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FEBRUARY 2016 FINANCE COMMITTEE MATERIALS

February 10, 2016

PFM
The PFM Group
Financial & Investment Advisors

MARKET UPDATE

DEBT OVERVIEW AND REFUNDING UPDATE

RATING AGENCY 2016 PUBLIC POWER SECTOR OUTLOOKS

WEEKLY MARKET UPDATE FOR WEEK ENDING 2/5/2016

- **Yields continue to fall.** Treasury yields fell on the week, trading at year-to-date lows through the middle of the week amid weakness in oil and stock markets around the globe. Yields pared declines on Friday to end the week after the January employment report was seen as reasonably strong
- **Equities extend 2016 losses.** Equities declined on the week, erasing gains logged over the prior two weeks and building upon 2016's year-to-date loss. Technology and consumer discretionary shares led indexes lower on the week, pushing the NASDAQ down over 5% on the week and 12% year-to-date. The S&P ended the week down 3.1%, extending the year's decline to over 8%.
- **International equities remain red.** In U.S. dollar terms, most indexes worldwide declined on the week, even as the dollar fell over 2.5%. In Europe, losses varied, with Spain's IBEX falling 0.64% while the Italian FTSE MIB fell over 4.5%. In Asia, the Hang Seng led losses, falling over 2%, while mainland Chinese indexes rose.
- **January's jobs report shows underlying strength.** The U.S. economy added 151K jobs in January, well below the estimate of 190K. Although job growth was less than expected, average hourly earnings rose a very strong 0.5% from December and 2.5% from a year earlier. This exceeded estimates and indicates that early signs of wage inflation may be gaining traction in the labor market. For all of 2015, the economy added 2.7 million jobs while earnings rose 2.7%, its biggest increase since 2009. The unemployment rate fell to 4.9%, its lowest level in almost 8 years, even as the labor participation rate ticked up. Economic data earlier in the week was not as favorable. Personal income rose more than expected in December, but spending was unchanged – not a good sign for a consumer driven economy. This lifted the savings rate to its highest since the end of 2012. Manufacturing continued to cause angst, as the January Markit PMI reading rose less than estimated while the ISM's manufacturing survey contracted for the 4th month in a row. Services, which have so far remained strong, saw some slowing in January, expanding at their slowest pace in over 2 years.

What we are watching:

- **Light domestic data.** Next week there are only two significant economic releases due out. Retail sales are expected to have risen 0.1% in January after a decline in December underscored soft consumer demand. University of Michigan's sentiment reading for February is due out, expected to rise slightly.
- **Janet Yellen takes to the stand.** U.S. Federal Reserve Chair Janet Yellen will deliver the Fed's semiannual Monetary Policy Report during the two days of testimony before the House Financial Services Committee next Wednesday and the Senate Banking Committee on Thursday.
- **Corporate earnings end.** The Q4 earnings season comes to perhaps a bitter close next week. AIG, Cisco, Coca-Cola, CVS, Societe Generale, Total, and Walt Disney are due to report next week.
- **Election season gears up.** On Tuesday, New Hampshire holds the first primary in the 2016 U.S. presidential campaign, following the Iowa caucuses that were held February 1.

Source: PFM Asset Management

FOMC STATEMENT HIGHLIGHTS

- Information received since the Federal Open Market Committee met in December suggests that **labor market conditions improved** further even as economic growth slowed late last year
- **Inflation has continued to run below the Committee's 2 percent longer-run objective**, partly reflecting declines in energy prices and in prices of non-energy imports. Market-based measures of inflation compensation declined further; survey-based measures of longer-term inflation expectations are little changed, on balance, in recent months
- Given the economic outlook, the Committee **decided to maintain the target range for the federal funds rate** at 1/4 to 1/2 percent. The stance of monetary policy remains accommodative, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation
- The Committee expects that economic conditions will evolve in a manner that will **warrant only gradual increases in the federal funds rate**. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data

January

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Bond Yields Forecasts Compiled by Bloomberg (as of 02/08/16)

Rate	Current	Q1 16	Q2 16	Q3 16	Q4 16	Q1 17	Q2 17
30Y UST	2.56%	3.03%	3.17%	3.26%	3.34%	3.43%	3.54%
10Y UST	1.74%	2.18%	2.39%	2.50%	2.63%	2.78%	2.99%
2Y UST	0.66%	1.03%	1.26%	1.45%	1.61%	1.78%	2.09%
3M LIBOR	0.62%	0.73%	0.90%	1.06%	1.22%	1.42%	1.77%
Fed Funds Target Rate (Upper Bound)	0.50%	0.65%	0.85%	1.00%	1.20%	1.40%	1.75%
Fed Funds Target Rate (Lower Bound)	0.25%	0.36%	0.57%	0.75%	0.97%	1.19%	1.49%

Source: Federal Reserve; Bloomberg

CURRENT INTEREST RATE SNAPSHOT

- While interest rates remain at low levels, economic data and resulting central bank policy will remain a key driver of investor activity and volatility in the marketplace

February 5, 2016

Year	Maturity	MMD	UST
1-Year	2017	0.38%	0.55%
2-Year	2018	0.57%	0.74%
3-Year	2019	0.67%	0.91%
4-Year	2020	0.78%	-
5-Year	2021	0.89%	1.25%
6-Year	2022	1.05%	-
7-Year	2023	1.21%	1.58%
8-Year	2024	1.39%	-
9-Year	2025	1.54%	-
10-Year	2026	1.66%	1.86%
11-Year	2027	1.77%	-
12-Year	2028	1.86%	-
13-Year	2029	1.95%	-
14-Year	2030	2.04%	-
15-Year	2031	2.12%	-

Year	Maturity	MMD	UST
16-Year	2032	2.20%	-
17-Year	2033	2.25%	-
18-Year	2034	2.30%	-
19-Year	2035	2.35%	-
20-Year	2036	2.40%	2.27%
21-Year	2037	2.46%	-
22-Year	2038	2.52%	-
23-Year	2039	2.58%	-
24-Year	2040	2.63%	-
25-Year	2041	2.66%	-
26-Year	2042	2.68%	-
27-Year	2043	2.69%	-
28-Year	2044	2.70%	-
29-Year	2045	2.71%	-
30-Year	2046	2.72%	2.68%

Source: Thomson Reuters

BENCHMARK TAX-EXEMPT INTEREST RATE PROGRESSION

- The past couple of months have been marked by economic uncertainty globally. Concerns over the slowdown in China's economy and plummeting oil prices have spurred investors to seek lower risk investments and driven U.S. Treasury and municipal bond rates lower

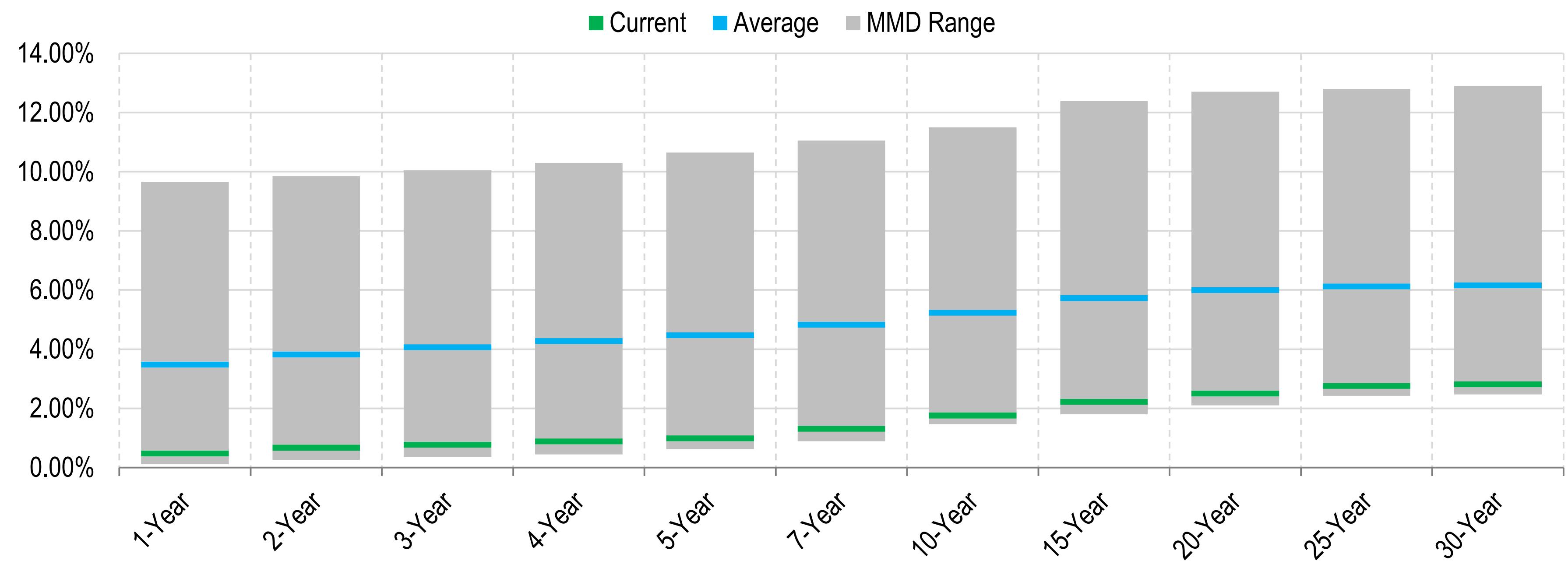
20-Year AAA MMD Rates
(February 2, 2015 to February 5, 2016)

Source: Thomson Reuters

BENCHMARK TAX-EXEMPT INTEREST RATE POSITION

- Benchmark tax-exempt rates remain well below their long-term averages across the yield curve

AAA MMD Rate Position
(June 1, 1981 Inception to February 5, 2016)



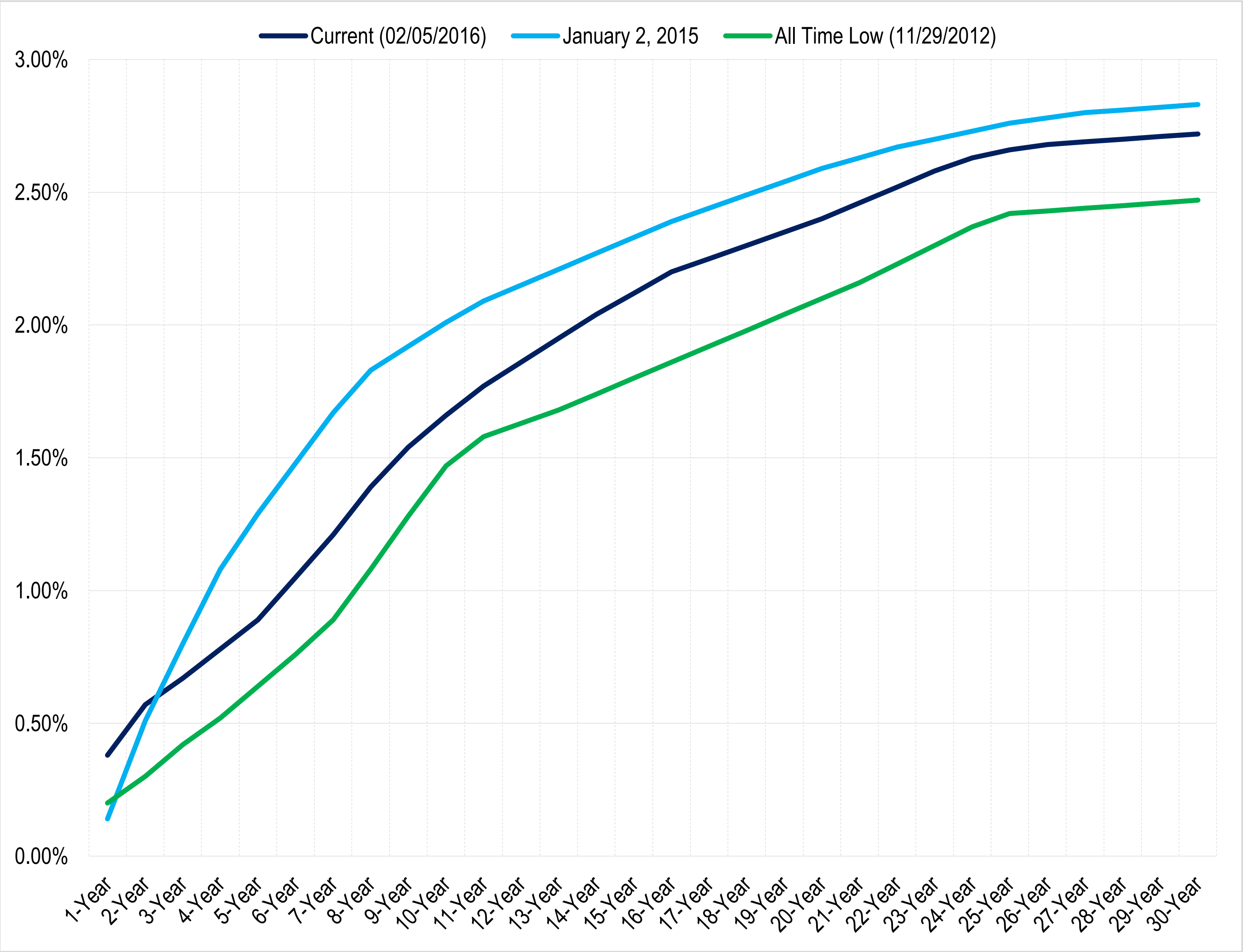
Summary of February 5, 2016 vs. Historical (since Inception) MMD Rates

Statistic	1-Year	2-Year	3-Year	4-Year	5-Year	7-Year	10-Year	15-Year	20-Year	25-Year	30-Year
February 5, 2016	0.38%	0.57%	0.67%	0.78%	0.89%	1.21%	1.66%	2.12%	2.40%	2.66%	2.72%
Average since Inception	3.18%	3.52%	3.76%	3.98%	4.17%	4.52%	4.93%	5.43%	5.70%	5.82%	5.86%
Spread to Average	-2.80%	-2.95%	-3.09%	-3.20%	-3.28%	-3.31%	-3.27%	-3.31%	-3.30%	-3.16%	-3.14%
Minimum	0.11%	0.25%	0.36%	0.44%	0.62%	0.89%	1.47%	1.80%	2.10%	2.42%	2.47%
Spread to Minimum	0.27%	0.32%	0.31%	0.34%	0.27%	0.32%	0.19%	0.32%	0.30%	0.24%	0.25%
Maximum	9.65%	9.85%	10.05%	10.30%	10.65%	11.05%	11.50%	12.40%	12.70%	12.80%	12.90%

