly reflective of asset ownership and legacy investment decisions. While all retail utility systems own distribution assets, higher levels of depreciation are typically

associated with systems that own generating assets. Moreover, depreciation may be an outsized component of operating costs for systems with high-cost, inefficient or nonperforming assets.

Other expenses include labor and administrative costs, and taxes or payments in lieu of taxes (PILOTs). Fitch includes amounts transferred to a host municipality as an operating expense because the importance of these payments to the recipients significantly increases the likelihood payments will be made, even during periods of financial stress. Labor costs, including pension-related costs, are generally a small portion of total operating expenses given the relatively low labor intensity of utility service, but could become increasingly burdensome for systems with large unfunded pension obligations.

The key metric Fitch uses to measure operating cost burden is the ratio of total operating costs to total unit sales. Specifically, Fitch assesses each utility's ratio against levels it considers to be representative of varying degrees of operating risk.

Operating Cost Burden

Metric to Support Assessment

- Fitch measures a utility's ratio of total electric operating costs to total energy kWh sales to determine operating cost burden for electric systems. Retail systems with an operating cost/kWh that is less than 10.75 cents/kWh have a very low operating cost burden; between 10.75 cents/kWh and 16 cents/kWh, low; between 16 cents/kWh and 21.5 cents/kWh, midrange; and above 21.5 cents/kWh, high.
- Fitch measures a utility's ratio of total natural gas operating costs to total retail natural gas sales to determine operating cost burden for natural gas systems. A portion of operating costs deemed to be related to transportation-only services are typically excluded. Retail systems with an operating cost/thousand cubic feet (Mcf) that is less than $9/Mcf have a very low operating cost burden; between $9/Mcf and $14/Mcf, low; between $14/Mcf and $18/Mcf, midrange; and above $18/Mcf, high.

Operating Cost Flexibility

An issuer's ability to manage operating costs underpins Fitch's assessment of its operating risk. For retail systems that purchase all or the majority of their energy supply, Fitch's analysis may extend to its wholesale suppliers or include consideration of relevant regional organized markets.

Risks related to operating cost flexibility are viewed as asymmetric, meaning reasonable or even strong flexibility would not result in a stronger assessment of operating risk than a utility's operating cost burden and capex requirements would otherwise suggest. Fitch expects systems possessing strong flexibility would use that flexibility to lower operating costs. The evaluation of operating cost flexibility is most likely to constrain the operating risk assessment for those systems that exhibit low operating costs but possess limited ability to preserve or manage costs in the wake of changes in operating conditions.

Fitch evaluates operating cost flexibility differently for electric systems versus natural gas systems. In each case, Fitch evaluates the items below to determine the degree to which limitations to operating cost flexibility may constrain the overall operating risk assessment.

Electric Systems — Resource Balance

Fitch reviews a system's current power supply portfolio and requests an integrated resource plan (IRP) or data necessary to evaluate the adequacy of current and planned resources to meet energy and demand requirements. Resource sufficiency may be determined through the calculation of a capacity reserve margin, which measures a system's excess resource capacity as a percentage of its peak demand, or through a broader marketplace assessment for systems operating within organized markets.

Systems reporting a reserve margin lower than 10% and/or operating in organized markets exhibiting capacity constraints are more susceptible to shortfalls in available capacity, whether as a result of unplanned outages or higher than anticipated peak demand. Capacity shortages could result in significantly higher operating costs and lower operating cost flexibility. Utilities with low reserve margins or operating in constrained markets could also face sizable capacity-related investment (see *Capital Planning and Management* section).

Alternatively, systems may report lower unit operating costs as a result of energy sales from excess capacity. In these cases, Fitch will evaluate the likelihood of continued sales in its assessment of operating cost flexibility. If future sales are unlikely or highly questionable, operating flexibility is limited.

Electric Systems — Resource Diversity

Fitch measures resource diversity in terms of capacity fuel mix and asset concentration. A utility's capacity fuel mix is the proportionate mix of capacity available to a system by fuel type (i.e. coal, natural gas, nuclear, etc.). Fitch believes a utility with a well-diversified resource portfolio has a greater ability to manage operating costs and related risks.

Utility systems that rely on any individual fuel for more than 80% of their available capacity would be considered to have a weak capacity fuel mix, and could face greater challenges in managing operating costs. Access to a more diversified fuel mix allows utility systems to moderate the effect of increasing fuel costs or other circumstances that could curtail availability or production, including applicable environmental standards or regulatory restrictions.

Similarly, systems that rely on any individual generating unit for more than 66% of their available capacity exhibit a high degree of asset concentration. Although a strong operating history could mitigate some operating risk, an extended outage or other circumstances that could curtail availability or production could significantly compromise a utility's operating cost flexibility.

Systems relying on third-party bilateral contracts that mature within two years or are subject to significant counterparty risk for more than 66% of their power supply may exhibit limited cost flexibility if regional capacity constraints and prevailing market conditions indicate renewed contracts will be costly or otherwise subject to unfavorable terms.

Natural Gas Systems — Resource Balance

Fitch reviews a system's current natural gas supply portfolio and requests an IRP or data necessary to evaluate the adequacy of current and planned resources to meet demand requirements. Resource sufficiency is determined by reviewing contractual supply arrangements, transportation capacity and storage availability to assess the system's capability for meeting peak demand.

Systems reporting limitations related to purchased gas or transportation capacity, or insufficient storage capacity, are more susceptible to shortfalls in delivered gas capabilities, whether as a result of supply shortages or higher than anticipated peak demand. Capacity shortages could result in significantly higher operating costs and lower operating cost flexibility. Utilities with insufficient delivery capabilities could also face sizable capacity-related investment (see *Capital Planning and Management* section).

Natural Gas Systems — Resource Diversity

Fitch assesses resource diversity by evaluating supplier concentration and contract risk. Fitch believes a utility with a well-diversified gas supply portfolio has a greater ability to manage operating costs and related risks. Utility systems that rely on an individual supplier or supply source for more than 80% of their gas supply would be considered to have supply concentration and could face greater challenges in managing operating costs. Access to a more diversified gas supply allows utility systems to moderate the effect of increasing gas costs or other circumstances that could curtail deliverability.

Systems relying on third-party supply contracts that mature within two years or are subject to significant counterparty risk for more than 66% of their natural gas supply may also exhibit limited cost flexibility if regional supply constraints and prevailing market conditions indicate renewed contracts will be costly or otherwise subject to unfavorable terms.

Capital Planning and Management

Fitch believes generating, transmitting and distributing electricity and natural gas safely and reliably requires significant and consistent capital investment. Ensuring the adequacy of resources to meet current and projected demand and the ability to deliver energy reliably are fundamental planning requirements of public power utility systems, and central to their missions. Expenditures necessary to add new resources or comply with environmental regulations often entail sizable and costly multiyear projects that can result in periodic spikes in

expenditure. In contrast, the need for systematic asset management and continual system investment, particularly to replace depreciating infrastructure, is necessary to maintain operating efficiency and preserve reliability.

Fitch assesses capital planning and management for U.S. public power systems through a review of the utility's historical spending practices and age of plant, as well as its capital investment plan (CIP) and projected spending requirements. Where appropriate, Fitch may also review the CIP and projected spending of a retail system's wholesale supplier.

Fitch assesses capital investment by examining average age of plant in the context of historical and projected capital spending. Systems that maintain an average age of plant less than 20 years and have adopted capital spending plans broadly in line with annual depreciation expense — greater than 80% — are considered to have lifecycle capital needs and spending plans that support a strong operating risk assessment.

Systems that maintain an average age of plant exceeding 20 years may be susceptible to the effects of historical underinvestment in operating assets, which can include elevated levels of routine maintenance, weak availability metrics, higher rates of fuel consumption, higher systems losses and poor reliability. However, capital planning and management can be highly cyclical. Therefore, CIPs aimed at addressing system deficiencies and increasing investment, as evidenced by capital spending well in excess of annual depreciation, support a midrange assessment, despite the age of plant. Conversely, older systems that continue to underinvest (as evidenced by historical and projected capital spending that is less than annual depreciation), and systems where concerns exist regarding the ability to provide service or where service is susceptible to significant outages from weather and other events are deemed to have high capital planning and management needs, and weak practices that are additive to operating risk.

Fitch's capital planning and management assessment also includes analysis of how planned projects fit with the utility's IRP and its long-term strategies, and the potential implications for operating risk. For utilities contemplating major construction projects, plans exhibiting weak planning mechanisms or involving complex or new technology judged to be at higher risk for cost escalation could also increase operating risk. The project team's qualifications and experience are also considerations. Guaranteed maximum price contracts, owners' and builders' contingencies, liquidated damages and capitalized interest funding are standard features utilized in most large utility construction projects, and serve to reduce the inherent construction and development risk in any large capital project. Where the completion risk is considered material, it may constrain the overall operating risk assessment and will be considered in the scenario analysis described in the *Financial Profile* section.

If not included in the CIP, Fitch requests a multiyear capital budget — typically five years — to assess the effect planned or proposed capital investments will have on the financial profile of the utility system. The manner of intended funding, and the near- and longer term effect on leverage, are particularly taken into account. A project's expected funding sources can affect the credit rating outcome, depending on the degree of debt funding, versus cash on hand, cash from operations and other nondebt sources. Fitch reviews the timing, availability and assumptions regarding planned debt issuance and the effect on the borrower's balance sheet and cash flow. See the *Financial Profile* section.

Capital Planning and Management

Metrics to Support Assessment

- Fitch calculates average age of plant as accumulated depreciation divided by annual depreciation expense, and assesses capital spending as a percentage of depreciation expense. In cases where accumulated depreciation is not available, Fitch will calculate age of plant as follows: 35 – (net property, plant and equipment divided by annual depreciation expense).
- High average age of plant (greater than 20 years for electric systems and 22.5 years for gas systems) indicates high lifecycle investment needs; average age of plant of 15–20 years for electric systems and 17.5–22.5 years for gas systems indicates elevated investment needs; and average age of plant less than 15 years for electric systems and 17.5 years for gas systems indicates moderate investment needs. High average age of plant combined with prolonged lower capital spending as a percentage of depreciation expense (lower than 80%) indicates underinvestment in system assets, and capital planning and management practices that are additive to operating risk.

Asymmetric Rating Factor Considerations — Operating Risk

In addition to the aforementioned considerations, the assessment of operating risk can be constrained by the following considerations.

Resource Management

Supply or resource-management risk is considered low for most public power systems given the interconnectivity of the U.S. electric grid, the expansive supply of natural gas and the proliferation of organized electric, which significantly reduce the risk of energy supply shortages. Shortfalls in resource capacity, energy or commodity supplies are expected to be met through market purchases or the use of alternative resources. The emphasis of our operating risk assessment is therefore on cost. However, geographic or infrastructure isolation may introduce vulnerability to supply shortages and challenges to reliability, which could constrain an issuer's operating risk assessment.