Source: Thomson Reuters

RECENT AAA MMD YIELD CURVE MOVEMENT

AAA MMD Yield Curve Movement



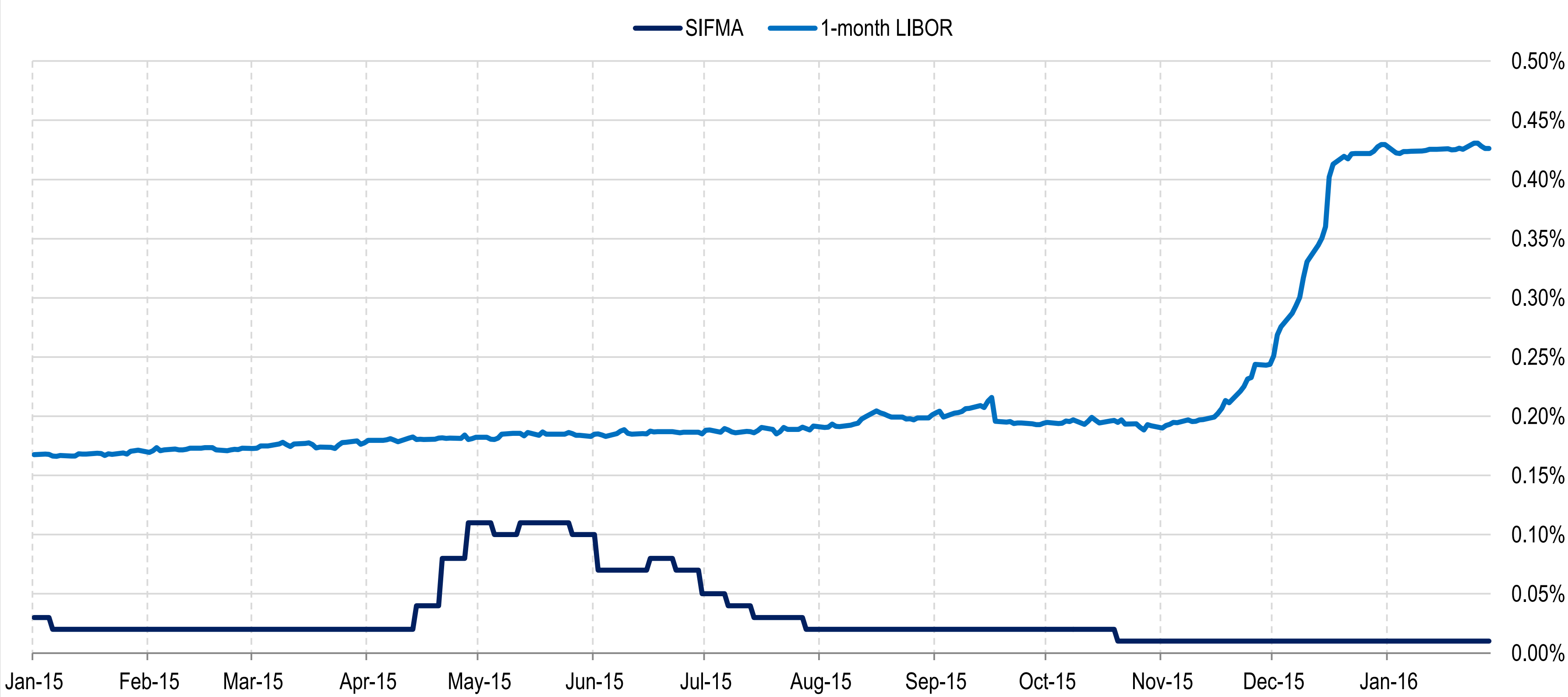
Maturity	∆ Since 01/02/15	∆ Since 11/29/12
1-Year	0.24%	0.18%
2-Year	0.06%	0.27%
3-Year	-0.13%	0.25%
4-Year	-0.30%	0.26%
5-Year	-0.40%	0.25%
6-Year	-0.43%	0.29%
7-Year	-0.46%	0.32%
8-Year	-0.44%	0.31%
9-Year	-0.38%	0.26%
10-Year	-0.35%	0.19%
11-Year	-0.32%	0.19%
12-Year	-0.29%	0.23%
13-Year	-0.26%	0.27%
14-Year	-0.23%	0.30%
15-Year	-0.21%	0.32%
16-Year	-0.19%	0.34%
17-Year	-0.19%	0.33%
18-Year	-0.19%	0.32%
19-Year	-0.19%	0.31%
20-Year	-0.19%	0.30%
21-Year	-0.17%	0.30%
22-Year	-0.15%	0.29%
23-Year	-0.12%	0.28%
24-Year	-0.10%	0.26%
25-Year	-0.10%	0.24%
26-Year	-0.10%	0.25%
27-Year	-0.11%	0.25%
28-Year	-0.11%	0.25%
29-Year	-0.11%	0.25%
30-Year	-0.11%	0.25%

Source: Thomson Reuters

SHORT-TERM INTEREST RATES

- SIFMA remains historically low at 1 basis point
- 1-month LIBOR, while still historically low, has doubled over the past couple of months to 43 bps—in conjunction with the Federal Reserve raising the Fed Fund's rate 25 bps
- FOMC officials left rates unchanged at the January meeting and the recent uncertainty in the global economy has left many market participants with doubts that a rate hike will occur at the next FOMC meeting in March either

Short-term Interest Rates (January 2015 to February 2016)

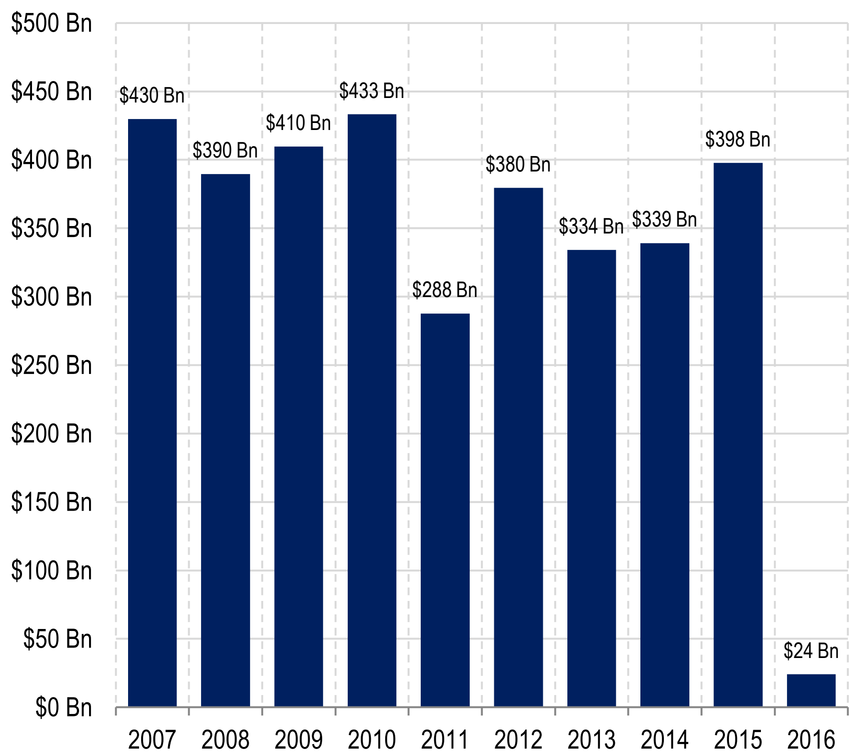


MUNICIPAL MARKET SUPPLY

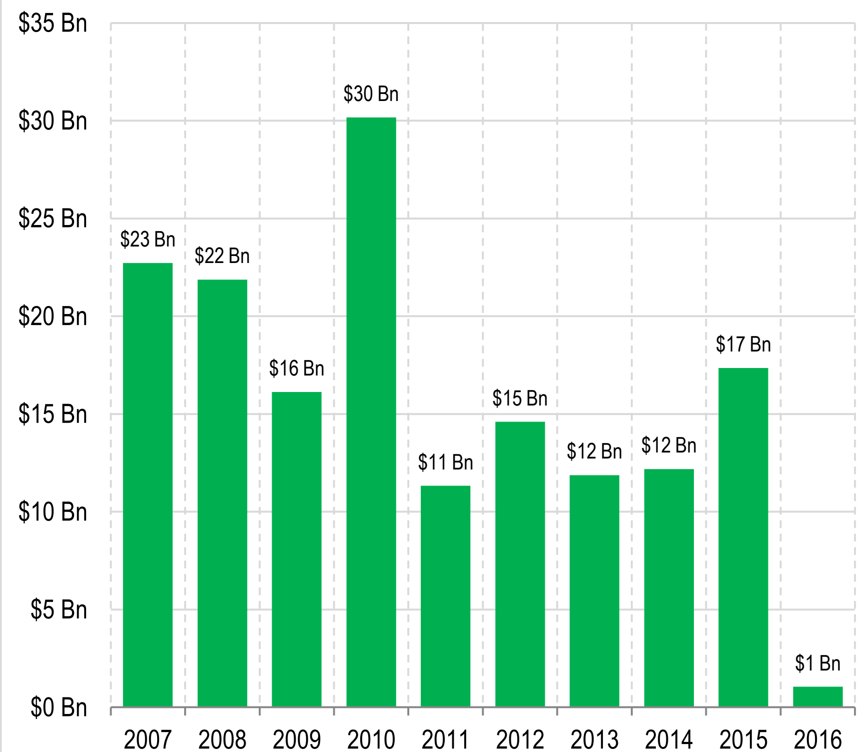
- Overall municipal market volume in 2015 exceeded 2014 volume by nearly $59 billion, resulting in the largest volume total since 2010
- Public power volume was ~4.3% of total municipal issuance, slightly above 2011- 2014, but down from 7% in 2010
- 2016 has gotten off to a relatively slow start with January volume 18% below 2015

Issuance Volume History
(2007 –January 2016)

Overall Municipal Market Volume



Public Power Volume

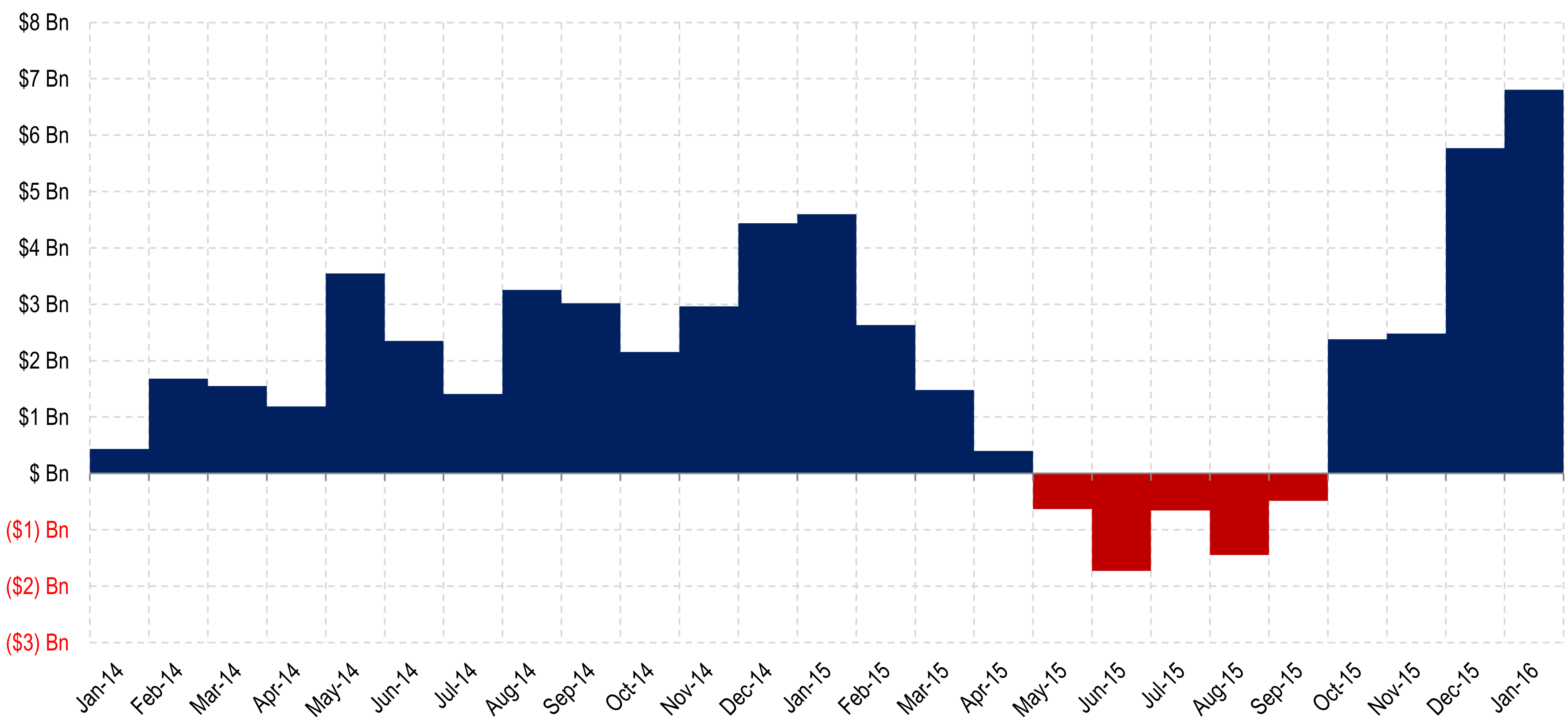


Source: Bond Buyer

MUNICIPAL MARKET DEMAND

- The municipal market saw net positive cash flow in 2015, albeit at amounts lower than in 2014
  - — Inflows into muni bond funds have bolstered the demand side of the equation. There was approximately $15 billion of net inflows into municipal bond funds in 2015 in addition to approximately $28 billion in 2014. Net inflows have continued to start 2016
- The demand for high-quality fixed income assets served to offset periods of heavy supply and volatility

Net Long-Term Municipal Bond Mutual Fund Flows
(January 2014 to January 2016)



Source: Investment Company Institute

Municipal Bond Market – January 2016

Economic Highlights

- A perceived slowdown in the global economy triggered a sharp sell-off in the equity markets as well as a drop in sovereign bond yields.
- Oil prices plunged, falling briefly below $27 per barrel — the lowest since 2003. Heavy supply at a time when global demand is waning may keep prices low throughout the year.
- U.S. gross domestic product (GDP) weakened to an annual growth rate of just 0.7% in the fourth quarter, based on the advance estimate. Decelerating consumer spending, a downturn in business investment, weaker exports, and lower spending by state and local governments drove the decline.
- The U.S. experienced robust job growth in December, adding 292,000 jobs, while the unemployment rate held at 5%.
- New home sales surged by more than 10% in December, capping their strongest year since 2007.
- In a surprise move, the Bank of Japan (BOJ) adopted a negative interest rate policy in an effort to boost growth and avoid deflation.

Bond Markets

- U.S. Treasury yields fell sharply in January as further weakening in both global growth and commodity prices caused investors to prefer safe assets. This "flight to quality" pushed yields lower by 25 to 40 basis points (bps) (0.25% to 0.40%), depending on the maturity.
- Falling yields resulted in strong performance across the investment-grade bond market. Bonds with longer durations benefited the most.
- Because of the persistently narrow difference between Treasury and agency yields, the return on federal agency securities largely tracked that of Treasuries.
- The potential for slower economic growth means that corporations may find it more difficult to sustain the strong profits of the past few years. As a result, investors demanded extra yield to purchase corporate securities in January. Because those yield spreads widened, the performance of the corporate sector lagged that of Treasuries. Lower-quality issuers (rated BBB and below) and those in energy-related industries trailed the most.
- Mortgage-backed securities (MBS) also trailed comparable-duration Treasuries. Sharply lower yields increased the risk that homeowners would refinance and MBS would prepay faster. Faster prepayments negatively affected most MBS, especially those with higher coupon rates.
- In its decision to hold rates steady at its January meeting, the Federal Open Market Committee (FOMC) noted it will be closely monitoring global economic and financial developments. That acknowledgement tempered market expectations for additional rate hikes this year, which, in turn, caused rates on commercial paper and bank certificates of deposit (CDs) to move lower, although they remain attractive compared to short-term Treasuries and agencies.

Municipal Bond Market

- Municipal new issuance decreased in January versus a year earlier, with long-term bonds sales down 18.1% to $24.1 billion compared to $29.5 billion last year. New money issuance is off to a strong start in 2016 with an increase of 24.4% to $10.6 billion from $8.5 billion the same month last year; however, refundings were down 47.5% to $8.8 billion versus $16.8 billion the same month last year, according to the Municipal Market Monitor (TM3) data.
- Although municipal bond flows remained positive, the pace of flows decreased in January. Total net inflows were $3.7 billion versus $5.9 billion in December. The weekly average for January was the same as December at $1.2 billion, according to the Investment Company Institute (ICI) Data.
- In January, the TM3 Municipal Market Index (MMD) experienced a substantial flattening of the yield curve. The two-year maturity was flatter by 11 bps and the five-year was flatter by 26 bps. The intermediate (seven-year) term saw the largest movement, with a 27 bps decrease. The long end also experienced significant flattening with the ten-year flatter by 22 bps and the 30-year by 7 bps, according to TM3 data.
- The 10-year MMD single-A General Obligation (GO) Index credit spreads decreased slightly in January to 52 bps from 53 bps in December. The 10-year MMD double-A GO Index also decreased by 1 bp to 20 bps in January, according to TM3 data.
- While the municipal market experienced a healthy rally for the month, it couldn't keep pace with the Treasury market. Municipal/Treasury ratios increased in January, reversing the course from December. The two-year increased to 84.8% from 72.9% in December; the five-year increased to 75.1% from 71.5%; and the intermediate term increased slightly to 76.5% from 73.5%. The long-end also saw ratios increase, with the 10-year moving to 88.7% from 84.4% in December and the 30-year ratio increasing to 99.8% from 93.5% last month, according to TM3 Data.
- In January, there were no surprises from the Fed, as it kept the federal funds rate unchanged during its January meeting. Speculation continues on whether the Fed will raise rates in 2016.

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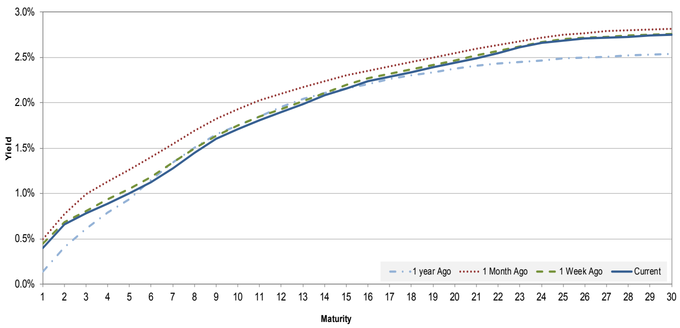
MMD Spot Rates				
	Current 1/29/2016	1 Week Ago 1/22/2016	1 Month Ago 12/29/2015	1 Year Ago 1/29/2015
2 year	0.66	0.68	0.77	0.41
5 Year	1.00	1.05	1.26	0.94
7 Year	1.28	1.34	1.55	1.34
10 Year	1.71	1.75	1.93	1.75
30 Year	2.75	2.76	2.82	2.54

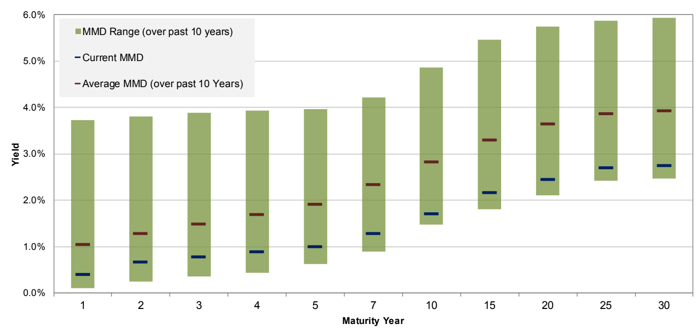
Change in Spot Rate (basis points)			
	1 Week Ago 1/22/2016	1 Month Ago 12/29/2015	1 Year Ago 1/29/2015
2 year	-2	-11	25
5 Year	-5	-26	6
7 Year	-6	-27	-6
10 Year	-4	-22	-4
30 Year	-1	-7	21

Market Rates			
	MMD AAA GO	U.S. Treasury	SIFMA Swap Curve
2 year	0.66%	0.78%	0.39%
3 year	0.78%	0.97%	0.60%
5 year	1.00%	1.33%	1.00%
7 year	1.28%	1.67%	1.32%
10 year	1.71%	1.92%	1.59%
30 year	2.75%	2.74%	2.36%

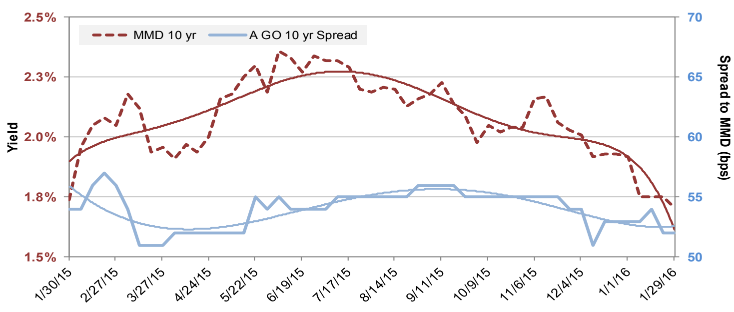
MMD AAA G.O. Curve



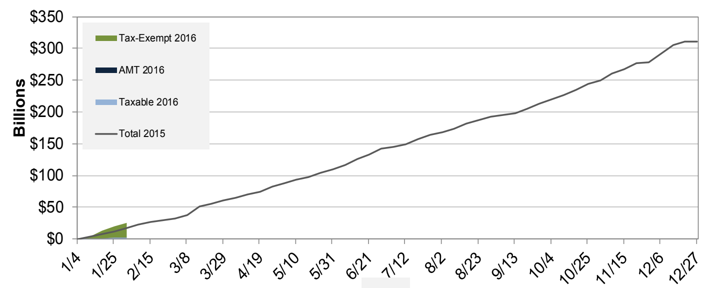
MMD Rates Over Time



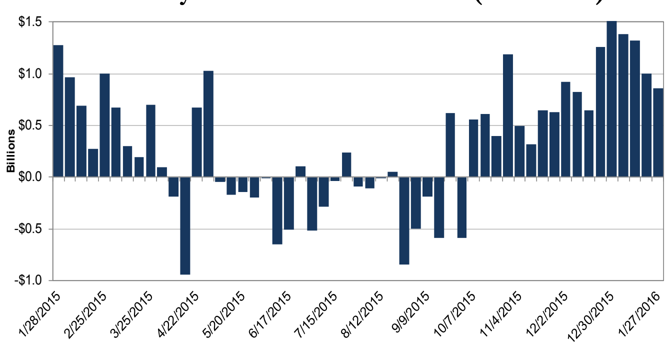
Rate and Spread Movement



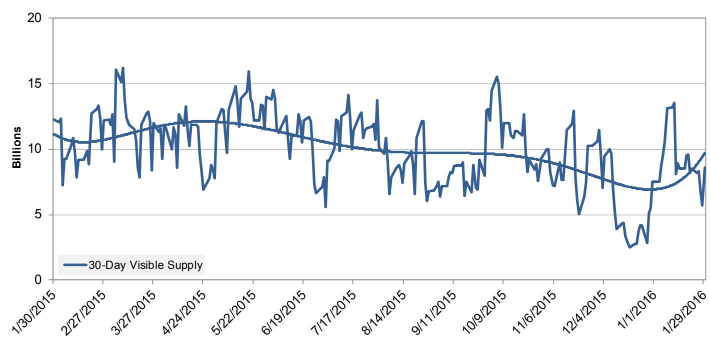
2016 Cumulative Issuance



Weekly Mutual Fund Inflows (Outflows)



30-Day Visible Municipal Supply



Economic Calendar								
Date	Time	Statistic	Date	Time	Statistic	Date	Time	Statistic
02/01/16	8:30 AM	Personal Income	02/09/16	10:00 AM	Wholesale Inventories	02/22/16	9:45 AM	Industrial Production
02/01/16	9:45 AM	Industrial Production	02/10/16	7:00 AM	MBA Mortgage Applications	02/23/16	9:00 AM	S&P/CaseShiller Home Price Ind
02/01/16	10:00 AM	ISM Manufacturing Index	02/10/16	8:30 AM	Monthly Budget Statement	02/23/16	10:00 AM	Existing Home Sales
02/01/16	2:00 PM	Construction Spending	02/11/16	8:30 AM	Jobless Claims	02/23/16	10:00 AM	Consumer Confidence
02/02/16	9:45 AM	ISM Manufacturing Index	02/12/16	8:30 AM	Retail Sales	02/24/16	7:00 AM	MBA Mortgage Applications
02/03/16	2:00 PM	MBA Mortgage Applications	02/12/16	8:30 AM	Import Price Index	02/24/16	9:45 AM	Industrial Production
02/03/16	9:45 AM	Industrial Production	02/12/16	10:00 AM	U. of Michigan Confidence	02/24/16	10:00 AM	New Home Sales
02/03/16	10:00 AM	ISM Manufacturing Index	02/17/16	7:00 AM	MBA Mortgage Applications	02/25/16	8:30 AM	Jobless Claims
02/04/16	8:30 AM	Productivity and Costs	02/17/16	8:30 AM	Producer Price Index	02/25/16	8:30 AM	Durable Goods Orders
02/04/16	8:30 AM	Jobless Claims	02/17/16	8:30 AM	Housing Starts	02/25/16	9:00 AM	House Price Index
02/04/16	10:00 AM	Factory Orders	02/17/16	8:30 AM	Building Permits	02/26/16	8:30 AM	GDP
02/04/16	10:00 AM	Durable Goods Orders	02/17/16	9:15 AM	Industrial Production	02/26/16	10:00 AM	U. of Michigan Confidence
02/05/16	8:30 AM	Trade Balance	02/17/16	2:00 PM	FOMC Meeting Minutes Released	02/26/16	10:00 AM	Personal Income
02/05/16	8:30 AM	Retail Sales	02/18/16	8:30 AM	Jobless Claims	02/29/16	9:00 AM	ISM Manufacturing Index
02/05/16	8:30 AM	Household Survey Revision	02/19/16	8:30 AM	Consumer Price Index	02/29/16	10:00 AM	Pending Home Sales

Sources: Bloomberg, Thomson Reuters, and ICI. Unless otherwise noted, all data is presented as of January 31, 2016.

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Fixed Income Management

Monthly Market Review

January 2016

Economic Highlights

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Equity Markets

- The S&P 500 Index fell 5% in January, while the Russell 2000 Index, which tracks companies with smaller market capitalizations, ended down 8.8%.
- Global equity markets in both developed and emerging markets lost 7-8% for the month. China's Shanghai Composite was a glaring exception, as the index ended January down a whopping 23.7%.

PFMAM Outlook

- The slowdown in the economy and sharp decline in global equity prices are likely to delay FOMC moves to raise rates and provide support for bond prices for at least several months. Investors could benefit from this by extending durations to match benchmarks, investing a bit further out on the yield curve.
- We observe, however, that the yield curve offers much less opportunity now than it did a month or two ago. Markets currently incorporate an assumption of perhaps one additional FOMC move to raise rates this year. If the global economy stabilizes, oil prices rise, and deflation fears abate, the Federal Reserve (Fed) could become more active and bond prices could retrace their recent upward move.
- Returns on investment-grade corporate bonds have generally lagged those of government bonds with similar durations. This means the relative value of investing in corporate bonds has increased. However, some specific sectors such as energy, as well as some specific issuers, could suffer given current economic trends; therefore, corporate bond investors need to be selective and diligent.
- Lagging returns for MBS indicate the possibility of value in this sector as well. Volatility and the uncertain path of future interest rates could limit the returns.
- The yield curve in the money market sector remains quite steep, notwithstanding the perception that the Fed will avoid raising short-term rates until later this year. Investors who have well-formed liquidity plans may be able to earn added yield by moving investments into six- to 12-month maturities when supported by liquidity needs.

PFM®
PFM Asset Management LLC

U.S. Treasury Yields

Duration	Jan 31, 2015	Dec 31, 2015	Jan 31, 2016	Monthly Change
3 Month	0.00%	0.17%	0.31%	0.14%
6 Month	0.05%	0.48%	0.43%	-0.05%
2 Year	0.45%	1.05%	0.78%	-0.27%
5 Year	1.16%	1.76%	1.33%	-0.43%
10 Year	1.64%	2.27%	1.92%	-0.35%
30 Year	2.22%	3.02%	2.74%	-0.28%

Yields by Sector and Maturity as of 1/31/16

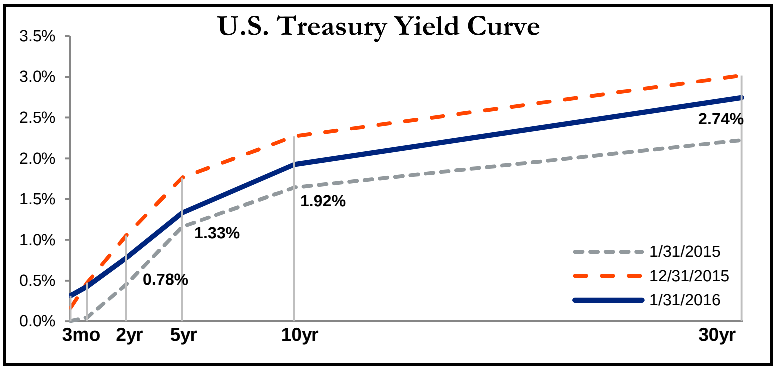
Duration	U.S. Treasury	Federal Agency	Corporates-A Industrials	Municipals
3 Month	0.31%	0.34%	0.80%	-
6 Month	0.43%	0.41%	0.85%	-
2 Year	0.78%	0.90%	1.35%	0.70%
5 Year	1.33%	1.54%	2.31%	1.24%
10 Year	1.92%	2.25%	3.24%	2.12%
30 Year	2.74%	3.07%	4.19%	4.29%

Spot Prices and Benchmark Rates

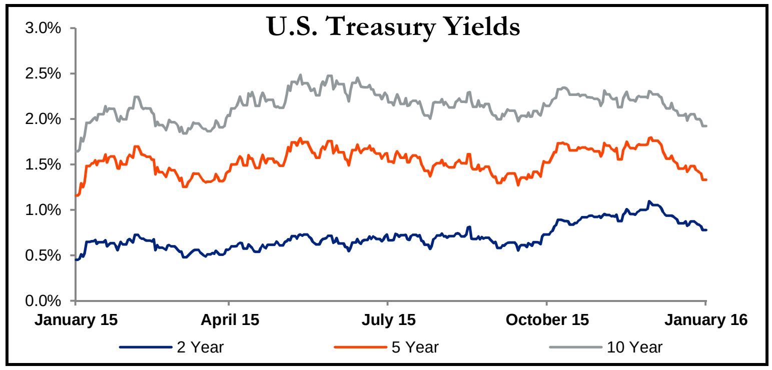
Duration	Jan 31, 2015	Dec 31, 2015	Jan 31, 2016	Monthly Change
1 Month LIBOR	0.17%	0.43%	0.43%	0.00%
3 Month LIBOR	0.25%	0.61%	0.61%	0.00%
Effective Fed Funds Rate	0.06%	0.20%	0.29%	0.09%
Fed Funds Target Rate	0.25%	0.50%	0.50%	0.00%
Gold ($/oz)	$1,279	$1,060	$1,116	$56
Crude Oil $/Barrel	$48.24	$37.04	$33.62	-$3.42
US Dollars per euro	$1.13	$1.09	$1.08	-$0.01

Upcoming Indicators to Watch

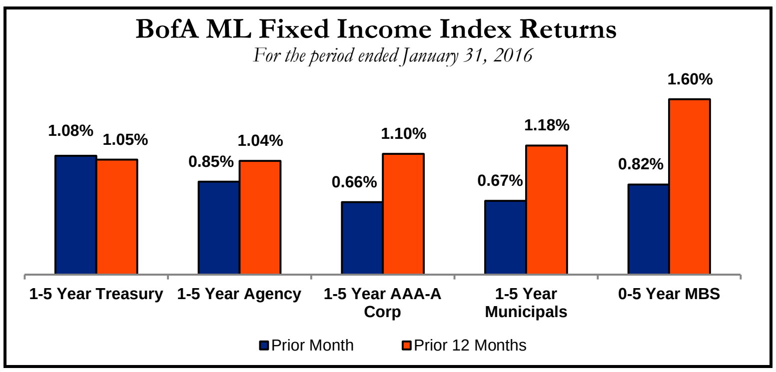
Indicator Name	Release Date	For	Consensus	Prior
Change in Nonfarm Payrolls	Feb 5	Jan	190k	292k
Retail Sales Advance MoM	Feb 12	Jan	0.10%	-0.10%
CPI MoM	Feb 19	Jan	--	-0.10%
Existing Home Sales MoM	Feb 23	Jan	--	14.70%
New Home Sales MoM	Feb 24	Jan	--	10.80%
GDP Annualized QoQ	Feb 26	4Q (2nd est.)	--	0.70%
Personal Spending	Feb 26	Jan	--	0.00%



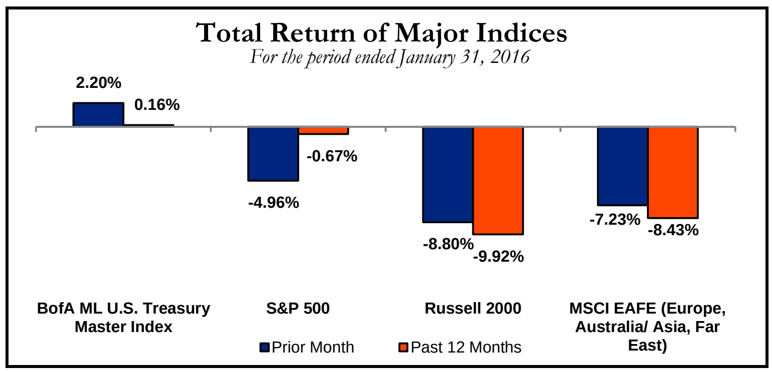
U.S. Treasury yields fell sharply in January as further weakening in both global growth and commodity prices caused investors to prefer safe assets.