Technological Risk

The development of new technologies throughout the utility sector, and their potential for disruption, is considered in the assessment of operating risk if it is not otherwise reflected in operating cost burden. As issuers confront the possibility that resources could be idled or stranded as a result of disruptive technologies, including distributed generation and battery storage, operating cost burden is expected to increase. However, if the full impact of disruption on operating cost and other financial metrics is most acute outside the scenario-analysis period, additional consideration may be warranted.

Financial Profile

The third key rating driver is a utility's financial profile. Having evaluated a public power system's revenue defensibility and operating risk, Fitch considers the entity's financial flexibility through a range of scenarios intended to assess its relative capacity to repay debt and other liabilities. This analysis will connect the system's overall risk profile, through its revenue defensibility and operating risk assessment, with its leverage and liquidity profile, assessed on a forward-looking and through-the-cycle basis rather than a single point in time. The evolution of the financial profile, its low point and its average through-the-cycle performance are considered. The assessment considers direct debt liabilities, pension liabilities and capitalized obligations, as described below.

Leverage Profile

Fitch will develop cash flow scenarios to frame the financial profile assessment. These scenarios will include a base case and a stress case, and in certain instances, additional sensitivities described more fully below. Revenue and operating cost assumptions, together with planned capex and additional debt capital or liability growth, are developed for the scenarios based on Fitch's review of an issuer's historical performance and expectations for future performance.

Once established, scenarios may be revised as appropriate to preserve the forward-looking nature of Fitch's analysis, and to reflect unexpected financial results or changes in assumptions if relevant to a utility's performance and rating. Fitch's expectations reflected in the scenario will be further shaped by revenue and operating risk KRD assessments. Peer analysis will be used wherever appropriate and if ratings for a relevant group of peers with similar operating and revenue defensibility profiles can be compiled. For issuers whose ratings are driven by counterparty credit quality, and where leverage profile may be less of a consideration, scenario analysis may be unnecessary.

Base Case Informs Scenario Analysis for Stress Case

Fitch will evaluate a base case cash flow scenario that serves as Fitch's expected case in the current operating environment. The base case serves as a starting point for further scenario and sensitivity analysis. The stress case will consist of a through-the-cycle scenario that incorporates a combination of revenue, cost or financial risk stresses as described below. These stresses are formed by reference to historical trends specific to the issuer and Fitch's expectations for the future. The stress case scenario analysis will reveal levels and shifts in key operating, leverage and liquidity metrics contrasted with the base case to determine if they are consistent with a stable rating through that stress.

Leverage Profile Key Focus of Stress Case Scenario

The stress case scenario highlights expected future financial leverage of the issuer, considering both through-the-cycle elements and forward-looking expectations. The measure of financial leverage considers the level of net debt and other fixed obligations as they relate to the generation of cash flow. The relative strength of balance sheet and available resources to absorb changes in working capital is considered in the context of the ability to adjust revenue to recover expenses and manage operating risks when forming a rating view.

Leverage Ratio — Net Adjusted Debt to Adjusted FADS

(Total Debt + Capitalized Fixed Charges + Pension Obligation – Unrestricted Cash – Funds Restricted for Debt Service)/(FADS + Fixed Charges – Transfers/Distributions + Pension Expense)

FADS – Funds available for debt service

Future financial leverage in the stress case scenario is reflected in the net adjusted debt-to-adjusted funds available for debt service (FADS) or leverage ratio, which measures a system's debt and other fixed obligations (net of certain balance sheet resources) relative to its annual operating funds available to service those obligations.

The resulting value is expressed as a multiple and may be positive or negative (where an issuer holds more cash and investments than the amount of its outstanding debt or reports operating losses). High values, or negative values as a result of operating losses, imply lower flexibility in meeting and managing debt and long-term liability obligations, as well as a lower capacity for additional debt absent rate increases and improved operating cash flow (see *Rating Positioning* table on page 17).

Rationale for Capitalization of Fixed Charges

Fitch views fixed obligations related to purchased power supply and gas purchased for delivery as a debt-equivalent form of funding for operational assets and adjusts its leverage ratios to include the debt-like features of these agreements. As supply and transportation agreements are often substitutes for asset ownership and long-term on-balance-sheet funding, Fitch will capitalize 30% of a system's expenses for purchased power and gas using an 8.0x multiple to create a debt-equivalent figure. This figure represents the estimated funding level for a hypothetical purchase of the supply and/or transmission assets and is included in Fitch's core leverage metrics.

A multiple of 8.0x reflects assets with an average remaining economic life of 15 years, consistent with the long-dated infrastructure assets owned by power suppliers, in a 6% interest rate environment. This adjustment enables a broad comparison between rated entities that incur debt to finance supply and/or transmission assets and those that contract for resources or finance infrastructure through a conduit entity. In cases where an issuer's actual fixed charges and related off-balance-sheet debt are available, or prevailing agreements include no fixed charges, appropriate adjustments may be used in Fitch's analysis.

Certain operating leases that are long term in nature are also viewed as a debt-equivalent form of funding. New accounting standards will establish principles reporting the assets and liabilities that arise from certain leases. For entities that adopted these standards, Fitch will include the reported liabilities in its calculation of long-term debt and make further adjustments to income statement metrics for operating lease payments, if appropriate. Where these accounting standards have not been adopted, operating leases that function more like capital leases or debt will be capitalized in a manner similar to purchase power expenses and included in adjusted debt metrics.

Rationale for Pension Treatment in Leverage Metrics

Issuers with defined-benefit (DB) pensions carry a financial obligation that is long term in nature, and uncertain in timing and amounts to be paid. Fitch views unfunded pension liabilities, which broadly represent the accrued liabilities in excess of the invested assets available to meet the obligation, as a debt-equivalent obligation that may be included in the calculation of Fitch's core leverage metrics and its assessment of an issuer's financial profile. Fitch's determination of each issuer's exposure to and level of pension obligations is dependent upon a number of variables, including accounting standards, applicable regulations and funding practices. The methodologies and parameters used in Fitch's analysis are outlined in *Appendix D — Pension Treatment in Leverage Metrics*.

Other Post-Employment Benefits

In most cases, Fitch does not consider the credit impact of other post-employment benefits (OPEB) in assessing the long-term liabilities of public power systems. For most governmental entities providing OPEB, the level of benefits has proven much easier to change than pensions, and legal protections appear limited in most cases. In cases where OPEB is exceptionally large and not subject to modification, Fitch may incorporate OPEB as an asymmetric risk factor.

Rationale for Transfer Treatment in Leverage Metrics

Fitch subtracts amounts regularly transferred, distributed or paid to owners or a host municipality as an operating expense in its calculation of adjusted FADS in its leverage assessment. These transfer payments and distributions may be reported as non-operating expenses or explicitly subordinate to debt service payments. However, Fitch believes the importance of these payments to the recipients significantly increases the likelihood payments will be made, even during periods of financial stress, and particularly during periods of financial stress affecting the host municipality. Moreover, given the practical timing of remittance, payments are often made prior to debt service. Amounts regularly paid to the utility by the host municipality or affiliated enterprise funds may be netted against operating expenses. Intermittent payments made by utilities, including periodic dividends and the repatriation of capital, are generally excluded from operating expenses given their discretionary nature and contractual restrictions on payment.

Establishing the Base Case

The development of a base case begins with Fitch's evaluation of an issuer's recent historical performance based on a review of its audited financial statements and any unaudited financial information — typically interim statements — covering a period of at least three years. The most recent unaudited financials will usually inform year one of the base case scenario.

The base case reflects Fitch's expectation of both historical financial results and management's projected performance. Fitch will consider the level of consistency in the recent financial and operating performance of the issuer, its management team and its market as one indicator of future performance. Fitch will generally start the base case analysis using revenue and expense assumptions, reflecting variability in unit sales derived from long-term historical performance; corresponding changes in fuel, purchased power and gas; and inflation. However, there may be analytical reasons to diverge from these input assumptions (e.g. nonrecurring events or changes in historical usage patterns). Fitch will evaluate each issuer, and develop and communicate expectations.

Although Fitch will review an issuer's annual operating budget or longer term forecast when presented, the Fitch base case ultimately reflects Fitch's criteria and expectations, including Fitch's macroeconomic assumptions. Fitch will consider the reasonableness of the assumptions that drive projected results if the issuer's forecast suggests future performance is expected to track differently from historical results due to a significant capital project, a new acquisition, new service offerings, changes in rate design or incorporated stress. Forecasts that rely on aggressive volume growth, noncore revenue, market share capture, market price assumptions, rate increases or cost reductions will be viewed with analytical caution in the rating process. Conversely, Fitch's base case may rely more on historical trends where issuer forecasts reflect stresses or conservative assumptions applied for planning or rate-setting purposes.

Stress Case Reflected in Forward-Looking Scenarios

The stress case analysis considers potential performance under a common set of assumptions, thereby illustrating how cycles affect individual issuers differently. The stress case ultimately reflects a stress through which the rating is expected to remain stable.

The FAST Econometric Application Programming Interface (API) — Fitch Analytical Stress Test Model (FAST) is used to formulate the base case and a stress case. The model, in essence, highlights how an issuer's financial profile can change through a demand cycle. While FAST supports Fitch's through-the-cycle analysis, it is not a forecasting model. FAST should be considered a scenario model to be used in the rating process to better differentiate between credits.

Fitch's overarching philosophy is that ratings should not change due to normal cyclical variations. Economic downturns are inevitable, and variations in financial performance in many cases can be

observed. Fitch believes ratings should account for this. However, broad shifts different from the ebb and flow of a normal cycle may also occur. Scenario analysis helps make the distinction between the two and helps communicate both rating sensitivities and what is already anticipated in the current rating. See *Appendix A* for additional detail on the model.

The typical stress assumed in the stress case scenario for IDRs/SCPs of 'BB'/'bb' and above, respectively, will generally reflect revenue and cost stresses commensurate with those a utility system would encounter following a sudden drop in demand based on the system's specific characteristics and risk attributes. The purpose of the scenario analysis is to establish benchmark measures of liquidity and leverage that are incorporated in the rating through the cycle. The stress case will reflect a demand stress using the assumptions outlined in *Appendix A*. In cases where issuers complete their own stress scenarios based on assumptions other than a demand stress (e.g. hydroelectric-dominant systems often complete multiple water condition scenarios that have the potential to enact a greater range of outcomes on leverage than a demand stress), Fitch may consider those outcomes in addition to the FAST.

The effect of the decline in demand and revenue on leverage will be reflected in the scenario, as will Fitch's expectations of the issuer's response. The FAST model applied to the utility systems and discussed further below will be the source for evaluating the change of leverage and prospects for higher revenue collection through rate increases, or automatically through rate designs that collect a higher percentage of revenue through fixed service charges or a fixed revenue requirement. In cases where a base case scenario is sensitized to reflect known or anticipated stress, the resulting leverage and financial metrics may be more relevant to Fitch's analysis than the outcome of the FAST stress case outlined in *Appendix A*.