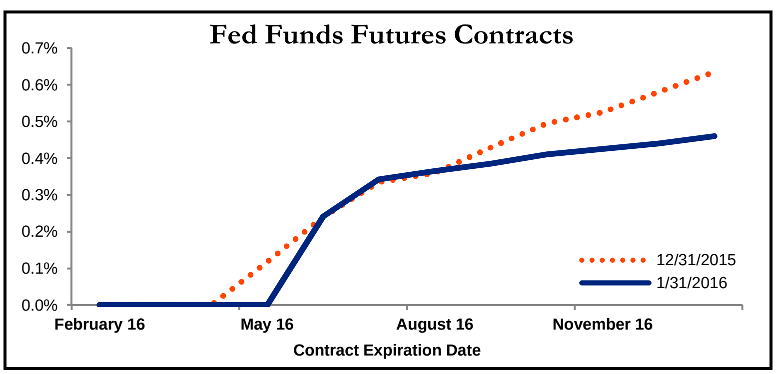
The "flight to quality" pushed yields lower by 25 to 40 basis points (bps) (0.25% to 0.40%), depending on the maturity.



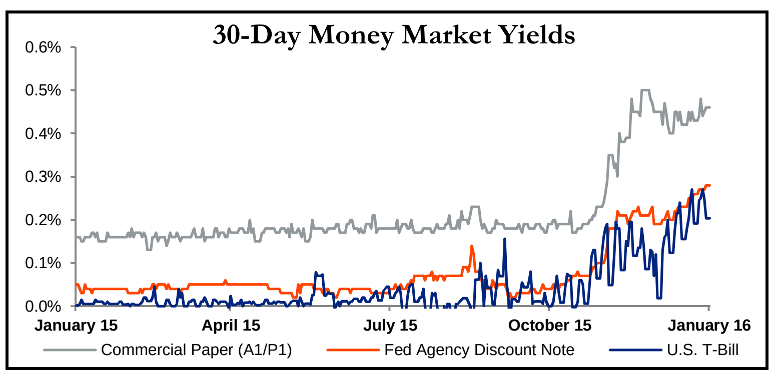
Because of the narrow difference between Treasury and agency yields, the return on federal agency securities largely tracked that of Treasuries.



A perceived slowdown in the global economy triggered a sharp sell-off in the equity markets.



The slowdown in the economy and sharp decline in global equity prices are likely to delay FOMC moves to raise rates.



Tempered market expectations for additional rate hikes this year caused rates on commercial paper to move lower.

Source: Bloomberg. Data as of January 31, 2016 unless otherwise noted.

Market Update

Debt Overview and Refunding Update

Rating Agency 2016 Public Power Sector Outlooks

NCPA MEMBER RATINGS

NCPA Member Ratings			
Member	**Ratings**		
	Moody's	**S&P**	**Fitch**
Alameda Municipal Power	-	A+ / Stable	A+ / Stable
Bay Area Rapid Transit District (1)	Aa2 / Stable	AA+ / Stable	AA+ / Stable
City of Biggs	-	-	-
City of Gridley	-	-	-
City of Healdsburg (Wastewater)	-	AA / Stable	-
Lodi Electric Utility	A2 / Stable	A- / Stable	A- / Stable
City of Lompoc (Water and Wastewater)	A2 / Not on Watch	-	-
City of Palo Alto (Combined Utility) (2)	Aa2 / Not on Watch	AAA / Stable	-
Port of Oakland (3)	A2 / Stable	A+ / Stable	A+ / Stable
Redding Electric Utility	A2 / Not on Watch	-	A+ / Stable
Roseville Electric	A2 / Stable	A+ / Stable	A+ / Stable
Silicon Valley Power	-	A + / Stable	A+ / Stable
Truckee Donner PUD (Water)	-	AA- / Stable	-
City of Ukiah (Wastewater)	Baa2 / Not on Watch	-	-
Associate Members			
Plumas-Sierra REC	-	-	-
Non NCPA LEC/Geothermal Members			
City of Azusa (Electric) (4)	-	A / Stable	-
California Department of Water Resources (Power and Water) (4)	Aa2 / Stable Aa1 / Stable	AA / Stable AAA / Stable	AA+ / Stable -
Modesto Irrigation District (4)	A2 / Stable	A+ / Stable	A+ / Stable
PWRPA (4)	-	-	-
TID (5)	A2 / Stable	AA- / Stable	A+ / Stable

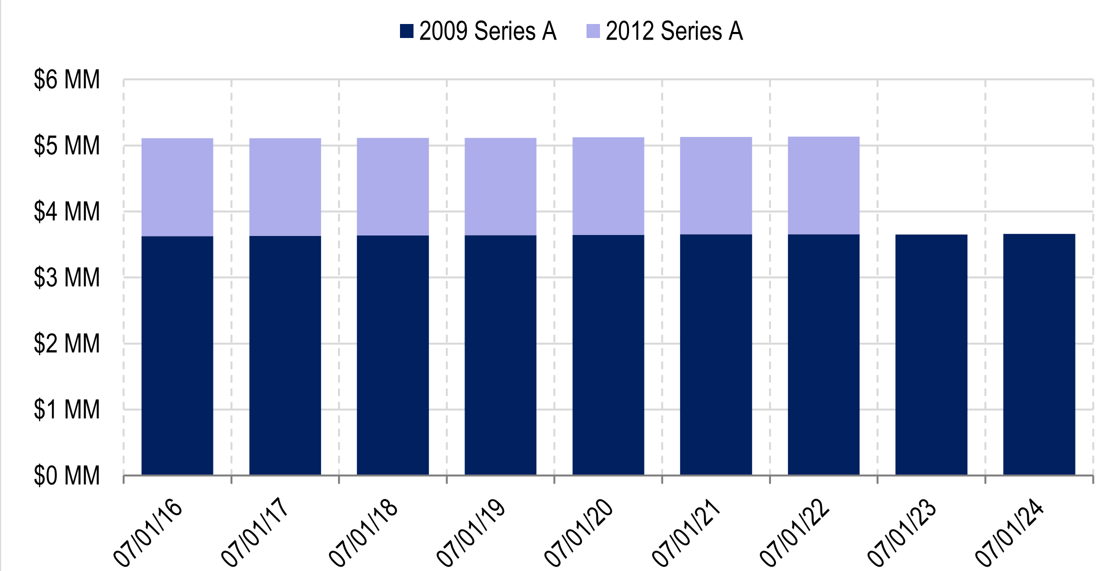
(1) Sales tax revenue backed; (2) Len securing the Aa1 rated 1995 bonds has been closed; (3) Senior most; (4) LEC project participant; (5) Geothermal project participant; Senior most

NCPA GEOTHERMAL PROJECT DEBT OVERVIEW

NCPA Geo. Project Participation Percentages

Member	Entitlement Share (%)	Beneficiary Share (%)
Alameda	16.8825	16.8825
Biggs	0.2270	0.2270
Gridley	0.3950	0.3360
Healdsburg	3.6740	3.6740
Lodi	10.2800	10.2800
Lompoc	3.6810	3.6810
Palo Alto	6.1580	0.0000
Plumas-Sierra	0.8145	0.7010
Roseville	7.8830	7.8830
Santa Clara	44.3905	44.3905
TID	0.0000	6.3305
Ukiah	5.6145	5.6145

NCPA Geothermal Project Debt Service



Summary of Outstanding NCPA Geothermal Project Debt

Series	Tax Status	Coupon Type	Issue Size	Outstanding Par	Outstanding Coupon Range	Call Date	Final Maturity
2009 Series A	Tax-Exempt	Fixed-Rate	$35,610,000	$25,645,000	5.000% - 5.500%	7/1/2019	7/1/2024
2012 Series A	Tax-Exempt	Fixed-Rate	$12,910,000	$9,510,000	2.289%	7/1/2017	7/1/2022

NCPA Geothermal Project Ratings

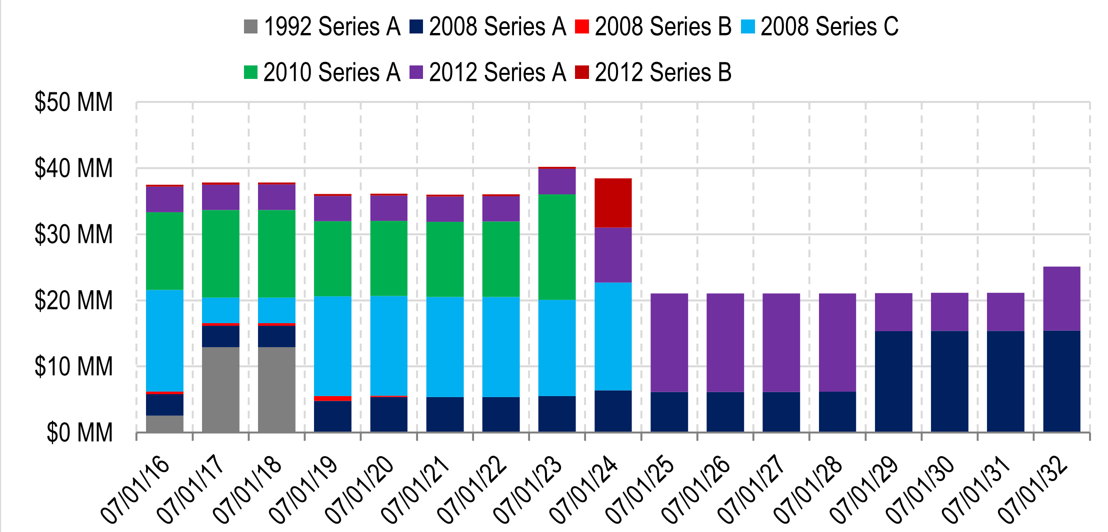
Moody's	S&P	Fitch
A1 Stable	A- Stable	A+ Stable

NCPA HYDROELECTRIC PROJECT DEBT OVERVIEW

NCPA Hydro. Project Participation Percentages

Member	Entitlement Share (%)
Alameda	10.000
Biggs	0.100
Gridley	1.060
Healdsburg	1.660
Lodi	10.370
Lompoc	2.300
Palo Alto	22.920
Roseville	12.000
Santa Clara	35.860
Ukiah	2.040
Plumas-Sierra	1.690

NCPA Hydroelectric Project Debt Service



Summary of Outstanding NCPA Hydroelectric Project Debt

Series	Tax Status	Coupon Type	Issue Size	Outstanding Par	Outstanding Coupon Range	Call Date	Final Maturity
1992 Series A	Tax-Exempt	Fixed-Rate	$195,610,000	$24,610,000	6.300%	Non-Callable	7/1/2018
2008 Series A	Tax-Exempt	Variable-Rate	$85,160,000	$85,160,000	Var. (3.819%) (S)	Current	7/1/2032
2008 Series B	Taxable	Variable-Rate	$3,165,000	$1,830,000	Variable (V)	Current	7/1/2020
2008 Series C	Tax-Exempt	Fixed-Rate	$128,005,000	$88,130,000	5.000%	7/1/2018	7/1/2024
2010 Series A	Tax-Exempt	Fixed-Rate	$101,260,000	$80,360,000	5.000%	7/1/2019	7/1/2023
2012 Series A	Tax-Exempt	Fixed-Rate	$76,665,000	$76,665,000	5.000%	7/1/2022	7/1/2032
2012 Series B	Taxable	Fixed-Rate	$7,120,000	$7,120,000	4.320%	Make-Whole	7/1/2024

(S) Swapped; Please see next page for details, (V) 4% variable rate assumed for debt service chart

NCPA Hydroelectric Project Ratings

Moody's	S&P	Fitch
A1 Stable	A+ Stable	A+ Stable

NCPA HYDROELECTRIC PROJECT DEBT OVERVIEW (CONT'D)

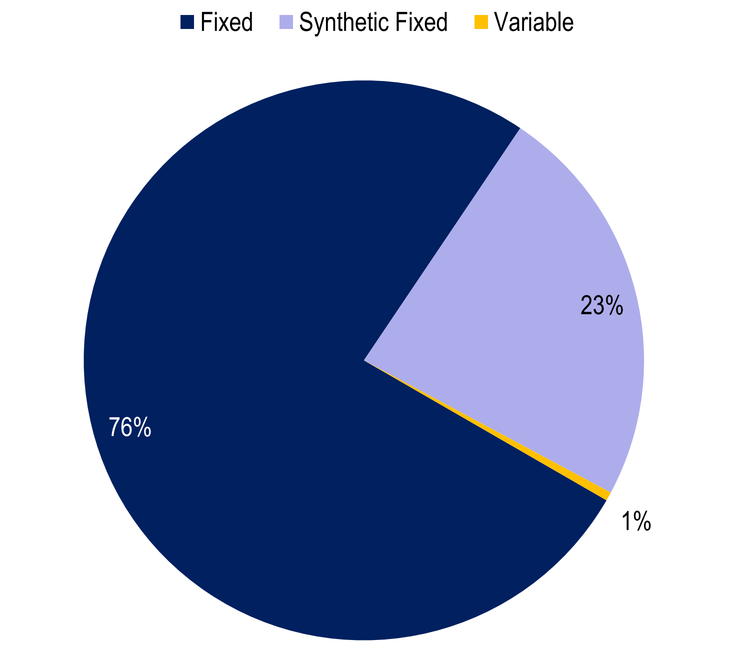
NCPA Hydroelectric Project Swap Summary

Series	NCPA Pays	NCPA Receives	Trade Date	Effective Date	Maturity Date	MTM Value *(As of 02/05/16)*	Initial Notional	Current Notional	Bank Counterparty
2008 Series A	3.8190%	54% of USD-LIBOR + 0.54%	11/24/04	11/24/04	7/1/32	($21,675,224)	$85,160,000	$85,160,000	Citibank, N.A., New York (A1/A/A+)
2008 Series B	USD-LIBOR	5.2910%	11/24/04	11/24/04	7/1/32	$328,551	$1,574,000	$1,235,837	Citibank, N.A., New York (A1/A/A+)

NCPA Hydroelectric Project Liquidity Summary

Series	LOC Provider	LOC Expiry	Last Reset
2008 Series A	Bank of Montreal (Aa3/A+/AA-)	September 09, 2019	0.01%
2008 Series B	Bank of Montreal (Aa3/A+/AA-)	September 09, 2019	0.40%