Assigning IDRs — 'B' Category and Below

Fitch will use the base case as a stress case for issuers with base case financial profiles indicating little capacity to navigate adverse economic conditions and ratings in the 'B' category or lower. Metrics are not useful for scaling ratings from 'B' to 'C', given the limited number of defaults in this sector. A qualitative assessment will be made of default risk and the extent of any remaining margin of safety indicated by the issuer's overall operating and financial risk profile. In this respect, the rating definitions associated with rating categories from 'B' to 'C' provide guidance.

Liquidity Profile

In addition to the leverage metric analysis described above, Fitch also performs a liquidity assessment. The liquidity profile assessment evaluates the liquidity resources available to an issuer that drive its capacity to cover expected or unexpected operating expenses, including timing delays in cost recovery. The first resource available to most issuers is periodic excess margin above operating costs that acts as a cushion to changing circumstance. A second source is unrestricted cash and investments in reserve, and a third is committed liquidity lines from investment-grade-rated financial institutions.

A weak liquidity profile relative to operations can constrain the overall assessment of the issuer's financial profile. Two key metrics used by Fitch to measure liquidity are coverage of full obligations (COFO) and liquidity cushion.

Coverage of Full Obligations

COFO is a measure of operational strength relative to a utility system's debt and fixed obligations that come due in any annual period. Fitch calculates COFO as follows:

Coverage of Full Obligations Ratio

(FADS + Fixed Purchase Charges – Transfers/Distributions)/(Total Annual Debt Service + Fixed Purchase Charges)
FADS – Funds available for debt service

While Fitch calculates a traditional debt service coverage ratio for all public power issuers, the calculation of COFO facilitates comparability among issuers as it also considers the effect of capitalized fixed charges, and transfers and distributions, on an issuer's liquidity profile. A comparison of coverage calculations is provided in *Appendix E* that illustrates how a system's

coverage ratio may be overstated if capitalized fixed charges and transfers and distributions are excluded from the calculation.

COFO is used to assess an entity's liquidity profile as follows:

Coverage of Full Obligations (COFO)

Metrics to Support Assessment

- COFO less than 1.0x is "weak" and risk additive.
- COFO below 1.0x may not be considered weak if a borrower maintains unrestricted cash on hand at 120 days or more.

Liquidity Cushion

Liquidity cushion measures a utility system's unrestricted cash and investments, and available lines of credit against average daily cash operating expenses. In addition to assessing a utility's full liquidity cushion, Fitch also assesses unrestricted cash against average daily cash operating expenses. All of the ratios measure the number of days the issuer could continue to pay its average daily cash operating expenses using the relevant source or sources of liquidity.

Liquidity Cushion Ratio

(Unrestricted Cash + Available Borrowing Capacity)/(Average Daily Cash Operating Expenses)

Available borrowing capacity under committed lines of credit is included in the liquidity cushion ratio if provided by investment-grade financial institutions, or lower rated institutions if the rating is equivalent to the issuer rating. Where necessary information is not available, liquidity will be assessed without explicit credit for borrowing capacity. Similarly, borrowing capacity includes available issuance capacity under CP programs where the allowable use of proceeds includes payment of scheduled debt service or is unrestricted. Programs rated 'F3' by Fitch will not be included when calculating borrowing capacity. Programs where the use of proceeds is limited to capital investment may also be excluded when calculating borrowing capacity.

Liquidity Cushion

Metric to Support Assessment

- A liquidity cushion above 90 days is neutral to ratings, as long unrestricted cash is above 30 days. A liquidity cushion below 90 days or unrestricted cash below 30 days is considered "weak" and risk additive.

The liquidity cushion assessment for utility systems organized as enterprise funds may include a separate review of the host municipality when governmentwide cash balances are consolidated and held within the general fund. Fitch's review will include an evaluation of the sufficiency of cash on hand, and the system's access and availability to funds. Governmentwide cash on hand is considered neutral; below 60 days is considered "weak" and is risk additive.

Rating Guidance: Applying Analytical Judgment to Align Key Risk Factors, Financial Profile and Ratings

The results of the scenario analysis are used to assess the impact of change on key liquidity and leverage metrics. Together, these create a financial profile on a forward-looking and through-the-cycle basis aligned with the assessment of KRDs to obtain an indicative rating level. The *Rating Positioning* table on the next page provides guidance to the analytical outcome, aligning the assessment of the issuer's overall risk profile — through revenue defensibility and operating risk assessments — with its leverage and liquidity profile.

The evaluation and importance of KRDs are specific to the individual credit being considered. However, while both revenue defensibility and operating risk are important in evaluating an issuer's financial profile, in some cases revenue defensibility can have a greater influence in the determination of an issuer's financial profile, as illustrated below. For example, issuer's with a revenue defensibility assessment of 'aa' and operating risk assessment of 'bbb' can operate at a higher degree of financial leverage than issuers with a revenue defensibility assessment of 'bbb' and operating risk assessment of 'aa' and achieve the same financial profile assessment.

The *Rating Positioning* table is the starting point in assessing an issuer's leverage and financial profile, as well as determining the final rating (IDR) or SCP. For example, an issuer's leverage profile may be higher or lower than suggested by the table if there is evidence that off-balance-sheet or contract debt is meaningfully different than amounts calculated pursuant to Fitch's analytical approach, or if the most relevant metrics are outside the scenario analysis period.

Similarly, ratings and SCPs may be higher or lower based on analytical judgment when factors are present that suggest a higher or lower risk of a shift in capacity for meeting financial obligations than would be suggested by the rating derived from the table. Considerations supporting a higher rating or SCP could include an issuer's capex profile and its position within the capital life cycle; rate designs that collect a higher percentage of revenue through fixed service charges; recovery mechanisms that significantly buffer the effect of demand variability; and greater revenue contribution from business lines that support higher leverage, including transmission, water and wastewater service. Considerations supporting a lower rating include rate structures that significantly limit the collection of revenue pursuant to fixed charges or automatic recovery mechanisms.

Rating Positioning

Revenue Defensibility Assessment	Operating Risk Assessment	Leverage Profile Assessment (Net Adjusted Debt/Adjusted FADS) (x)			
		aa	a	bbb	bb
aa	aa	< 10	10–12	12–15	> 15
aa	a	< 8	8–10	10–15	> 15
a	aa	< 8	8–10	10–15	> 15
aa	bbb	< 7	7–9	9–13	> 13
a	a/bbb	< 6	6–8	8–12	> 12
aa	bb	< 5	5–7	7-11	> 11
bbb	aa/a	< 4	4–6	6–10	> 10
a	bb	< 4	4–6	6–10	> 10
bbb	bbb	< 0	0–4	4–6	> 6
bbb	bb	< 0	0–2	2–4	> 4
bb	a/aa	—	< 1	1-3	> 3
bb	bbb	—	< 0	0–2	> 2
bb	bb	—	< (3)	(3)–0	> 0
Suggested Financial Profile Assessment		**aa Very Strong**	**a Strong**	**bbb Midrange**	**bb Weak**
Suggested Analytical Outcome[a]		**AA**	**A**	**BBB**	**BB**

[a]SCPs will be assessed as 'aa', 'a', 'bbb', 'bb'. FADS – Funds available for debt service
Source: Fitch Ratings

'AAA' has not been incorporated in the rating positioning table in this criteria, as public power issuers are generally exposed to operating risks and practical limitations on rate setting that are rarely offset by their strong, monopolistic market position and rate-setting autonomy. An 'AAA' assessment is possible, but highly unlikely absent extraordinary government support or guarantees from an equivalently rated entity.

The *Rating Positioning* table is constructed assuming all asymmetric risk-additive features are neutral and the issuer does not have a weak liquidity profile. The financial profile assessment could be lowered if the issuer has a weak liquidity profile, and ratings/SCPs may be notched lower from the guidance if negative asymmetric factors are present. The degree of notching is qualitatively assessed and reflects a judgment on the relative additional risks to financial capacity that may result. Multiple asymmetric risk factors are likely to attract multiple notches. A single factor may not result in any notching if its effect on financial capacity is considered limited, or is already reflected in a rating sensitivity or a Negative Outlook.

Other Considerations

Counterparty Focus

The leverage profile may be less of a consideration in a rating where the entity benefits from a contractual framework in which revenues and costs are largely balanced through pass through to one or more counterparties. In such cases, protections afforded in the contractual framework to mitigate the loss of one or more counterparties will be more relevant to the final rating outcome. Where an entity is exposed to a single counterparty or the loss of the weakest among a group of counterparties, the rating will generally be no higher than the IDR/SCP of the weakest counterparty unless there are mitigating structural features that allow absorption of that loss without materially altering an entity's financial profile. In these situations, the financial profile assessment may be the same as the relevant counterparty, or in the case of wholesale systems, the purchaser credit quality assessment (PCQ).

Volatility in Financial Profile

Higher than normal volatility in the leverage profile of an entity historically or in a through-the-cycle scenario may suggest a rating different than that indicated by the *Rating Positioning* table.

No Funded Debt

For entities with financial obligations, but de minimis debt levels, no funded debt or no net debt, leverage profile may be less of a consideration in a rating. In these cases, an entity's revenue defensibility or operating risk assessment may be more relevant in determining the final rating/SCP.

Asymmetric Additive Risk Considerations

The final rating/SCP assigned will also consider certain additional risk factors that may affect the rating conclusion. These additional risk factors work asymmetrically, where only below-standard features are factored into the final rating levels, while more credit-positive features are expected to be the rule.

When multiple risk-additive features exist, the IDR/SCP will be lower than the indicative rating, possibly by multiple notches, based on the severity of the risks. For example, an issuer with a midrange revenue defensibility assessment, and operating risk assessment along with net leverage consistent with an indicative rating of 'A' might only achieve an IDR of 'BBB+' if its debt structure was assessed to be weak, reflecting a material exposure to refinance risk or swap risk. It might only achieve an IDR of 'BBB' if debt structure, and management and governance practices were assessed as weak. The final rating/SCP will reflect a qualitative assessment of the extent and impact of the asymmetric risk factors. The asymmetric considerations are discussed fully in Fitch's *Public Sector, Revenue-Supported Entities Rating Criteria*.

Debt Structure and Contingent Liquidity Exposures

U.S. public power system debt structure is typically strong, characterized by long-dated (generally 20–40 years) amortizing debt issues with fixed interest rates and declining or level annual debt service requirements. While some systems utilize bullet structures, variable-rate demand bonds (both hedged and unhedged), direct placement and renewable bank financing, the par value of these financing vehicles is usually manageable or below the level of cash on hand, thereby eliminating significant interest rate and refinancing risk. Thus, the debt structure attribute for many utility systems is neutral. However, there may be issuers whose debt structures have features that add risk, such as non-amortizing bullet maturities or mandatory put bonds. These will be considered when assessing adjustments to the rating suggested by the *Rating Positioning* table on page 17.

While most variable-rate demand bonds and CP issuance are supported by external dedicated liquidity facilities provided by financial institutions, borrowers sometimes choose to support these obligations using their own internal liquidity, including unrestricted cash and investments, and general lines of credit. In such instances, Fitch's analysis considers the stability and availability of funds sufficient to meet potential purchase requirements, as well as the policies and procedures that would be followed if a failed remarketing occurs (see *Public Sector, Revenue-Supported Entities Rating Criteria*). Moreover, Fitch will evaluate the potential change in leverage that could result from utilization of cash resources in the financial profile assessment.

A weak debt structure will constrain the overall assessment of the issuer's financial profile. Absent unrestricted cash resources sufficient to address structural shortcomings, Fitch considers the following debt characteristics and terms consistent with a "weak" assessment:

- Material exposure to refinance risk (use of bullet maturities; debt not fully amortized at maturity), which distorts near-term financial metrics and increases the uncertainty of both market access and the cost of debt at a future date.
- Highly sculpted and substantial use of deferred amortization instruments that materially distort near-term financial metrics.
- Material exposure to unhedged floating-rate interest. Fitch considers whether the unhedged portion of exposure, if any, would have a material impact to the issuer's financial profile under stressed interest rate assumptions.
- Material exposure to contingent liabilities, including swap and derivative contracts that include collateral posting requirements, and termination events that require a payment of the current market-to-market value of the swap contract.

For more information on Fitch's global approach to analyzing debt structures, see Fitch's master criteria *Public Sector, Revenue-Supported Entities Rating Criteria*.

Management and Governance

The quality of governance and management is an important consideration when assessing the potential performance of an issuer over the life of its debt. However, Fitch considers this attribute to be asymmetric, where weak governance and management may cause the rating to be lower, all else being equal. In contrast, the presence of strong governance and management — as evidenced by comprehensive strategic planning and adherence to financial policies, particularly rate setting — will be considered when evaluating the impact of stress scenarios and the ability of an issuer to manage through those stresses.

Weaker characteristics of management and governance that will constrain the rating, when analyzing the ability to execute on organization initiatives and plans, as well as the capacity to manage through the business cycle include:

- Lack of experience.
- Significant political pressure in the underlying municipality or in the members' service areas that can delay or prevent rate increases and impair its financial profile.
- Political considerations that impose a disproportionate influence or a limitation on utility operations and decision making.
- Repeated failure to adopt budgets in a timely manner due to absence of consensus in governing body or resistance of key stakeholders.
- Failure to maintain open communications between the issuer and any relevant governing body, which may reveal itself in unexpected operating changes.
- Weak or lack of forecasts and resource-management plans.
- Limited or lack of policies and procedures.
- Official allegations of substantial corruption, or breach of financial reporting law or regulation.
- Inability to adequately protect cyber and other infrastructure from attack.

Legal and Regulatory

Forming an opinion of the quality of the legal or contractual framework upon which many assumptions rest is a prerequisite to the credit analysis. For instance, the framework may be purely contractual or rely on statute or codified law, or a particular statutory instrument, or the powers of a constitutional or statutory authority. Fitch forms a view on the clarity of the legislation and/or regulation, the scope of regulatory discretion, and any effect this may have on facility performance or dispute resolution. The financing documentation — and if appropriate, any legislation it may depend on — or detailed summary documents, such as offering materials, are reviewed for key commercial elements and contract clarity, especially regarding allocation or transfer of risk.

The public power sector is exposed to a wide range of state and federal regulation. A utility's effective participation in the regulatory and legislative processes, and its response to regulatory developments are therefore considered in Fitch's analysis. Fitch combines a review of the current and expected regulatory climate with an assessment of the organization's ability to maintain stable operations in the face of regulatory change. Fitch may review responses to prior regulatory mandates, identifying financial and operational effects. Fitch also examines the potential for future regulatory initiatives and assesses whether the organization, through its systems, practices and resources, will have the ability to manage potential downside risk.

Weaker characteristics of legal and regulatory framework include:

- Contractual, regulatory or statutory framework dependent on untested or temporary legislation or regulation.
- Weak or no legal opinions; contracts not available for inspection.
- Proposed legislation or initiatives that would curtail existing rate-setting authority.
- Less effective participation in regulatory process with negative regulatory outcomes.

Information Quality

The quality of information received by Fitch, both quantitative and qualitative, can be a constraining factor for ratings. Information quality may constrain the rating category to a maximum level or, in extreme cases, preclude the assignment of a rating. Information quality for the initial rating and for surveillance purposes is considered when a rating is first assigned. Fitch must be confident adequate ongoing data will be available to monitor and maintain a rating once assigned. Information quality encompasses such factors as timeliness and frequency, reliability, level of detail and scope.

The information provided to Fitch may contain reports, forecasts or opinions provided to the issuer or their agents by various experts. Where these reports contain matters of fact, Fitch will consider the source and reliability. Where the information is a forecast or opinion, Fitch expects these to be based on well-reasoned analysis supported by the facts.

The status of the expert and the materiality of their forecast or opinion will also be considered in determining what weight may be given their forecasts or opinions. Factors such as experience in the jurisdiction, location or terrain; experience with the technology or transaction type; and formal qualification or licensing are often relevant. When forming its rating opinion, Fitch may place less weight on expert reports that lack clarity or contain extensive caveats, or were conducted under less relevant circumstances. Such features may lead to adjustments in Fitch's financial or operational analysis. We expect experts to conduct their reports to professional standards. If possible, reports are compared with similar reports to highlight unusual or optimistic features.

The degree to which Fitch uses expert information will depend partly upon the above issues and on the relevance of the information to the identified key risks. Where available, if expert information does not address a material issue, but might be expected to, Fitch may request further information or make an appropriate assumption. Fitch may choose not to provide a rating if it determines the reports are not sufficiently supported, complete or reliable.

Fitch considers this attribute to be negative when information is substantially based on assumptions, extrapolated or subject to material caveats; or if the data is often subject to delay, has a history of revisions or errors, or is limited in scope.

Data Sources

The key rating assumptions for the criteria are informed by Fitch's analysis of information provided by obligors, financial advisors, legal advisors, third-party engineers, consultants, underwriters and/or available through publicly sources. Information includes, but is not limited to, audited and interim financial statements, regulatory filings, operational data and service area demographic information. In certain cases where data specific to particular factors in these criteria are unavailable, Fitch may use other data sources to extrapolate information or may assign a particular credit factor an assessment level Fitch feels is appropriate.

Fitch typically uses both consolidated audited financial statements and segment financial information in its credit analysis. However, there are instances where Fitch is asked to rate a newly formed entity or segment that cannot provide historical audited financial results. In those cases, Fitch may base its analysis on historical pro forma financial statements provided by the entity. Fitch will evaluate the legal, financial, operational and managerial linkage between obligors and affiliated segments. The credit analysis and rating rationale will be based on fully consolidated statements where Fitch deems the dependence or inter-reliance among segments to be significant.

Rating Assumption Sensitivity

Revenue Defensibility: Ratings are sensitive to changes in attributes of revenue defensibility that affect overall assessment. Changes in volatility of demand, rate flexibility or counterparty quality, as well as the presence of asymmetric factors, can change the final assessment.

Operating Risk: Ratings are sensitive to changes in operating risk attributes, reflecting shifts in operating costs, operating cost flexibility and capital needs, as well as the presence of asymmetric factors that affect the overall assessment.

Financial Profile: Ratings are sensitive to changes in leverage profile or liquidity profile assessments, as well as other considerations, that result in a different rating positioning in the analytical guidance table.

Variations from Criteria

Fitch's criteria are designed to be used in conjunction with experienced analytical judgment exercised through a committee process. The combination of transparent criteria, analytical judgment applied on a transaction-by-transaction or issuer-by-issuer basis, and full disclosure via rating action commentary strengthens Fitch's rating process while assisting market participants in understanding the analysis behind our ratings.

A rating committee may adjust the application of these criteria to reflect the risks of a specific transaction or entity. Such adjustments are called variations. All variations will be disclosed in the respective rating action commentaries, including their impact on the rating where appropriate.

A variation can be approved by a rating committee where the risk, feature or other factor relevant to the assignment of a rating and the methodology applied to it are both included within the scope of the criteria, but where the analysis described in the criteria requires modification to address factors specific to the particular transaction or entity.

Limitations

Ratings, including Rating Watches and Outlooks, assigned by Fitch are subject to the limitations specified in Fitch's Ratings Definitions and are available at www.fitchratings.com/site/definitions.

Disclosure

Fitch expects to disclose, as part of its rating action commentaries or new issue reports, base case and stress case assumptions, and the rationale for adjustments to either the base case or stress case assumptions. Fitch will also disclose each entity's functional responsibilities if they serve as the foundation of the assessment, and any direct relationship between the general government's credit quality and related utility securities within the appropriate rating action commentary. In addition, Fitch will disclose any variation to criteria (as mentioned in the *Variations from Criteria* section).

Appendix A: FAST Econometric API — Fitch Analytical Stress Test Model

FAST

A public power system's capital spending and rate-setting flexibility have a significant bearing on creditworthiness, given the importance of financial leverage and liquidity to the system's credit rating. Fitch's FAST for U.S. public power systems was developed to provide scenario stress analysis, assess the impact of a stress to demand on operating cash flows and net leverage, and assess an issuer's capacity for corresponding rate action.

Scenario analysis highlights the forward-looking stress case of issuer performance under stress. The scenario analysis is not intended to be a forecast. The analysis is meant to illustrate performance under stress for a specific issuer and place it into context with the performance of other issuers facing the same stress.

Declines in demand can be anticipated to occur, to varying degrees, as a result of economic cycles and changes in market conditions, and in particular due to typical variations in weather patterns. Fitch believes such changes within reasonably anticipated ranges should be accounted for in the rating.

FAST generates an empirically based, objective demand estimate that allows for uniformity/consistency in terms of the magnitude of the top-down stress. Given the relatively low correlation of the change in demand to the change in broad economic indicators for many issuers, FAST utilizes a multipronged approach that incorporates both a basic econometric approach, when a significant correlation to the economy for that issuer is evident, and an alternative methodology.

Methodologies Utilized — Generation of Top-Down Stress

The user stipulates a stress in terms of standard deviations of GDP. This is converted to an actual GDP stress used by both of the approaches described below. For example, a −2 standard deviation event would roughly translate to −1% GDP on the basis of the last 20 years. GDP is used as a key input to provide consistency between the two approaches used and other sectors within Public Finance. While there is an implicit assumption of causality for the resulting demand estimate in the case of the econometric approach, GDP should be viewed purely as a scaling factor in the case of the interpolation approach. These approaches are used to gauge the percentage change in demand for a given scenario assumption, and are described below.