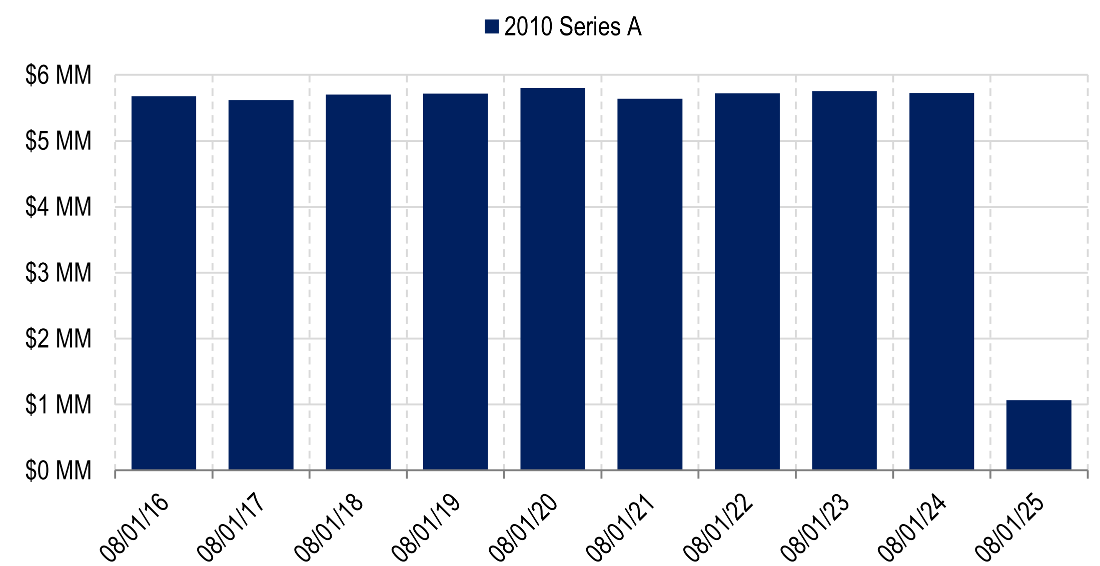
Breakdown of NCPA Hydroelectric Project Debt Type



NCPA CAPITAL FACILITIES DEBT OVERVIEW

NCPA Capital Facilities Participation Percentages	
Member	**Entitlement Share (%)**
Alameda	19.00
Lodi	39.50
Lompoc	5.00
Roseville	36.50

NCPA Capital Facilities Debt Service



Summary of Outstanding NCPA Capital Facilities Debt

Series	Tax Status	Coupon Type	Issue Size	Outstanding Par	Outstanding Coupon Range	Call Date	Final Maturity
2010 Series A	Tax-Exempt	Fixed-Rate	$55,120,000	$41,070,000	3.600% - 5.250%	2/1/2020	8/1/2025

NCPA Capital Facilities Ratings

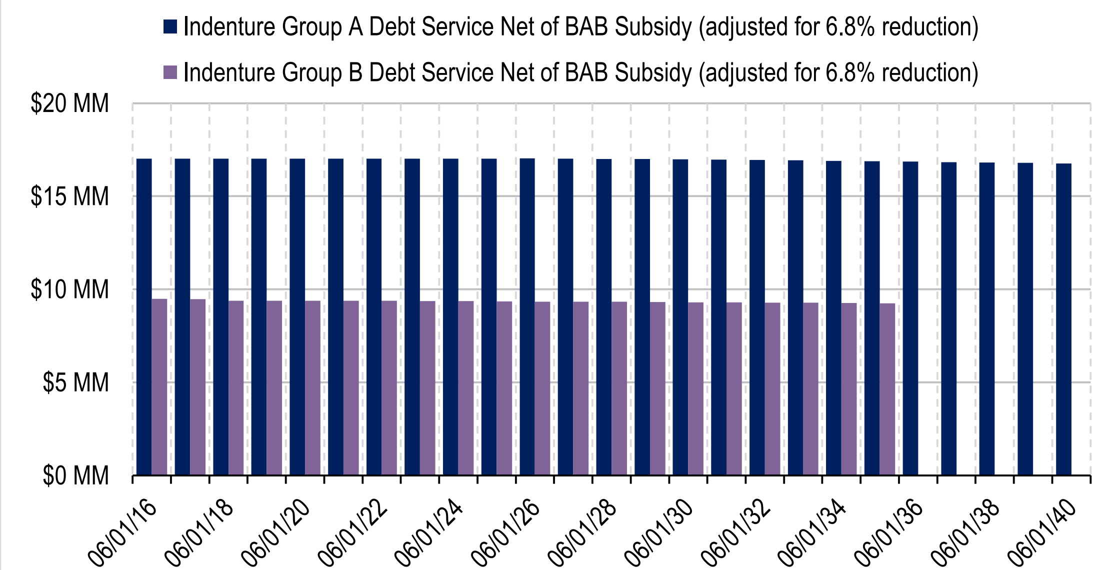
Moody's	S&P	Fitch
A2 Stable	A- Stable	-

NCPA LODI ENERGY CENTER DEBT OVERVIEW

NCPA LEC Participation Percentages

Member	Entitlement Share (%)	Ind. Group A Cost Share (%)
CDWR	33.5000	-
Azusa	2.7857	4.9936
Biggs	0.2679	0.4802
Gridley	1.9643	3.5212
Healdsburg	1.6428	2.9448
Lodi	9.5000	17.0295
Lompoc	2.0357	3.6491
Santa Clara	25.7500	46.1588
Ukiah	1.7857	3.2010
MID	10.7143	-
Plumas-Sierra	0.7857	1.4084
PWRPA	2.6679	4.7824
SFBART	6.6000	11.8310

NCPA Lodi Energy Center Debt Service



Summary of Outstanding NCPA Lodi Energy Center Debt

Series	Tax Status	Coupon Type	Issue Size	Outstanding Par	Outstanding Coupon Range	Next Call	Final Maturity
Indenture Group A							
2010 Series A	Tax-Exempt	Fixed-Rate	$78,330,000	$64,250,000	5.000%	6/1/2020	6/1/2025
2010 Series B	Taxable BABs	Fixed-Rate	$176,625,000	$176,625,000	7.311% (T)	Make-Whole	6/1/2040
Indenture Group B—CADWR							
2010 Series A	Tax-Exempt	Fixed-Rate	$30,540,000	$18,640,000	5.000%	Non-Callable	6/1/2019
2010 Series B	Taxable BABs	Fixed-Rate	$110,225,000	$110,225,000	4.630% - 5.679% (T)	Make-Whole	6/1/2035

(T) Taxable Build America Bonds; Interest rate gross of BAB subsidy

NCPA Lodi Energy Center Ratings – Indenture Group A

Moody's	S&P	Fitch
A2 Stable	A- Stable	A Stable

Lodi Energy Center Ratings – Indenture Group B

Moody's	S&P	Fitch
Aa2 Stable	AAA Stable	-

REFUNDING SCREENS

- With interest rates driven lower over the past few months, there are certain refunding candidates in NCPA's debt portfolio that generate material savings in spite of the long escrow periods to call dates and the relatively short amortization of the debt
  - — PFM can provide further analyses on refunding economics and map out a path forward if NCPA is interested in looking into a refunding(s) at this time

Geothermal Project | Refunding Screen | ($ in 000s)

Candidate						New Yield	Individual PV Savings		Negative Arbitrage	Escrow Efficiency
Series	Component	Maturity	Par	Coupon	Call Date		$	%		
2009A	Serial	7/1/2020	$2,815	5.25%	7/1/2019	1.13%	$42	1.50%	$18	70.70%
2009A	Serial	7/1/2021	$2,970	5.50%	7/1/2019	1.24%	$157	5.28%	$30	84.00%
2009A	Serial	7/1/2022	$3,135	5.50%	7/1/2019	1.40%	$256	8.18%	$49	84.10%
2009A	Serial	7/1/2023	$3,305	5.00%	7/1/2019	1.56%	$293	8.87%	$69	81.00%
2009A	Serial	7/1/2024	$3,480	5.25%	7/1/2019	1.74%	$398	11.45%	$94	81.00%
			$15,705				$1,147	7.30%	$258	81.64%

Assumptions: Interest rates as of February 5, 2016; SLGS escrow; Delivery Date of 1/1/2016; COI of $15 per bond; UD of $3 per bond

Hydroelectric Project | Refunding Screen | ($ in 000s)

Candidate						New Yield	Individual PV Savings		Negative Arbitrage	Escrow Efficiency
Series	Component	Maturity	Par	Coupon	Call Date		$	%		
2010A	Serial	7/1/2020	$9,150	5.00%	7/1/2019	1.08%	$207	2.26%	$41	83.50%
2010A	Serial	7/1/2021	$9,610	5.00%	7/1/2019	1.19%	$518	5.39%	$79	86.70%
2010A	Serial	7/1/2022	$10,145	5.00%	7/1/2019	1.35%	$799	7.88%	$139	85.20%
2010A	Serial	7/1/2023	$15,230	5.00%	7/1/2019	1.51%	$1,518	9.97%	$290	83.90%
			$44,135				$3,042	6.89%	$549	84.71%

Assumptions: Interest rates as of February 5, 2016; SLGS escrow; Delivery Date of 1/1/2016; COI of $7.5 per bond; UD of $3 per bond
Advance refundability status of series are subject to tax counsel review

- The Hydroelectric Project, Series 2008C transaction is callable 7/1/2018 and refunding it would generate higher savings (~10%), but our preliminary analysis suggests only a small portion of it is advance refundable
- The Lodi Energy Center, Series 2010A (Indenture Group A) transaction is advance refundable, but is callable further out in 6/1/2020 and generates a lower level of savings in the current market (~6%)

Market Update

Debt Overview and Refunding Update

Rating Agency 2016 Public Power Sector Outlooks

2016 Outlook: U.S. Public Power and Electric Cooperative Sector

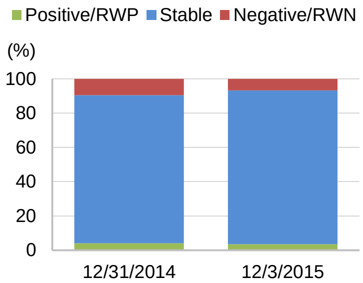
Outlook Report

Rating Outlook

STABLE

(2015: STABLE)

Rating Outlooks



RWP – Rating Watch Positive.
RWN – Rating Watch Negative.
Source: Fitch.

Sector Outlook

STABLE

(2015: STABLE)

- Environmental compliance manageable.
- Rate pressures easing.
- Low, stable costs positive.

Analysts
Dennis M. Pidherny
+1 212 908-0738
dennis.pidherny@fitchratings.com

Christopher Hessenthaler
+1 212 908-0773
christopher.hessenthaler@fitchratings.com

Kathy Masterson
+1 512 215-3730
kathy.masterson@fitchratings.com

Alan Spen
+1 212 908-0594
alan.spen@fitchratings.com

Matt Reilly
+1 415 732-7572
matt.reillly@fitchratings.com

Lina Santoro
+1 212 908-0522
lina.santoro@fitchratings.com

Rating and Sector Outlooks Stable: Fitch Ratings' outlook for the public power and electric cooperative sector is stable through 2016. Strong sector characteristics, including autonomous rate-setting authority, the essentiality of electric service and reliable cash flow, should allow the sector to retain a solid fiscal foundation. The outlook for ratings is also stable.

Carbon Regulations Enacted: The EPA's Clean Power Plan (CPP) — finalized in August 2015 — establishes carbon dioxide (CO2) emission reduction goals that will require expanded reliance on natural gas-fired generation, development of vast new renewable energy resources and application of demand-side energy efficiency nationwide. Interim compliance goals do not begin until 2022. However, state implementation planning will begin to influence strategic decision making much earlier.

Carbon Compliance Challenges: Preserving financial margins and credit quality while complying with the EPA's CPP will be most challenging for utilities operating in states subject to sizable mandated carbon-reduction goals, high carbon-reduction costs and a relatively high cost of electricity. Although the near-term effects of the CPP will be limited, longer term compliance could be costly.

Rate Pressures Stabilize: Modest but sustained economic growth, together with improving affordability metrics, has moderated rate pressures in recent years for most public power and cooperative issuers. Favorable operating conditions, a continued ability and willingness to increase electric rates to preserve margins and a relatively stable outlook for local governments should help sustain the sector's upward trend in debt service coverage.

Low, Stable Costs Positive: Low natural gas prices and interest rates should also support financial performance and moderate revenue requirements through the outlook period. Fitch expects natural gas prices ($3.50/thousand cubic feet [mcf]) and interest rates to remain low by historical standards (2016 Fed funds target rate, 0.8%; 10-year U.S. Treasury bonds, 2.5%). However, a steep, unexpected rise in costs remains a longer term risk as fuel and interest costs are among the largest expense items incurred by public power utilities.

Improving Renewable Energy Economics: Declining cost curves for renewable energy resources could present significant opportunities for public power and electric cooperative utilities, as well as significant risks. While the current trend should allow utilities to more economically meet renewable energy mandates and carbon-reduction goals, declining costs related to residential photo-voltaic (PV) systems and battery storage could dampen consumption, pressure unit costs and challenge the traditional utility model.

Outlook Sensitivities

Unwillingness to Support Metrics: A widely observed unwillingness of public power and cooperative issuers to raise rates to support current and projected financial metrics in response to economic weakness, increased cost pressures or declining consumption could change the sector rating outlook to negative.

Key Issues for 2016

Strong Sector Fundamentals

Fitch believes strong sector characteristics and a conservative business model provide public power and electric cooperative issuers with stability and strength, even during periods of uncertainty, and will continue to do so in 2016. The fundamental strengths of the sector include: autonomous rate-making authority; the essentiality of electric service; mandates to serve well-defined areas with monopolistic characteristics; a relative cost-of-capital advantage over investor-owned utilities; and reliable cash flow. Sector stability is further evidenced by the current distribution of rating outlooks among Fitch-rated issuers. As of Dec. 3, 2015, 90% of the public power and cooperative ratings assigned by Fitch maintained a Stable Outlook.

Carbon Regulations Enacted, Compliance Challenges Ahead

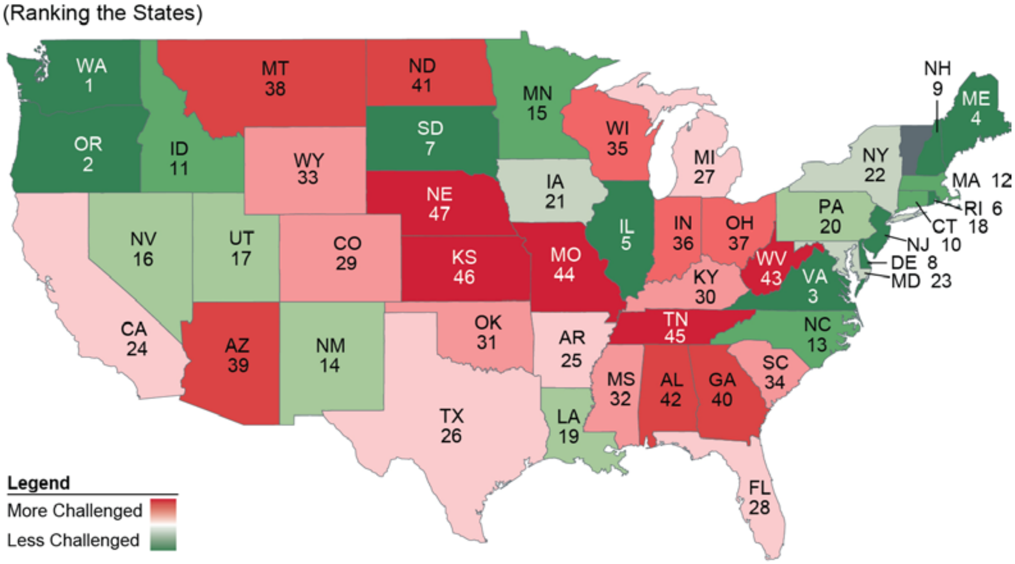
On Aug. 3 2015, the EPA released the final version of the CPP, its plan to reduce carbon emissions from existing power plants, which is expected to have broad implications for electric utilities. The CPP outlines state-specific CO2 emission goals, and the guidelines for development, submission and implementation of state plans to meet the mandated goals.

The Carbon Cost Recovery Index score for each state is a composite measure of four components: the carbon reduction ratio, average marginal CO2 costs, average retail price of electricity and the affordability ratio. For additional information, please see reports in Other Research below.

Fitch believes the final CPP rules are unlikely to have a material effect on public power and cooperative utilities through the outlook period, as mandated reduction goals begin in 2022. However, initial state implementation plans may be submitted as early as Sept. 6, 2016, and are likely to influence strategic decision making over the near term.

Power and cooperative utilities that operate in states subject to sizable mandated carbon-reduction goals, high carbon-reduction costs and high electric costs will likely be most challenged to maintain margins while complying with the CPP. For these utilities, meeting the goals and recovering related costs may require sizable rate increases on end users already burdened by comparatively high electric costs or retail rates. Fitch's carbon cost recovery index ranks the relative challenge each state faces below.