Fitch envisions a stress to GDP for years one through five of the stress case in the range of −1.5 to −2.5, −0.5 to −1.5, +0.5 to +1.5, +0.5 to +1.0 and −0.5 to +0.5 standard deviations, respectively, though these levels are subject to change. The base case scenario assumes the year five stress case stress.

Econometric Approach

This approach utilizes a regression model unique to each issuer, where the change in GDP is the independent variable, and the percentage change in demand (kWh for electricity and thousand cubic feet for gas) is the dependent variable. The optimal GDP lag or lead is determined, with the best-fit model subjected to various tests to assess statistical validity, including utilizing cutoffs for minimum explanatory power, coefficient significance, data normality and other factors, such as serial correlation. If the specific issuer model meets the requisite hurdles, the results (percentage change in demand) for the specified GDP level are utilized in the analysis; otherwise, they are discarded.

Current model parameters (subject to change): minimum correlation = 0.6; min t statistic = 2; skew limit +/− versus 0 = 1.5; excess kurtosis limit +/− versus 0 = 1.5; Durbin Watson limit +/− versus 2 = 1.5. Underlying annual issuer percentage change data is also subject to outlier control relative to the universe using a winsorization procedure, with upper and lower tail truncation set between the 95th and 100th percentile, and the 0 and 5th percentile, respectively; upper and lower fixed parameter levels used across all historical years that are generally within this range may be used. These parameters are subject to change.

Fitch acknowledges this methodology will likely never equal the accuracy provided by other techniques, such as a multivariate approach, where multiple independent variables are utilized and where the model is more customized to a specific issuer. Such an undertaking is beyond the scope of this exercise, where the objective is to gauge only the approximate impact and where having a more customized approach may run counter to the goal of having a uniformly applied stress across the portfolio.

Interpolation Approach

In some ways, the interpolation approach can be thought of as an extreme short-cut version of the econometric approach, where only two key data points are utilized to form a best-fit line and statistical assumptions are relaxed. The two methods can produce similar results, but only when the correlation between GDP and demand is high.

The higher point (x, y) in this particular analysis is defined by the average year experience (average percentage change in GDP, compound annual average percentage change in issuer demand for the specific segment) over the calibration period (period utilized to determine model parameters), while the lower point represents the worst year experience (low-year percentage change in GDP, low-year percentage change in specific issuer segment demand, regardless of whether these occurred the same year or not) over the calibration period. Determining the scenario change in issuer demand is a simple interpolation exercise between these two points using the scenario GDP change as the x coordinate.

However, an important distinction from the econometric approach is that with this approach there is no assumption of causality, with GDP being used only as a scaling factor. As this methodology keys off the average annual and low-year experience, without being tied to specific periods, it picks up on the issuer's own inherent cyclicality, regardless of the cause, be it weather related or any other.

For example, if we assume the stress for a particular year is −2 standard deviations, which corresponds to −1% GDP, and the average annual GDP growth over the calibration period is +2% and the low year was −3%, then the −1% GDP assumption implies the stress for the issuer would be that point 60% down from the average-year demand experience to the low year: −60% = [(−1%) − (+2%)] / [+2% − (−3%)]. If the particular issuer had average annual demand growth of +2.5% and a worst-year experience of −7.5% due to particularly bad weather that year, the interpolation estimate would be: −3.5% = +2.5% + [−0.60 * (+2.5% − (−7.5%)]. Thus, GDP is only being used as a scaling factor here. If there is a significant tie to the broader economy, then the econometric approach would be expected to pick up this effect.

Point Estimate/Range Determination

The range around the point estimate — average of the interpolation and econometric approaches if the latter is available, otherwise just the interpolation approach — is calculated in the same manner as an ordinary confidence interval utilizing the standard error of estimate (SE) from the econometric approach. The objective of the interval is to give a reasonable, but not excessive, degree of latitude to the analysts in a systematic way rather than capturing, for example, the vast majority of the outcomes expected for a given change in GDP. Consequently, the range generated would likely be relatively narrow, typically significantly less than +/− 0.5 SE from the point estimate.

Limitations

This exercise is a sensitivity analysis designed to produce a meaningful approximation of the impact on demand for the specific scenario chosen. However, underlying data can present challenges. For all issuers, FAST controls for extreme outliers, and analysts perform a qualitative review of the historical data used in the generation of output. Available history, coverage and general quality should be considered when interpreting the output generated by the FAST.

FAST Scenario Analysis Component

The purpose of the scenario analysis is to place FAST's demand stress within the broader context of the issuer's financial profile and assess capacity to maintain financial position through a typical demand cycle.

The starting point for scenario analysis is a base case that follows after the most recent five periods of actual financial reporting to illustrate a business-as-usual baseline. The base case

reflects Fitch's expectation of financial performance throughout the scenario period. The stress case is formulated through scenario analysis. The stress case typically carries forward all base case assumptions with the exception of demand for retail electricity, wholesale electricity and gas (as applicable to the issuer), which are instead modeled using FAST's demand stress outputs. Further, the stress case may be modified to reflect analytical judgment and external information used to adjust the assumptions below and anticipate an issuer's response to the stress to create final assumptions for the scenarios.

For each case, the scenario analysis will calculate basic financial metrics based on the aforementioned assumptions. The metrics include: net adjusted debt to adjusted FADS, COFO, days unrestricted cash and investments on hand, and debt service coverage.

Once established, Fitch scenarios may be revised as appropriate to preserve the forward-looking nature of Fitch's analysis, and to reflect unexpected financial results or changes in assumptions if relevant to an entity's performance and rating.

Principal Scenario Assumptions

As described above, the scenario analysis allows analysts to tune some base and stress case assumptions to align with analysts' best judgment of reasonable expectations for issuer behavior and performance in the scenario out years. Absent an explicit analyst input or override, certain benchmark assumptions are applied. Benchmark assumptions are:

- Base case unit sales (retail, wholesale and gas): grown at a baseline assumption output from the FAST demand stress generator, or held constant in real terms if the corresponding revenues are less than 5% of total operating revenue.
- Stress case unit sales (retail, wholesale and gas): grown at a stress assumption output from the FAST demand stress generator or held constant in real terms if the corresponding revenues are less than 5% of total operating revenue.
- Revenue per unit sold (retail, wholesale and gas): constant in nominal terms.
- All other utility operating revenues: constant in real terms.
- Operating lease payments: constant in real terms.
- All other operating expenses: constant in real terms.
- Depreciation: five-year moving average ratio of depreciation to gross property, plant and equipment.
- Amortization: constant in real terms.
- Amortization of deferred revenue: zero.
- Adjustment for pension expense: five-year moving average.
- Proceeds from issuance of debt (unrestricted): 100% of capex plus any amount necessary to keep the unrestricted cash balance from going negative.
- Proceeds from issuance of debt (restricted): zero.
- Principal refunding: zero.
- Principal payments: prior-year total long-term debt amortized based on the 15th year of a 30-year time horizon and using the interest rate implied by the last year of historical data, or 4.5% if an implied rate cannot be calculated.
- Capex: 1.2x depreciation.
- Non-operating transfers out, PILOT and dividends: constant in real terms.
- The residual of other components of change in cash: zero.
- The magnitude of the stress assumption, in terms of standard deviations of GDP, which is a consistent scaling factor across the portfolio, used to produce the demand stress.
- Inflation assumption: 2%.

- Purchased power and fuel expense: grown at the weighted average of the retail and wholesale demand stress.
- Purchased gas: grown by the gas demand stress.
- Interest income: average of prior year's unrestricted funds and current year's unrestricted funds, all of which is multiplied by the interest rate implied in the last year of historical data, or 2.0% if an implied rate cannot be calculated.
- Adjustment for purchased power (cash flow): 30% of purchased power costs.
- Adjustment for operating lease payments: equal to operating lease payments.
- Cash interest paid: average of prior year's total debt and current year's estimated total debt, all of which is multiplied by the interest rate implied in the last year of historical data, or 4.5% if an implied rate cannot be calculated.
- Adjustment for purchased power (balance sheet): 8.0x the cash flow adjustment.
- Adjustment for operating lease payments (balance sheet): 8.0x the cash flow adjustment.
- Adjusted net pension liability: five-year moving average.

All other stocks are maintained constant in nominal terms and flows are held constant real terms.

Please refer to the special credit factor accompanying the current version of the model for an accounting of all modeling assumptions and calculations.

Limitations

The scenario analysis is a simulation of how an issuer might fare, faced with a demand scenario scaled off of a portfoliowide consistent stress in terms of standard deviations of GDP. The scenario analysis should not be interpreted as a forecast of actual performance under stress.

Appendix B: Wholesale Supplier Key Rating Factors

Fitch's KRDs are assessed using the following guidance for wholesale suppliers, including JAAs, G&Ts and other government-owned systems. The guidance outlines general expectations for a given rating category, and in some cases, includes operational and financial assessments of both the wholesale supplier and its purchasing utilities.

Key Rating Factors — Wholesale Public Power Suppliers

Revenue Defensibility	**aa**	**a**	**bbb**	**bb**
Revenue Source Characteristics	Very strong. Wholesale revenues are derived from unconditional contracts that provide for full cost recovery, and the unlimited reallocation of costs among contracted purchasers.	Strong. Wholesale revenues are derived from unconditional contracts that provide for full cost recovery, but include limited reallocation of costs among contracted purchasers.	Midrange. Wholesale revenues are derived from contracts that may include some degree of conditionality, no reallocation of costs among contracted purchasers or a sole purchaser.	Not applicable.
Rate Flexibility	Independent legal ability to increase service rates without external approval.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation of operating and capital costs being recovered on a timely basis is strong.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation that operating and capital costs may not be recovered on a full or timely basis.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation that operating and capital cost recovery will be neither full nor timely.
Purchaser Credit Quality (PCQ)	Very strong purchaser credit quality.	Strong purchaser credit quality.	Midrange purchaser credit quality.	Weak purchaser credit quality.
Asymmetric Rating Factor Considerations	The analysis of revenue defensibility also considers the term, tenor and conditionality of relevant supply contracts, and any reliance on non-utility revenue.			
Operating Risk				
Operating Cost Burden	Very low operating cost burden.	Low operating cost burden.	Midrange operating cost burden.	High operating cost burden.
Operating Cost Flexibility (Asymmetric Risk Factor)	The analysis of an issuer's operating cost flexibility is an asymmetric risk factor where weaker elements can constrain the overall assessment of operating risk. Fitch will consider available reserve margin, regional energy markets, fuel concentration, asset concentration, environmental standards, regulatory restrictions and contract structure.			
Capex Requirements	Moderate lifecycle investment needs supported by adequate historical and manageable planned capital investment.	Elevated lifecycle investment needs and supported by adequate historical and manageable planned capital investment.	High lifecycle investment needs that are sufficiently addressed by planned capital investment.	High lifecycle investment needs insufficiently addressed by planned capital investment.
Other Asymmetric Rating Factor Considerations	Resource management, project completion risk and counterparty risks can also constrain the assessment.			
Financial Profile				
Leverage Profile	Very Strong: Refer to the *Rating Positioning* table on page 17.	Strong: Refer to the *Rating Positioning* table on page 17.	Midrange: Refer to the *Rating Positioning* table on page 17.	Weak: Refer to the *Rating Positioning* table on page 17.
Liquidity Profile	Liquidity profile is based on coverage of full obligations and liquidity cushion. A weaker liquidity profile can constrain the financial profile assessment.			
Asymmetric Additive Risk Factors				
Risk Considerations	Debt structure, management and governance, legal and regulatory, and information quality may constrain the final rating.			

Revenue Defensibility

The assessment of revenue defensibility for wholesale suppliers includes a review of the applicable contractual framework pursuant to which power and energy is supplied, the related obligations of all parties involved, purchaser credit quality and the supplier's legal ability to determine rates. For wholesale suppliers that also provide limited retail service, the assessment may be informed by the revenue defensibility characteristics outlined for retail systems

Revenue Source Characteristics

Power Supply Contract Characteristics

Fitch Considers the Following Contracts to Be Unconditional

- Take-or-Pay Contracts: Contracts wherein purchasers are obligated to make specified payments to the supplier, whether or not output is delivered from a specified project or resource. These contracts are most frequently associated with individual power projects, which are designed to provide only a portion of the purchaser's power requirements.
- Take-and-Pay Contracts: Contracts wherein a purchaser's payment obligation is contingent only upon the delivery of output. Contract provisions must provide that the supplier may procure output from any available source, thereby mitigating operational or performance risk. These contracts are most frequently associated with all-requirements contracts, where purchasers are required to purchase all energy and capacity needs from the wholesale supplier.

Fitch reviews the contractual framework supporting a wholesale supplier focusing specifically on the terms, tenor and conditionality of the payment obligations to assess the defensibility of revenue. Wholesale public power suppliers generally exhibit strong revenue defensibility, as revenue is typically derived from retail systems pursuant to long-term, unconditional power supply contracts (see *Power Supply Contract Characteristics* table above) that extend through the life of outstanding debt.

Moreover, a common feature of power supply contracts throughout the sector allows wholesale suppliers to recover the obligations of a defaulting purchaser by increasing — or stepping up — the obligations of the remaining nondefaulting purchasers. Fitch factors the ability, timeliness and degree to which a wholesaler can reallocate defaulted obligations among purchasers in its assessment of revenue defensibility.

Wholesale suppliers that rely exclusively on uncontracted sales — or contracted sales subject to meaningful operating risk, termination or are otherwise highly conditional — for the repayment of debt may not be rated using these criteria. These may include suppliers subject to completion risk, fully or partially exposed to merchant price and volume risk, or those supplying energy pursuant to contracts that may be terminated at the purchaser's option. In these cases, Fitch's *Thermal Power Project Rating Criteria* or *Renewable Energy Project Rating Criteria* may be applied instead.

Rate Flexibility

Fitch's analysis of rate flexibility for wholesale suppliers focuses primarily on the supplier's independent legal ability to determine rates of service. While a supplier's rate competiveness is evaluated and may be particularly relevant for suppliers facing contract renewals or seeking to expand membership, the influence of the wholesale cost of power on rate competitiveness and affordability is best measured at the retail level. Pressure to moderate or avoid wholesale rate increases is most likely to mount as a result of corresponding retail increases, and is considered a component of Fitch's analysis of purchaser credit quality.

Purchaser Credit Quality

The final component of the revenue defensibility assessment for wholesale suppliers is purchaser credit quality. The overwhelming majority of purchasers are expected to be municipally and cooperatively owned retail systems exhibiting strong operating fundamentals. Purchaser credit quality is therefore expected to be strong or very strong for most wholesale suppliers.

Fitch uses a variety of inputs to evaluate purchaser credit quality, including both private and public ratings, and internal Credit Opinions and credit scores. If Fitch does not maintain a rating, Credit Opinion or credit score on a purchaser, one may be assigned as required. Fitch also reserves the right to use another NRSRO's publicly monitored rating in place of a required

Credit Opinion or credit score when the underlying analytical approach is viewed as largely consistent with Fitch's approach.

Fitch's framework for credit scoring retail systems incorporates many of the same factors previously outlined. However, a credit score is subject to different standards than a full rating or Credit Opinion. Credit scores assess a limited range of factors and are point-in-time. Specifically, the credit score considers a system's ability to absorb rate increases, measured by its rate flexibility and service area characteristics as a proxy for revenue defensibility, and net margin and cash cushion as a proxy for financial profile. Operating risk is not considered for credit scoring.

Revenue Source Characteristic — 'aa'

For suppliers with a revenue source characteristic assessment of 'aa' — due to of an unlimited ability to reallocate costs — Fitch will use individual purchaser evaluations to calculate a purchaser credit index (PCI), which numerically reflects the weighted average credit quality of the relevant obligors. Fitch will evaluate purchasers that account for at least 40% of the supplier's total wholesale revenue or energy sales when calculating the PCI and determining the PCQ.

Purchaser Credit Index (PCI)

Metric to Support Assessment
• Wholesale systems whose purchasers have a PCI of less than 1.5 are subject to very strong purchaser credit quality consistent with an 'aa' rating factor assessment; between 1.5 and 2.4, strong credit quality or 'a'; between 2.5 and 3.4, midrange credit quality or 'bbb'; and above 3.4, weak or 'bb'.

In cases where a supplier has a revenue source characteristic assessment of 'aa' but provides only a small portion of purchaser requirements, the PCQ assessment may be higher than the PCI indicates if a single purchaser exhibiting stronger credit quality could easily assume all contractual payment obligations without affecting its credit quality.

Revenue Source Characteristic — 'a' or 'bbb'

The PCQ factor for wholesale suppliers with a revenue source characteristics assessment of 'a' or 'bbb' — because of a limited ability or inability to reallocate defaulted payments — will generally reflect the credit quality of the weakest obligors, after factoring mitigating structural features available to the issuer that allow for the absorption of loss. These features include applicable step-up provisions, cash reserves or other credit-enhancement provisions. Fitch will only rely on public and private ratings and Credit Opinions in these cases. Credit scores will not be considered.

Where structural features are insufficient to cover an individual purchaser's obligations in the event of its default, the PCQ factor assessment will be capped by the credit quality of that purchaser. For example, if a supplier's step-up provision is limited to 25% of a purchaser's obligation, that supplier's ability to meet debt service obligations would be highly reliant on payments from any purchaser with an allocated share higher than 20%. Stepping up the required payments from the nondefaulting purchasers responsible for less than 80% of contractual obligations by 25% would not restore contractual obligations to 100%, resulting in a potential shortfall in revenue. If a supplier is highly reliant on more than one purchaser (i.e. each purchaser has an allocated share of more than 20%), the supplier's rating will be capped by the credit quality of the weakest of those purchasers who exceed the required step-up percentage. In each case, if the relevant purchasers are not rated by Fitch, a notch-specific private rating will be assigned.

Fitch will evaluate the credit quality of a minimum number of purchasers who collectively account for contractual obligations sufficient to meet the supplier's obligations, after factoring mitigating structural features. For example, in the scenario above where purchaser obligations may be increased up to 25%, purchasers responsible for at least 80% of the total contract obligations in aggregate would be evaluated, because implementing the 25% increase on the pool would restore contract obligations to 100%. The PCQ factor would then be assessed at a level commensurate with the weakest purchaser required to reach the 100% threshold after invoking the step-up protection. In evaluating the requisite purchasers, unrated purchasers will be assigned private ratings or Credit Opinions, as necessary.

Alternatively, for suppliers with 10 or more purchasers, Fitch may initially evaluate aggregate credit quality of the purchaser pool using its Portfolio Stress Model (PSM), developed for assigning credit ratings to state revolving fund programs and municipal loan pools. The PSM produces liability stress hurdles based on the aggregate rating, contract share and term of the purchasers. To capture the risk of large unrated purchasers, Fitch will evaluate the credit quality of all unrated purchasers with shares of more than 5% of the pool's contractual obligations, after factoring available step-up protection.

The rating stress hurdle produced by the PSM is measured against the structural loss-absorption features of the contractual arrangement. The measurement determines whether or not sufficient resources, including contract payments, are available to the wholesaler to meet timely bond debt service payments while sustaining purchaser payment defaults. Please refer to *State Revolving Fund and Municipal Finance Pool Program Rating Criteria* for more details.

Using the PSM, Fitch calculates the total expected loss — the liability stress hurdle multiplied by (1 minus the assumed recovery rate) — that can be sustained for each rating category. To be eligible for a certain rating category, the structural features and amount of loss absorption must exceed this expected loss. For example, if the characteristics of a pool of purchasers produce 'AAA' and 'AA' liability stress hurdles of 50.5% and 41.9%, respectively, and an assumed recovery of 60% is applied, then enhancement in excess of 20.2% (60.0% * 50.5%) and 16.7% (60.0% * 41.9%) would be necessary to achieve the respective rating category. Similar to the earlier scenario, if an issuer was able to increase contractual obligations by 25% and absorb losses equal to 20% of the contractual obligations, the loss absorption would exceed the 'AA' stress hurdle, but not the 'AAA' stress hurdle.

However, the relationship of the expected loss to the rating hurdles does not guarantee the PCQ factor will receive the corresponding assessment. Fitch also considers the effect of large individual purchasers and the leading role these obligors typically assume in managing these issuers. For example, while the supplier's PCQ assessment is capped at the credit quality of any single purchaser whose share exceeds the issuer's loss protection, the assessment may also ultimately be capped by the credit quality of other rated purchasers.

In these cases, Fitch will begin with the purchaser with the weakest credit quality and aggregate the shares of individual purchasers by improving credit quality to determine the credit quality of the purchaser whose share drives the aggregate share above the available protection. The PCQ factor assessment will be capped at the applicable assessment. In the above scenario where available support is sufficient to cover losses totaling 20%, and the three weakest purchasers — each accounting for a 7% share — were assessed at 'bbb', 'bbb' and 'a', the PCQ factor assessment would be capped at 'a'. If the shares were 15% (bbb), 10% (bbb) and 5% (a), then the assessment would be capped at 'bbb'.

Alternatively, in cases where the PSM results suggest aggregate purchaser pool credit quality of 'BB' as a result of large number of unrated participants, the PCQ factor assessment may instead reflect the credit quality of the largest individual purchasers. Where purchasers accounting for more than 50% of the contractual obligations have been assigned investment-grade ratings or Credit Opinions, and loss absorption of at least 20% is present, the PCQ assessment will be no lower than 'BBB'.

Asymmetric Rating Factor Considerations — Revenue Defensibility

In addition to the aforementioned considerations, the assessment of revenue defensibility can be affected by the following.