Carbon Cost Recovery Index
(Ranking the States)



Note: The labels reflect the rank of the index and state. Vermont has no sources of generation that are affected by the Clean Power Plan, therefore no goals have been established. Alaska and Hawaii have been excluded from Fitch's analysis.
Source: Fitch.

Related Research

Other Outlooks
www.fitchratings.com/outlooks

Other Research

The Carbon Effect 2.0 (Reassessing the Challenges for Public Power) (October 2015)

U.S. Public Power (Peer Study) (July 2015)

The Carbon Effect (Assessing the Challenges for Public Power) (January 2015)

Related Criteria

Criteria for Rating Prepaid Energy Transactions (December 2015)

U.S. Public Power Rating Criteria (May 2015)

Revenue-Supported Rating Criteria (June 2014)

Although EPA annual cost estimates appear manageable, compliance scenarios reflect assumptions related to low-cost renewable energy and demand-side energy efficiency that Fitch believes are aggressive. Should these assumptions, together with the economics of gas-fired generation, prove overly optimistic, compliance costs could soar.

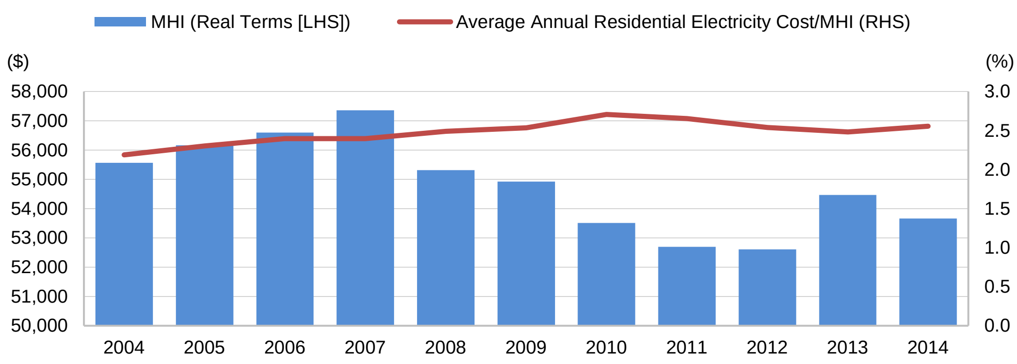
Despite the autonomous rate-setting authority enjoyed by the vast majority of the public power and cooperative issuers, an issuer's willingness to maintain and preserve robust margins in the wake of higher operating costs is uncertain. If the cost burden and higher retail rates related to compliance result in weaker financial metrics and reduced financial flexibility, downward rating pressure could materialize.

Rate Pressures Stabilize

Most public power and cooperative issuers have the authority to raise electric rates at their sole discretion, and have diligently exercised this authority to recover costs in a timely manner. This fundamental credit strength has helped ensure the timely recovery of costs and has ultimately contributed to the operating stability of the sector.

Modest but sustained economic growth, together with improving affordability metrics, has moderated rate pressures in recent years. In 2013, household income rose for the first time in six years, buffering the effect of higher electric cost and contributing to strong sectorwide debt service coverage medians. Although household income fell and retail electric costs rose in 2014, triggering a divergence last observed in 2008, continued improvement in median debt service coverage suggests less acute rate pressures and a broader willingness to maintain margins. Positively, income remains above the levels observed in 2010–2012.

Residential Electric Cost to Median Household Income (MHI)



Source: U.S. Energy Information Administration, U.S. Census Bureau.

Fitch expects economic growth to continue in 2016 (2.5%) and 2017 (2.3%) as the economy approaches full capacity and the labor market recovery continues, which should help preserve a base level of demand and support rate-setting initiatives.

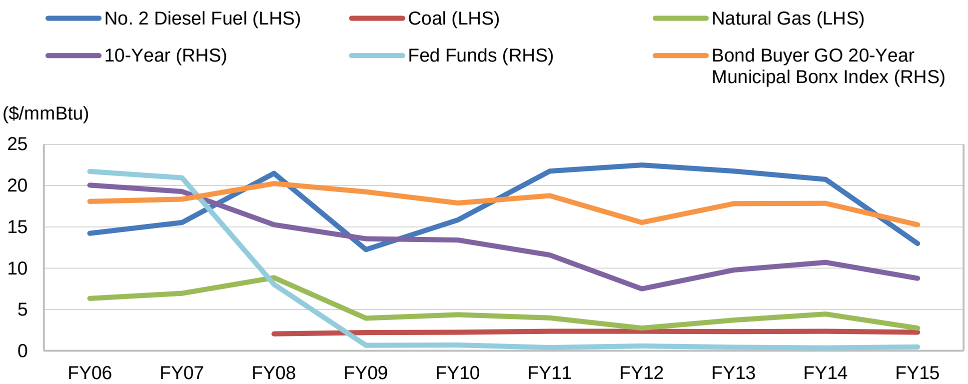
Low Fuel Cost and Interest Rates Broadly Positive

Low energy prices should remain broadly positive for most issuers through 2016. Favorable fuel and purchased power costs should continue to support stronger operating margins, provide headroom for rate increases necessary to mitigate other escalating costs, and in some cases, lower total charges to ratepayers.

Fitch lowered its 2016 forecast assumption, or price deck, for U.S. natural gas earlier this year to \$3.25/mcf from \$4.00/mcf, reflecting increasingly efficient U.S. shale production and lagging demand growth. Longer term prices were lowered to \$3.75/mcf from \$4.50/mcf, with stress case prices falling below $3.00/mcf in most years. Operating efficiencies have also driven Fitch's 2016 base case price for crude oil to $60/barrel. Although oil-fired generation accounts for less than 1% of total U.S. energy production, prices will continue to influence natural gas fundamentals and to a lesser extent electric consumption.

Prevailing low interest rates and robust access to the capital markets also remain positive for the capital-intensive public power sector. The replacement and refunding of debt at lower rates has allowed issuers to reduce interest expense and lower revenue requirements. More than 55% of the municipal electric power debt issued in 2009–2015 was earmarked for the full or partial refunding of existing debt. Interest rates, including the benchmark 10-year Treasury, Bond Buyer municipal index and Fed funds, remain extremely low, and in some cases challenged record levels during 2015.

U.S. Average Cost of Fuel and Interest Rates



MmBtu – Million British thermal units. FY – Fiscal year. Note: Coal data for 2006 and 2007 unavailable.
Source: U.S. Energy Information Administration, Fed.

Although the Fed has left interest rates unchanged through 2015, Fitch still expects it to start the global monetary tightening cycle before year end. Gradual hikes are expected to bring rates to 1.6% by year-end 2017. Yields on the 10-year Treasury are similarly expected to trend upward in 2016 and 2017, but remain low by historical terms.

U.S. Interest Rates: Base Case

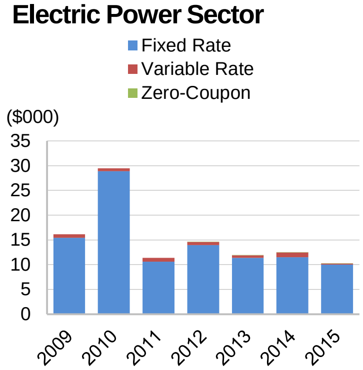
(%) Annual Averages	Base Case 2015	2016	2017
Real GDP Growth	2.5	2.5	2.3
CPI Inflation	0.3	1.7	2.0
Fed Funds Interest Rate	0.3	0.8	1.6
10-Year Treasury Yield	2.1	2.5	3.0

Source: Fitch.

Prudent hedging strategies typically adopted by most public power issuers and relatively stable capital structures should protect margins and coverage metrics against any sudden upward price movement over the near term. Nearly all debt issuance throughout the sector since 2009 has been long-term, fixed rate, including 98% of 2015 issuance through June. The median ratio of variable-rate debt to total debt for the entire Fitch-rated portfolio of issuers totaled only 9.0% at year-end 2014.

Despite the benign forecast for rates and fuel costs, a steep, unexpected rise from current levels remains a longer term concern for the sector. Fuel and interest costs are among the largest expense items incurred by public power utilities and the most significant drivers of revenue requirements.

Municipal Bond Issuance — Electric Power Sector

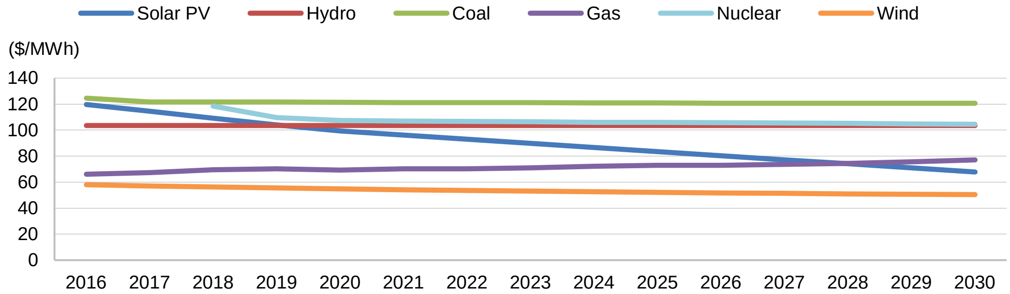


Source: The Bond Buyer.

Improving Economics of Renewable Resources

The economics of renewable energy technologies continue to improve, particularly for onshore wind generation and utility-scale solar installations. Since 2010, capital costs related to utility-scale PV have declined an estimated 55%, while fixed operating and maintenance costs have fallen 25%, according to the National Renewable Energy Laboratory (NREL). NREL predicts the levelized cost of energy (LCOE) from utility-scale solar PV plant will fall from $94/MWh–$187/MWh to $48/MWh–$94/MWh by 2030 as a result of improved efficiencies, declining production costs and variations in solar resources. The range of LCOE associated with land-based wind resources is similarly expected to fall from $50/MWh–$85/MWh to $31/MWh–$53/MWh. For some public power and cooperative issuers, renewable energy purchases are already well within these forecast boundaries.

Levelized Cost of Energy Projections



PV – Photovoltaic.
Source: NREL.

Positively, current trends should continue to lower the cost of complying with state-mandated renewable portfolio standards and self-imposed renewable energy targets. Declining costs could also improve the economics of achieving mandated carbon-reduction goals prescribed pursuant to the CPP, lowering both revenue requirements and related rate increases.

Declining costs related to residential PV systems and unsupportive net metering arrangements could conversely pose a significant risk to public power systems by reducing revenue and upsetting traditional cost-allocation methodologies. Expected declines in the cost of battery storage solutions, together with rooftop solar installations, could ultimately allow customers to break away from the grid, straining cost recovery and potentially stranding investment.

Fitch expects the sector's widespread autonomous rate-making authority, continued discipline in rate setting and improved rate design should limit near-term risk, but remains mindful of the potential long-term disruption.

2015 Review

The public power and electric cooperative sector's performance exhibited high stability in 2015. Events unfolded generally as expected, as issuers continued to benefit from modest economic recovery, financial markets characterized by low interest rates and abundant liquidity, and relatively low fuel and energy prices.

Rating actions taken by Fitch throughout 2015 have been consistent with the stable outlook, as the vast majority represented rating affirmations (89% of all rating actions). Rating actions YTD also included 10 upgrades (5%), which were largely attributable to sustained improvement in operating performance or reduced operating risk. There were no rating downgrades in 2015. Other actions included the assignment of new ratings (5%) and rating withdrawals.

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OUTLOOK
2 DECEMBER 2015

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ANALYST CONTACTS

Dan Aschenbach 212-553-0880
Senior Vice President
dan.aschenbach@moodys.com

Thomas Brigandi 212-553-2985
Associate Analyst
thomas.brigandi@moodys.com

Kevin G. Rose 212-553-0389
VP-Senior Analyst
kevin.rose@moodys.com

Clifford J Kim 212-553-7880
VP-Senior Analyst
clifford.kim@moodys.com

Sarah Lee 212-553-6955
Analyst
sarah.lee@moodys.com

Scott Solomon 212-553-4358
VP-Sr Credit Officer
scott.solomon@moodys.com

Gaurav Purohit 212-553-4381
Analyst
gaurav.purohit@moodys.com

John Medina 212-553-3604
VP-Senior Analyst
john.medina@moodys.com

Daniel Oh 212-553-6871
Associate Analyst
daniel.oh@moodys.com

A.J. Sabatelle 212-553-4136
Associate Managing Director
angelo.sabatelle@moodys.com

Chee Mee Hu 212-553-3665
MD-Project Finance
cheemee.hu@moodys.com

Public Power Electric Utilities — US

2016 Outlook — Stable Outlook But Carbon Reduction Presents Challenges

Our outlook for the US public power electric utility industry is stable. Our outlook reflects our view of fundamental business conditions for the industry over the next 12 to 18 months.

» **Our stable outlook is based on our view that US public power utilities are willing and able to raise consumer rates when needed to recover costs.** We expect that debt-service coverage and liquidity in the industry will remain stable in 2016. For rated US public power generators, we expect that the median fixed obligation charge coverage ratio will hold steady with 2015, at about 1.61x, and that median days liquidity on hand will be about 215.

» **Stagnant growth in electricity demand will continue to put pressure on utilities to raise electric rates.** The US government estimates that growth in demand for electricity will be near zero or will decline next year. Utilities plan to boost energy-efficiency programs in 2016; however, rate structures are also changing to ensure the recovery of fixed costs.

» **Debt levels should hold steady in 2016.** We expect that the median debt ratio for generators will remain stable at 40%, as weak demand growth translates into lower levels of investment in new generation. Efforts to reduce carbon emissions and expand renewable energy could be a source of new debt issuance.

» **The industry's transition to cleaner sources of power is the main risk to our stable outlook.** The industry's ability to transition to cleaner power while maintaining customer rates and system reliability is uncertain and is a developing risk.

» **Utilities that rely heavily on coal-fired generation will be affected the most by carbon rules.** Public power electric utilities in the Midwest and Southeast, where coal-fired generation accounts for more than 70% of the total power supply, will be the most affected by environmental mandates. Also, several public power electric utilities have long-term debt outstanding on new coal-fired generation units that only went into commercial operation after 2010. There is a risk that some utilities will face stranded cost pressure.

» **What could change our outlook.** A decline in the median fixed obligation charge coverage ratio, such that it fell below 1.50x, or signs that customers are leaving the grid due to distributed generation, which would threaten fixed cost-recovery, could cause us to take a negative view of the sector. We do not expect these scenarios to adversely affect the sector over the next 12 months. We are unlikely to take a positive view of the industry over the next year.

Metrics will remain stable in 2015

Our outlook for the US public power electric utility industry for 2016 is stable, based on our expectation that the utilities' ability and willingness to raise consumer rates when needed to recover costs will support stable operations and financial performance as reflected in debt-service coverage and liquidity metrics.