In cases where a portion a wholesale supplier's revenue is derived pursuant to contracts that provide for conditional payments, include termination provisions or do not extend through the maturity of outstanding debt, revenue defensibility is reduced. Fitch will therefore consider in its analysis the tenor, relevant counterparties and terms of relevant contracts to assess the degree to which replacement funds — either from replacement contracts, uncontracted sales or wholesale rate increases — may be necessary to meet scheduled debt payments.

Fitch also examines wholesale system revenue derived from uncontracted sales and non-utility operations, and the extent to which the system relies on these revenues to meet covenanted revenue requirements and debt service obligations. Non-utility and market-based revenues are

subject to higher volatility as a result of competitive pressures on both demand and price, and generally weaken revenue defensibility.

Operating Risk

The relevance of operating risk in Fitch's analysis of wholesale systems will largely be determined by the degree to which resource performance and the cost of power supply influence the credit quality of the purchasers and their ability to support supplier obligations. Operating risk is expected to be a meaningful factor in Fitch's analysis where wholesale suppliers are responsible for meeting the majority of purchaser supply requirements. The assessment of operating risk for wholesale suppliers focuses on operating cost burden, operating cost flexibility, and capital planning and management. Similar to the evaluation of retail systems that own and manage their own resource portfolio, the ability of a supplier to consistently provide low-cost energy, power and gas enables purchasing retail systems to achieve a strong financial profile, while maintaining competitive rates and preserving affordability.

Fitch will initially assess operating cost burden for wholesale systems and projects by comparing the ratio of total operating costs with total unit sales, which excludes distribution costs borne by purchasers, with levels Fitch considers to be representative of varying degrees of operating risk. When evaluating partial-requirement suppliers and single-asset project suppliers, Fitch may alternatively assess operating cost burden by comparing the relative magnitude of project costs and capacity with the purchasers' total cost of supply and total capacity requirements, or by assessing the strategic benefit or importance of the resource. A lower ratio indicates a lower operating cost burden.

Operating Cost Burden

Metrics to Support Assessment

- Fitch measures a supplier's ratio of total electric operating costs to total energy (kWh) sales to determine its electric operating cost burden. Wholesale systems with an operating cost/kWh less than 5.5 cents/kWh have an operating cost burden that is very low; between 5.5 cents/kWh and 11 cents/kWh, low; between 11 cents/kWh and 16.5 cents/kWh, midrange; and above 16.5 cents/kWh, high.
- Fitch measures a supplier's ratio of total gas operating costs to total gas sales to determine its gas operating cost burden. Wholesale systems with an operating cost/Mcf less than $3.5/Mcf have an operating cost burden that is very low; between $3.5/Mcf and $10/Mcf, low; between $10/Mcf and $16.5/Mcf, midrange; and above $16.5/Mcf, high.
- Alternatively, Fitch may evaluate operating cost burden for partial requirement suppliers or single-asset suppliers by reviewing the relative magnitude of the cost and/or capacity as a percentage of the purchasers' total resources and related costs, as well as the strategic benefit or importance of the resource. Projects that account for less than 25% of each purchaser's cost or capacity, or provide significant strategic importance would be deemed to have a very low/low operating cost burden; projects that account for between 25% and 50% of cost or capacity, or provide no extraordinary strategic importance, midrange; and projects that are strategically burdensome, weak.

Fitch assesses operating cost flexibility, and capital planning and management for wholesale systems using the same factors and metrics outlined on pages 9–11. Operating risk and cost flexibility risk are lesser considerations for suppliers that provide only a small portion of purchaser requirements or operate a single asset, and where revenues are derived pursuant to take-or-pay contracts. In these cases, Fitch will evaluate operating characteristics, but purchaser credit quality will be given greater consideration in the determination of the final rating. A strong/very strong operating risk assessment could potentially enhance the rating above or toward the higher end of the PCQ rating factor assessment (i.e. 'A+' with a PCQ of 'A'); whereas weaker operating risk assessment or operating cost flexibility could weigh the rating downward (i.e. 'A–' with a PCQ of 'A'). However, in either case, any influence on the rating would be limited and reflect Fitch's determination of whether the obligations of the weaker purchasers would be assumed upon default given the inherent value of the resources and the incentive of the remaining purchasers to preserve the supplier's credit quality.

Financial Profile

Fitch expects to use the same factors, metrics and scenario analysis outlined on pages 12–15 to evaluate the financial profile of most wholesale suppliers, including those with an unlimited

ability to reallocate costs among purchasers to ensure cost recovery and revenue source characteristics assessed as 'aa'.

Focus on Purchaser Credit Quality

For issuers with revenue source characteristic assessments of 'a' and 'bbb' that possess only a limited ability to reallocate costs or provide only a portion of the purchaser's requirements, and benefit from a contractual framework in which revenues and costs are largely balanced and passed through to one or more purchasers, the leverage profile may be less of a consideration in a rating. The PCQ rating factor assessment, supplemented by the operating risk assessment, may serve as the basis for the financial profile assessment and be more relevant to the final rating outcome in these cases.

Similarly, in unique cases where an issuer possesses a revenue source characteristic assessment of 'aa' and supplies a portfolio of utilities whose credit quality has been assessed by Fitch — considering the full effect of the issuer's operating risk and its share of the issuer's obligations — and where sufficient flexibility exists to enable the wholesaler to reallocate costs prior to a default occurring, the PCQ rating factor assessment may serve as the basis for the financial profile assessment and be more relevant to the final rating outcome than the issuer's own leverage profile. This may be particularly relevant for wholesalers with five or fewer purchasers.

Asymmetric Risk Considerations

Fitch considers the same asymmetric additive risk consideration in its analysis of wholesale systems as outlined on pages 22–25.

Appendix C: Purchaser Credit Index Scoring Matrix

Credit scores for purchasing utility systems that are unrated by Fitch and not subject to a Credit Opinion are determined using the *Purchaser Credit Index Scoring Matrix* below, together with evaluations of ability to absorb rate increases, net margin and cash cushion. Systems that are rated or subject to a Credit Opinion may be assigned scores informed by their determined credit quality. Scores may also be informed by and assigned based on known facts, including other publicly monitored NRSRO ratings, that are not considered in the scoring matrix. In cases where data necessary to meet the assessments outlined below are insufficient, purchasing utilities will be assigned the lowest score.

Purchaser Credit Index Scoring Matrix

	Net Margin and Cash Cushion			
Ability to Absorb Rate Increases	**aa**	**a**	**bbb**	**bb**
aa	1	2	2	3
a	1	2	2	3
bbb	2	3	3	4
bb	3	3	4	4

Source: Fitch Ratings

Net Margin and Cash Cushion

Net margin and cash cushion measures a utility system's overall financial performance and readily available cash, after accounting for its purchased power and gas obligations, as well as any operating or financial obligations the system may have incurred on its own.

Net Margin and Cash Cushion

Metrics to Support Assessment
• Fitch calculates the net margin and cash cushion as: (net margins + unrestricted cash and investments) /(average daily cash operating expenses). • Utility systems that have a net margin and cash cushion of 170 days or more have an 'aa' factor assessment; between 70 days and 169 days, 'a'; between 30 days and 69 days, 'bbb'; and less than 30 days, 'bb'. However, systems with debt/FADS in excess of 7.0x cannot be assessed higher than 'a'.

FADS – Funds available for debt service

Ability to Absorb Rate Increases

For credit scoring purposes, the ability to absorb rate increases of a purchasing utility is determined using the following matrices, which assess the system's service area and rate flexibility, in the context of its legal ability to set rates for service.

Ability to Absorb Rate Increases

Ability to Set Rates:	**Yes**			
	Service Area Characteristics			
Rate Competitiveness	**aa**	**a**	**bbb**	**bb**
aa	aa	aa	a	a
a	aa	aa	a	a
bbb	a	a	a	bbb
bb	a	a	bbb	bbb

Ability to Set Rates:	**No**			
	Service Area Characteristics			
Rate Competitiveness	**aa**	**a**	**bbb**	**bb**

aa	aa	a	a	a
a	a	a	a	bbb
bbb	a	a	bbb	bbb
bb	a	bbb	bbb	bb

Source: Fitch Ratings

Service Area Characteristics

Fitch's scoring methodology evaluates a utility's service area and the ability of its customers to support purchased power requirements by measuring four characteristics: median household income, unemployment, customer growth and revenue mix. Each of these characteristics is separately assessed against nationwide averages or other thresholds.

Service Area Characteristics

Metrics to Support Assessment

(%)	Stronger	Midrange	Weaker
Median Household Income/U.S Median Household Income	> 125	75–125	< 75
Unemployment Ratio/U.S Unemployment Ratio	< 75	75–125	> 125
Five-Year Average Annual Customer Growth Rate	> 1.5	0.0–1.5	< 0.0
Residential Revenue/Total Revenue	—	> 35	< 35

- Systems that exhibit characteristics that are all considered midrange, or exhibit an equal number of stronger and weaker characteristics, are considered to be consistent with an 'a' assessment; systems that exhibit a greater number of stronger characteristics than weaker characteristics are considered to be consistent with an 'aa' assessment; systems that exhibit one or two more weaker characteristics than stronger characteristic would be assessed as 'bbb' and 'bb', respectively.

Rate Competitiveness

Fitch's scoring methodology evaluates a purchasing utility's rate competitiveness and its ability to generate additional revenue to support purchased power requirements by assessing the relationship between a system's average retail rate and the state average, as well as affordability.

Rate Competitiveness

Metric to Support Assessment

- Utility systems with retail rates less than 90% of the state average have rate competitiveness consistent with an 'aa' factor assessment; between 90% and 120%, 'a'; between 121% and 150%, 'bbb'; and greater than 150%, 'bb'. However, systems where rate affordability exceeds 3.5% cannot be assessed higher than 'a', and systems where rate affordability exceeds 4.5% cannot be assessed higher than 'bbb'.

Appendix D: Pension Treatment in Leverage Metrics

Rationale for Pension Treatment

Utility systems vary considerably in the types of pension benefits offered to workers, which also affects whether and how Fitch incorporates pensions in its analysis of an entity's financial flexibility. Issuers with DB pensions carry a financial obligation that is long term in nature, and uncertain in timing and amounts to be paid. Ongoing employer and employee contributions, which accumulate as invested assets in a trust fund and generate investment returns, are the primary sources for funding benefits and offsetting the pension liability a system has incurred. This contrasts with defined-contribution plans, which are predictable annual commitments that do not give rise to a long-term liability.

Through a series of actuarial calculations that can vary, the present value of the pension obligation accrued to date can be compared with the invested assets available to meet the obligation. An excess of that liability over the invested assets value represents the unfunded portion of the pension obligation that has accrued — generally reported as the net pension liability (NPL) or funded status by the system. In some cases, a system will be a participant in a multi-employer plan and the employer's share of that calculated liability will be considered in the analysis.