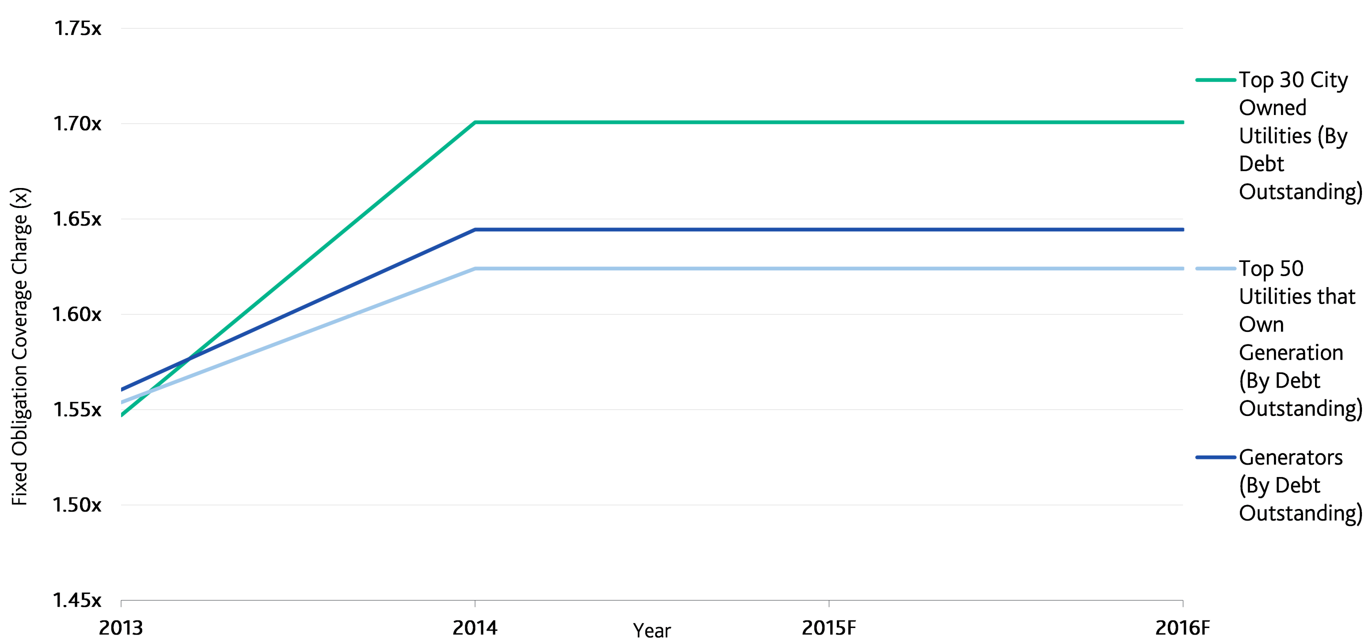
We expect that the median fixed obligation charge coverage ratio for generators will be 1.61x in 2015 and 2016, and that median days of liquidity on hand for generators is estimated to be about 215 in 2016 (compared with about 214 days in 2015). Our stable outlook is supported by the public power industry's unregulated ability to establish consumer rates in order to maintain stable and sound financial metrics. Also, we assume that cost drivers will remain stable (see box on the next page), which should result in somewhat easier rate-setting.

Our rated universe of public power electric utilities includes electricity generators, electricity distributors and joint action agencies, which are groups of municipal electric utilities that jointly finance electricity generation. Our outlook for the industry is mainly driven by our expectations for generators because they make up the bulk of the debt of the industry and because they support the debt of the joint action agencies.

Exhibits 1 shows the stable trend in debt coverage metrics for 139 US public power electric utility generators and, within that group, the largest 30 city-owned utilities by revenue and the 50 largest generators by revenue. For example, some Midwestern public power electric utilities that previously struggled to absorb the operating and debt-service costs of major new generation facilities into their rate structures, now appear to have raised rates sufficiently to improve their financial metrics.

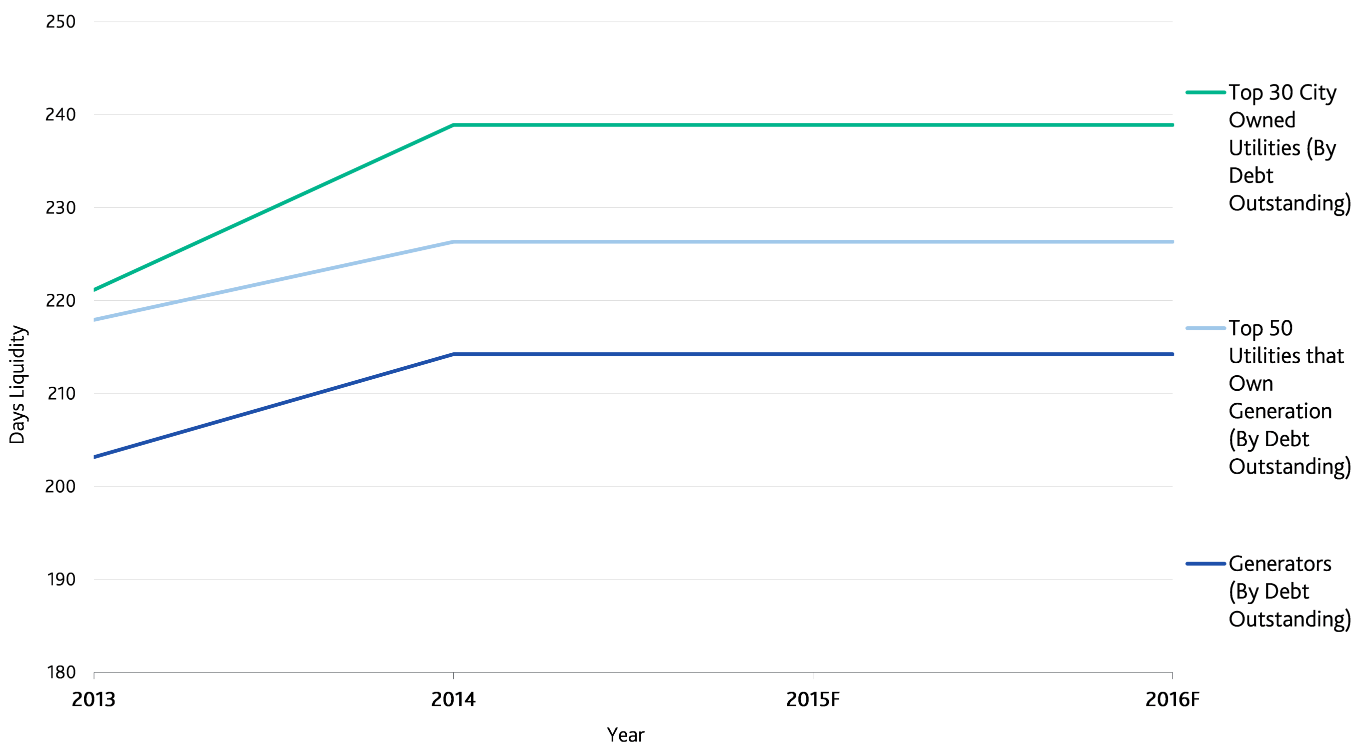
For more information on financial medians, please refer to our report, Fiscal 2014 Medians Largely Stable, Point to Continued Steadiness.

Exhibit 1
Median Fixed Obligation Charge Coverage Ratio Will Remain Stable



Sources: 139 rated public power electric utility financial statements for historical data, Moody's Investors Service forecasts

Exhibit 2
Liquidity Has Improved and Will Remain Stable



Sources: 139 public power electric utility financial statements for historical data, Moody's Investors Service forecasts

What could change our outlook. We would consider changing our outlook to negative if the median fixed obligation charge coverage ratio fell below 1.50x, or if customers begin to move off the grid, which would threaten the ability of the utilities to recover costs. This could happen if solar power and battery storage technology open the door wider to new providers of electricity. While this is possible, the timing is beyond the scope of our 18-month outlook. Also, while distributed generation is a potential threat, utilities are refining their rate structures to stay ahead of the industry transformation that a widespread adoption of solar-power storage could bring.

Our Assumptions

We made the following assumptions in our analysis:

* According to Moody's Macroeconomic Board, US gross domestic product growth will range between 2% and 3% in 2015 and 2016.

* Moody's Macroeconomic Board also expects that the pace of US Federal Reserve interest-rate increases will be much slower than in previous cycles. Almost all public power utilities have fixed-rate debt, and debt-service schedules are level.

* Moody's forecasts for natural gas prices include $2.75 per million British thermal unit (MMBtu) at Henry Hub in 2015; $3.00/MMBtu in 2016; $3.25/MMBtu in 2017; $3.45/MMBtu in 2018 and $3.55/MMBtu in 2018.

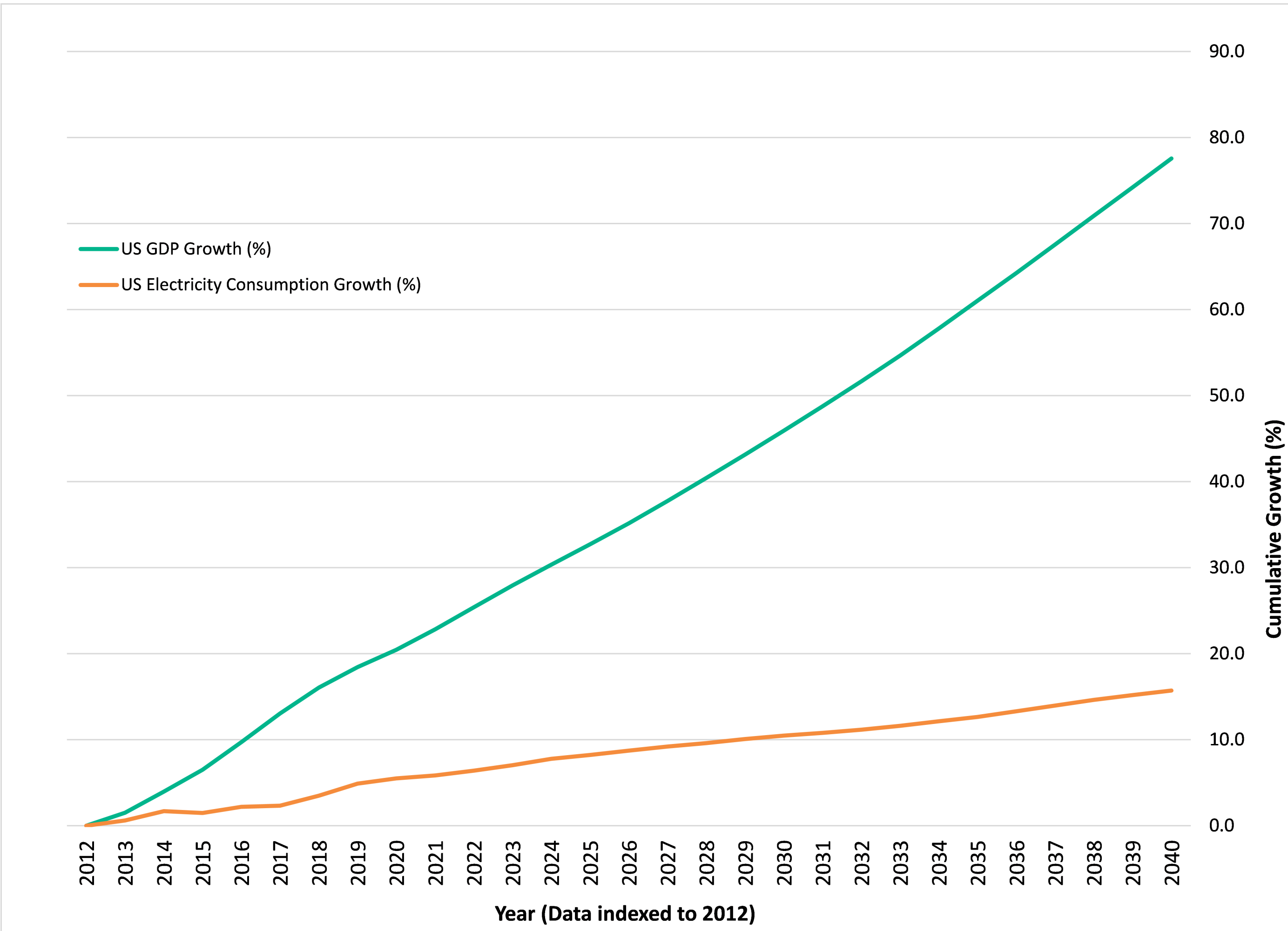
* The US Energy Information Administration in October 2015 forecast that delivered coal prices will average $2.25/MMBtu for 2015, and increase one cent to average $2.26/MMBtu in 2016.

* The US Energy Information Administration expects that residential energy demand will decline 1.4% in 2016, that commercial sales will rise 0.7% and that industrial sales will decline 0.3%.

Stagnant growth in electricity demand will continue to put pressure on utilities to raise electricity rates in order to recover costs

We expect that the multiyear trend of reduced electricity sales, largely related to energy- efficiency programs, will continue. Exhibit 3 shows the widening gap between projections for electricity consumption and GDP growth. The US Energy Information Administration (EIA) estimates that demand growth will stagnate near zero or fall in 2016. Utilities plan to boost the role of energy-efficiency programs; however, their rate structures will also change to ensure that utilities will be able to recover their fixed costs.

Exhibit 3
The Gap Between US Electricity Consumption and US Economic Growth Will Widen



Sources: US Energy Information Administration for electricity consumption growth, Moody's Analytics for gross domestic product growth

Debt levels will likely hold steady in 2016

Debt levels should hold steady in 2016, given expectations for weak growth in power demand, which in turn should reduce the need for utilities to take on more debt to invest in new generation.

We expect that the median debt ratio for generators in 2016 will hold steady with this year, at about 40%. We expect that the median debt ratio for the largest 50 utilities by debt outstanding will remain stable at around 55% (see Exhibit 4).

Capital plans in 2016 will focus on improvements to utility distribution systems aimed at increasing reliability. That said, efforts to reduce carbon emissions and expand renewable energy could be a source of new debt issuance soon or over the next few years. Some projects that are now in the planning stages or in construction that could have an impact on median financial metrics are listed below.

* Salt River Project (Aa1 stable) is assessing the development of up to 900 megawatts (MW) of new gas-fired peaking facilities to help integrate more renewables into its supply mix and replace some of its coal-fired generation by 2022.

* San Antonio CPS (Aa1 stable) expects the 95 MW Alamo 5 solar facility to come online at the end of 2015, which would complete the installation of one-half of the facilities in the 450 MW solar agreement with OCI Solar Power.

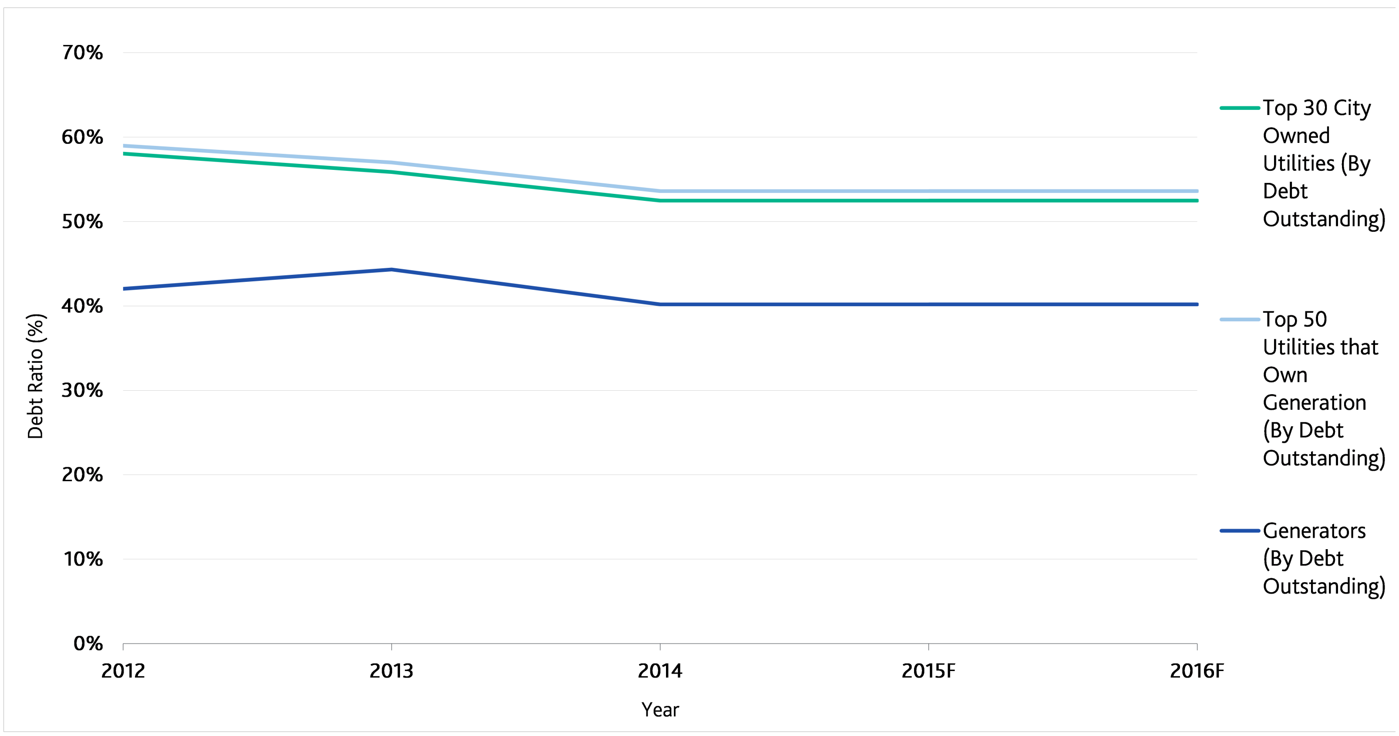
* Sacramento Municipal Utility District 's (Aa3 stable) capital improvement plan includes a new transmission line and pumped storage facility that is intended to ensure system reliability as more renewable energy is included in the supply mix.