Fitch views the unfunded balance of accrued DB pension liability as a debt-equivalent obligation. The size of the reported liability and the annual payments necessary to amortize it can be subject to a range of institutional decisions regarding benefit levels and actuarial assumptions, economic trends and regulatory considerations. Changes in these factors may affect the size of the unfunded liability over time. However, the most important drivers of unfunded liability tend to be the level of actual returns on the investment portfolio supporting the pension compared with a target return, and the adequacy of the employer contribution actually made. Fitch will review the reported unfunded liability over time versus at a point in time. Material volatility in a plan's asset values due to market movement is less relevant to Fitch's assessment of pension-related risk than is the plan's longer term prospects for funding improvement over time.

GASB or FASB

Institutions in the sector include both public-sector enterprises that follow GASB (public sector) accounting rules and not-for-profit enterprises that follow FASB (private) accounting rules, and the pensions of most not-for-profit enterprises are subject to federal regulation. There are differences in the calculation and reporting of the unfunded pension liability between GASB and FASB. GASB DB pension plans are unique in using their long-term investment return assumption as the liability discount rate.

In contrast, FASB plans use a low, variable, regulated discount rate tied to market rates, with some relief post 2009, distinct from the investment return assumption in calculating liability. As such, there is a fundamental difference in reported unfunded pension liability between Employee Retirement Income Security Act-regulated FASB plans and public-sector GASB plans that Fitch believes must be reflected in the analysis to support comparability. The calculation of the related pension liability, if any, to be added to an institution's adjusted debt varies, as described below. Notwithstanding this difference, the calculations and adjustments Fitch makes are intended to create equivalency to the leverage assessment regardless of the accounting methodology applied.

Public Institutions Using GASB

Public-sector DB pensions represent a source of uncertainty given the absence of uniform regulations that compels progress on prefunding, the irrevocable nature of vested benefits and the variability of reported liabilities. These factors in combination led to the accretion of long-term liabilities and a rising demand for contributions.

Fitch applies the same approach to pension liability of a public-sector enterprise as it does when considering pension obligations of state and local governments. The primary credit risk of DB pensions for public enterprises is in the accumulation of long-term liabilities. There is no uniform regulation of funding practices and the liability can accrete under multiple circumstances, including due to underperformance of assets, failure to achieve actuarial and

economic assumptions, and inadequate annual contributions. Bankruptcy is possible but rare, and liquidation is improbable due to legal constraints. Fitch's baseline assumption is that vested benefits are irrevocable, and benefits can be changed only for new hires.

The starting point for this analysis is the pension data as disclosed by the institution. To convey more effectively the magnitude of risks associated with public DB plans, and to improve comparability across plans, Fitch adjusts the reported NPL upward to reflect a 6% discount rate, if the NPL is based on a higher discount rate. This approach is identical to the adjustment to NPLs outlined in Fitch's *U.S. Public Finance Tax-Supported Rating Criteria*. The resulting adjusted NPL is combined with debt obligations in Fitch's assessment of financial flexibility. In some cases, an enterprise without audited financial statements separate from its primary government may not report detailed pension liability data; for example, when the primary government participates in several pension plans. Fitch will adjust the institution's reported NPL in such cases for purposes of its analysis based on the primary government's main or general employee plan.

Allocating Multi-Employer Liabilities Under GASB 68

Although some public-sector enterprises may directly sponsor and manage a DB pension plan, many provide pension benefits as part of a larger cost-sharing multi-employer system, or within a single-employer system that provides benefits to a primary government and its separate enterprises. As such, the ability of public power systems to influence pensions is often limited, as decisions on benefits, assumptions and contributions are made by a legislature, local government or pension board. Multi-employer plan assets in these cases are not legally separated by employer. A single actuarial valuation is performed and the resulting NPL, expense, and deferred inflows and outflows for all participating entities are allocated proportionally, based on the pension's contribution practices. Each participating employer's audit contains only its proportionate share.

GASB 68's allocation method informs Fitch's approach to assessing liabilities in a cost-sharing plan or a single-employer plan allocated to one or more enterprises. GASB 68's default assumption is that the liability is assigned where the obligation is required to be funded, generally by the participating employers. The standard considers pensions to be deferred compensation, for which the direct employer is ultimately obligated. Fitch follows GASB 68 reporting for the liability allocation because the methodology is consistent with our expectations for how systems function, including how they resolve funding challenges.

The fact that most cost-sharing multi-employer plans are state sponsored does not mean the unfunded liabilities of the plans are the responsibilities of the state or of the pension system itself. In some cases, the state has explicit legal and fiscal responsibility for plan funding, and Fitch allocates a share of the liability to the state accordingly, rather than to other participating employers. However, it is much more common for a state to take responsibility only for liabilities associated with its direct employees. Even in cases where they historically provided support for related governments in the plans, states generally retain the option to pull back on this support. Fitch does not shift the reported liability away from the institution based upon this support where GASB 68 assigns it to an institution. However, as noted below, where there is a longstanding history of direct support and through funding provided to a class of employers from the state, Fitch accounts for this in its analysis.

Treatment of State Support of Public Pension Obligation in the Leverage Assessment

Fitch relies on the pension liability data as reported by the institution when assessing its liability burdens. Some public institutions report special funding situations, under which states assume some or all of an NPL, and Fitch's analysis reflects such support. In rare instances that fall short of a special funding situation, but where consistent, explicit state subsidy of pensions is provided, Fitch may modify its assessment of leverage to reflect the presence of state appropriations supporting all or part of an enterprise's pension liability.

FASB Plans

Some public power systems may offer DB pensions whose pensions are subject to federal regulations, which have shifted considerably in recent years and continue to evolve. Fitch generally expects these issuers to manage their pensions within the existing regulatory

framework, which includes provisions for calculating contributions and premiums for mandatory federal pension insurance.

Fitch's starting point for the pension analysis is the projected benefit obligation (PBO) as reported by the issuer, and for purposes of assessing leverage within the FAST analysis, Fitch recalculates the funded status assuming 80% of the PBO. Any resulting adjusted pension deficit is added to debt obligations in Fitch's forward-looking assessment of the financial flexibility. This adjustment to the PBO is intended to serve only as a proxy for capturing the impact of regulations on how pensions are likely to be funded, rather than a precise recalculation of actual liabilities.

The regulatory environment encourages issuers to manage to an 80% funded ratio utilizing generally conservative investment return assumptions. Funding to 80% based on a lower discount rate generally corresponds to nearly fully funded levels using a normalized 6% long-term return assumption. If the regulatory environment shifts, Fitch will modify its approach to take into account the expected impact of these changes on a forward-looking basis. Fitch may also incorporate pension contributions and other pension-related cash outflows in the stress case scenario to fully capture near-term liquidity risks from DB pension plans.

Other public power systems participate in multi-employer DB pension plans that, while regulated, are jointly sponsored with organized labor and disclose only limited information. For multi-employer DB pensions, clarity on the status of pensions or their likely impact on finances may be limited. If such pensions represent, in Fitch's view, a material risk in its assessment of a health provider's financial profile, they could be reflected as an asymmetric risk factor (see *Information Quality* section on page 20).

Appendix E: Defined Terms and Supporting Calculations

The following terms are applicable for the calculation of leverage, COFO and liquidity cushion ratios:

- **Available Borrowing Capacity:** Amounts available under committed lines of credit and for issuance under CP Programs. See page 16 for more information.
- **Average Daily Cash Operating Expenses:** (Operating Expenses – Depreciation – Amortization) / 365.
- **Capitalized Fixed Charges:** Fixed Charges * 8. See *Rationale for Capitalization of Fixed Charges* on page 13 for more information. Capitalized fixed charges may exclude capitalized operating leases if liabilities are already included in total debt pursuant to accounting standards.
- **Cash Days on Hand:** Unrestricted Cash / (Operating Expenses – Depreciation – Amortization) * 365.
- **Fixed Charges:** (Purchased power expenses * 30%) + (Purchased gas expenses * 30%) + operating lease payments.
- **Fixed Purchase Charges:** (Purchased power expenses * 30%) + (Purchased gas expenses * 30%).
- **Funds Restricted for Debt Service:** Includes amounts deposited in debt service and debt service reserve funds, as well as the cushion of credit program administered by the Rural Utilities Service.
- **Funds Available for Debt Service (FADS):** EBITDA plus interest income. FADS may further reflect adjustments for subsidies, noncash expenses, non-operating income, grants, nonrecurring items and non-operating expenses paid ahead of debt service as appropriate.
- **Pension Expense:** Amount recognized in an employer's financial statements as the cost of a pension plan for a period on an accrual basis.
- **Pension Obligation:** Unfunded pension liabilities, which broadly represent the accrued liabilities in excess of the invested assets available to pension obligations, as calculated by Fitch. See *Rationale for Pension Treatment in Leverage Metrics* on page 13 for more information.
- **Total Annual Debt Service:** Cash interest paid + scheduled long-term principal payments (i.e. prior year's current portion of long-term debt). Voluntary prepayments and principal amounts repaid as a part of a refinancing are not included. However, where a borrower incorporates balloon indebtedness, long-term bank facilities, remarketed debt or bullet maturities, Fitch may adjust scheduled debt service to eliminate amounts successfully refinanced, remarketed or renewed, or to include payments on debt obligations reported as operating expenses. Cash interest paid may also be adjusted if payment dates distort cash payments vis-à-vis annualized interest expense, while capitalized interest may be excluded for systems undertaking large construction programs.
- **Total Debt:** All long-term and short-term debt obligations including capital leases, outstanding CP, notes payable and current maturities. Certain nonrecourse obligations and separately secured obligations may be excluded.
- **Transfers/Distributions:** Amounts regularly transferred, distributed or paid to owners or a host municipality. See *Rationale for Transfer Treatment in Leverage Metrics* on page 13 for more information.
- **Unrestricted Cash:** Cash and investments available for short-term liquidity needs with no limitations on use. Funds restricted solely by board or management policy and/or available for general system purposes, including debt service, may also be included. Funds explicitly limited for construction or other capital investment are not considered unrestricted.

Supporting Calculations

A comparison of coverage calculations is provided in the *Coverage Ratio Calculations — Example* table below to illustrate how a system's debt service coverage ratios may be overstated if capitalized fixed charges and transfers and distributions are excluded from the calculation.

Coverage Ratio Calculations — Example

($)	Debt Service Coverage Ratio Calculation	Coverage of Full Obligations Calculation
Revenue	1,000	1,000
Purchased Power or Gas Expense	(500)	(500)
Other Operating Expenses (Excluding Depreciation)	(300)	(300)
EBITDA	**200**	**200**
Interest Income	10	10
Funds Available for Debt Service (FADS)	**210**	**210**
Fixed Charges (Adjusted for Purchased Power or Gas)	—	150
Transfer Payment	—	(50)
Adjusted FADS	**—**	**310**
Cash Interest Paid	25	25
Scheduled Principal Payments	25	25
Debt Service	50	50
Fixed Charges	—	150
Adjusted Debt Service	—	200
Debt Service Coverage (x)	4.2	—
Coverage of Full Obligations (x)	—	1.6

Source: Fitch Ratings

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