* Intermountain Power Agency (A1 stable) expects to develop a minimum 600 MW natural-gas-fired plant at the Intermountain Power Project (IPP) site by 2025, effectively replacing the coal-fired IPP.

* American Municipal Power, Inc. (A3 stable on combined Hydro and Meldahl projects) has constructed 350 MW of new hydroelectric facilities at four sites along the Ohio River, which are set to go into commercial operation over the next year.

* South Carolina Public Service Authority (A1 stable) is a 45% owner and participant in financing the continuing construction of the 2,200 MW carbon-neutral Summer Nuclear Units 2 and 3. The project is 50% completed (24% construction completed)and the units are scheduled for commercial operation in 2019 and 2020, respectively.

Exhibit 4
We Expect That Debt Ratios Will Hold Steady



Sources: 139 public power electric utility financial statements for historical information, Moody's Investors Service forecasts

Transition to Cleaner Power Sources Is the Main Risk to Our Stable Outlook

The ability of public power electric utilities to transition toward cleaner power sources and away from coal, while maintaining affordable customer rates and system reliability, is uncertain and is a developing risk to our stable outlook that will play out over the next several years.

The US Clean Power Plan has set limits on carbon emissions and compliance deadlines state by state, and most utilities have already been working on compliance plans at a measured pace. Risks to our outlook could increase if carbon-reduction plans accelerate, thereby increasing execution risk. Increasing debt leverage could affect cost-competitiveness.

States are challenging the regulations in the courts, and the deadlines to comply with current regulations are several years away. Also, some regulatory details remain uncertain. Even so, states are required to submit implementation plans to the US Environmental Protection Agency by 2016, or 2018, at the latest, with a deadline extension.

The transition to cleaner power could be credit negative if ratepayers balk at the cost increases and utilities are unable to pass through higher consumer rates. Another major risk for the industry is whether the grid can meet demand with intermittent renewable power sources, as they begin to take more share of the power supply mix.

TIMELINE for the CLEAN POWER PLAN

1) State Implementation Plan due - 6 September 2016

2) Progress Update - 6 September 2017

3) End of State Extensions - September 2018

4) Reporting Period starts - 1 July 2022

Source: US Environmental Protection Agency

The credit impact of carbon reduction plans will affect utilities that rely heavily on coal-fired generation

Utilities that are heavily reliant on coal-fired generation will face more immediate impacts from new regulatory rules on plant emissions . Exhibit 5 shows select municipal electric utilities whose power supply is dominated by coal.

Although public power electric utilities across the US have a more diverse resource mix than cooperatives and investor-owned utilities, coal-fired generation in the Midwest and Southeast accounts for over 70% of the public power resource mix. Shifting from base-load around-the-clock coal-fired generation to significantly more intermittent solar and wind energy could create system reliability challenges, particularly in these regions.

Several joint action agencies have significant concentration in coal-fired electricity plants, including new "supercritical" generation units with advanced environmental controls. For some of these plants, despite being the most efficient units, lower market prices for energy have been a competitive threat to the economic value of these new coal units.

There is a risk that some utilities will face stranded cost pressure amid pressure from short-term energy markets and steepening carbon regulation. Exhibit 6 shows new coal-fired generation units in which public power electric utilities have invested over $9 billion. The units achieved commercial start-up after 2010, and are reaching the expected efficient performance levels, according to the utilities, which lowers carbon production. Investments in these units considered that the plants complied with most of the current EPA pollution compliance standards, except carbon. Whether these new coal-fired units will face stranded costs over the longer term depends on the outcome of how much carbon reduction will be required. The state implementation plans required by the Clean Power Plan are expected to be filed in 2016.

Exhibit 5

Coal as a Percentage of the Energy Mix in 2014

Public Power Electric Enterprise	Rating	Outlook	Coal as % of 2014 Energy Mix
Algona Municipal Utilities, IA	Baa1	Stable	95.00%
BATAVIA (CITY OF) IL*	A1	Negative	83.00%
GRAND ISLAND (CITY OF) NE	A1	Stable	95.00%
HASTINGS (CITY OF) NE	A2	Stable	90.00%
LAFAYETTE (CITY OF) LA	A1	Stable	62.00%
LANSING BOARD OF WATER & LIGHT, MI	Aa3	Stable	83.00%
PADUCAH (CITY OF) KY*	Baa1	Stable	56.00%
Princeton Electric Plant Board, KY*	Baa1	Stable	71.00%
ROCHELLE (CITY OF) IL*	A3	Stable	51.00%
ROCHESTER (CITY OF) MN	Aa3	Stable	70.00%
SPRINGFIELD (CITY OF) IL	A3	Stable	99.60%
UNIFIED GOVERNMENT OF WYANDOTTE CT, KS	A3	Stable	86.00%
Azusa (City Of) CA	A2	Stable	75.00%
HENDERSON MUNICIPAL POWER & LIGHT, KY	Baa2	Stable	100.00%
OWENSBORO ELECTRIC LIGHT AND POWER, KY	A3	Stable	65.00%

***Prairie State owner**

Sources: Public power electric utility financial statements, Moody's Investors Service

Exhibit 6

The Newest Coal-Fired Generation Units

Public Power Utility Owner	Rating	Selected Plant Name	1H 2015 Operating Capacity (MW)	1H 2015 Plant Availability Factor (%)	1H 2015 Plant Nominal Heat Rate (Btu/kWh)	1H 2015 Plant Capacity Factor (%)
MJMEUC	A3	Plum Point Energy Station (1)	670	79.1	9,817	70.0
Public Power Generating Agency	A2	Whelan Energy Center 2 (2)	232	85.3	10,400	59.3
Illiniois Municipal Electric Agency	A1	Trimble County 2 (3)	760	85.5	9,488	75.2
Omaha Public Power District	Aa2	Nebraska City 2	685	61.3	9,783	48.9
South Carolina Pub Serv Auth	A1	Cross 4	600	73.1	10,179	61.2
Salt River Project	Aa1	Springerville 4 (4)	415	94.7	11,044	75.9
WPPI Energy	A1	Elm Road Generating Station 2 (5)	634	88.8	9,338	75.7
American Mun Power Inc	A1	Prairie State Energy Campus 1 & 2 (6)	1,629	74.4	9,399	68.2
Wyoming Municipal Power Agency	A2	Dry Fork Station (7)	405	95.8	10,560	92.2
			2015 Medians	82.2	9,950	69.1

(1) Owners: EIF Plum Point LLC (29.6%), John Hancock (27.25%), MJMEUC (22.11%), East Texas Electric Co-op Inc. (7.52%), Empire District Electric Co. (7.52%), Municipal Energy Agency of MS (6.0%)
(2) Owners: Hastings (City of), NE (36.86%), Heartland Consumers Power District (27.3%), Municipal Energy Agency of NE (27.3%), Grand Island (City of), NE (5.12%), Nebraska City (City of), NE (3.42%)
(3)Owners: Louisville Gas & Electric Co. (38.67%), Kentucky Utilities Co. (36.33%), Indiana Municipal Power Agency (12.88%), Illinois Municipal Power Agency (12.12%)
(4) Owners: Tucson Electric Power Co. (48.29%), Tri-State G&T Assn Inc (25.92%), Salt River Project (25.79%)
(5) Owners: Wisconsin Electric Power Co. (83.34%), WPPI Energy (8.33%), Madison Gas and Electric Co. (8.33%)
(6) Owners: American Mun Power Inc (23.26%), IMEA (15.17%), IMPA (12.64%), MJMEUC (12.33%), Prairie Power Inc (8.22%), Southern Illinios Power Coop (7.90%), Kentucky Muni Power Agency (7.82%), Northern Illinois Municipal (7.60%), Peabody Energy Corp. (5.06%)
(7) Owners: Basin Electric Power Coop (92.90%), Wyoming Municipal Power Agency (7.10%)

Note: Data for performance metrics are from January to June 2015
Sources: US Environmental Protection Agency, SNL, Moody's Investors Service

What could change our outlook. We would consider changing our outlook to negative if the median fixed obligation charge coverage fell below 1.50x, leaving less margin to ensure timely payment of debt service and less protection should business condition become more adverse.

The outlook could also change if a significant number of customers begin to move off the grid threatening the recovery of fixed costs. This could happen if solar rooftop programs and battery storage technology open the door wider to new third-party providers of electricity. We believe this has some potential, but it is likely well past the outlook period of 12 to 18 months. The worst-case scenario from a fixed cost recovery perspective is an acceleration of improvements in battery storage technology along with litigation that opens up the utility's monopoly customer base to third-party competition.

While distributive generation is a threat, utilities are refining their rate structure to stay ahead of the industry transformation that could result from a widespread adoption of solar power and storage technology. We believe that public power electric utilities are now focused on ensuring that their rate structures incorporate sufficient fixed-charge recovery to make the local utility neutral to competition and to ensure that the utility maintains a sound financial position. While this risk is beyond the 2016 outlook, utilities with significant fixed costs and long maturity dates are starting to realize that planning for the potential change is important to their financial health.

We do not expect a change to a positive outlook in 2016, given our expectations for stable financial trends.

Appendix A

Top 25 Public Power Electric Enterprises By Debt Outstanding

Top 25 Public Power Electric Enterprises By Debt Outstanding	Rating	Outlook	State	Debt Outstanding ($'000)
Tennessee Valley Authority	Aaa	STA	TN	23,621,000
Bonneville Power Administration, WA	Aa1	STA	WA	15,571,590
Long Island Power Authority, NY	Baa1	STA	NY	10,087,297
Puerto Rico Electric Power Authority, PR	Caa3	NEG	PR	8,100,000
Los Angeles Department of Water & Power, CA	Aa3	POS	CA	7,780,397
South Carolina Public Service Authority, SC	A1	STA	SC	6,639,162
California Dept. of Wtr. Res. (Power Sys.)	Aa2	STA	CA	5,940,000
San Antonio (City of) TX Combined Utility Enterprise	Aa1	STA	TX	5,131,925
Salt River Project Agricultural Improvement and Power District, AZ	Aa1	STA	AZ	3,888,260
Lower Colorado River Authority, TX	A2	STA	TX	3,585,000
Sacramento Municipal Utility District, CA	Aa3	STA	CA	3,137,105
New York State Power Authority, NY	Aa1	STA	NY	2,849,000
JEA, FL	Aa2	STA	FL	2,717,820
Colorado Springs (City of) CO Combined Utility	Aa2	STA	CO	2,385,022
Omaha Public Power District, NE	Aa2	STA	NE	2,224,843
Nebraska Public Power District, NE	A1	STA	NE	2,098,188
Seattle (City of) WA Electric	Aa2	STA	WA	1,903,800
LCRA Transmission Services Corporation, TX	A1	STA	TX	1,818,000
Orlando Utilities Commission, FL	Aa2	STA	FL	1,511,320
Austin (City of) TX Electric	A1	STA	TX	1,419,528
Grant County Public Utility District 2, WA	Aa3	STA	WA	1,251,775
Grand River Dam Authority, OK	A1	STA	OK	1,153,545
Turlock Irrigation District, CA	A2	STA	CA	1,042,610
Gainesville (City of) FL Combined Utility	Aa2	STA	FL	947,950
Modesto Irrigation District, CA	A2	STA	CA	745,270

Source: Moody's Investors Service

Top 20 JAA All-Requirements Agencies By Debt Outstanding

Top 20 JAA All-Requirements Agencies By Debt Outstanding	Senior Lien Rating	Outlook	State	Debt Outstanding ($'000)
American Municipal Power, Inc., OH (issuer rating)	A1	Stable	OH	4,828,510
North Carolina Municipal Power Agency 1, NC	A2	Stable	NC	1,314,455
Indiana Municipal Power Agency, IN	A1	Stable	IN	1,251,770
Illinois Municipal Electric Agency, IL	A1	Stable	IL	1,087,260
Florida Municipal Power Agency, FL	A2	Stable	FL	1,047,360
Piedmont Municipal Power Agency, SC	Baa1	Stable	SC	1,009,590
Oklahoma Municipal Power Authority, OK	A2	Stable	OK	782,499
Southern Minnesota Municipal Power Agency, MN	A1	Stable	MN	644,367
Western Minnesota Municipal Power Agency, MN	Aa3	Stable	MN	580,035
WPPI Energy, WI	A1	Stable	WI	455,155
Minnesota Municipal Power Agency, MN	A2	Stable	MN	261,415
Platte River Power Authority, CO	Aa2	Stable	CO	235,755
Northern Municipal Power Agency, MN	A3	Stable	MN	229,760
Nebraska Municipal Energy Agency, NE	A2	Stable	NE	173,235
Connecticut Municipal Electric Energy Cooperative, CT	Aa3	Stable	CT	118,615
Wyoming Municipal Power Agency, WY	A2	Stable	WY	108,360
Missouri Joint Municipal Electric Utility Commission, MO	A2	Stable	MO	54,393
Kansas Power Pool, KS	A3	Stable	KS	38,805
Alabama Municipal Electric Authority, AL	A3	Positive	AL	36,225
Utah Municipal Power Agency, UT	A2	Stable	UT	25,025

Source: Moody's Investors Service

Top 25 JAA Take-or-Pay Projects By Debt Outstanding

Top 25 JAA Take-or-Pay Projects By Debt Outstanding	Senior Lien Rating	Outlook	State	Debt Outstanding ($'000)
Energy Northwest, WA - Project 2 (Columbia Generation Station), WA	Aa1	Stable	WA	3,337,010
Municipal Electric Authority of Georgia - Project One, GA	A1	Stable	GA	2,268,126
American Municipal Power, Inc.- Prairie State Energy Campus Project	A1	Stable	OH	1,608,235
Intermountain Power Agency, UT	A1	Stable	UT	1,318,692
Energy Northwest, WA - Project 3, WA	Aa1	Stable	WA	1,228,700
Energy Northwest, WA - Project 1, WA	Aa1	Stable	WA	1,048,005
Municipal Electric Authority Of Georgia - General Resolution Project, GA	A1	Stable	GA	874,085
Missouri Joint Municipal Electric Utility Commission - Prairie State Project, MO	A2	Stable	MO	810,720
Texas Municipal Power Agency, TX	A2	Stable	TX	721,652
Southern California Public Power Authority - Transmission Project Revenue, CA	Aa3	Stable	CA	708,515
Public Power Generation Agency, NE	A2	Stable	NE	682,175
AMP Fremont Energy Center Project	A1	Stable	OH	537,700
Kentucky Municipal Power Agency, KY	Baa1	Stable	KY	517,635
Northern Illinois Municipal Power Agency, IL	A2	Stable	IL	510,225
Northern California Power Agency - Hydroelectric Project 1, CA	A1	Stable	CA	401,215
Northern California Power Agency # Lodi Energy Center, CA	A2	Stable	CA	378,765
Florida Municipal Power Agency - St. Lucie Project, FL	A2	Stable	FL	337,960
Northern California Transmission Agency, CA	Aa3	Stable	CA	314,195
Southern California Public Power Authority - Canyon Power Project Revenue, CA	Aa3	Stable	CA	301,470
Missouri Joint Municipal Electric Utility Commission - Plum Point Project, MO	A3	Stable	MO	296,670
Missouri Joint Municipal Electric Utility Commission - Iatan Project, MO	A2	Stable	MO	272,997
Southern California Public Power Authority - Milford Wind Corridor Phase 1 Project, CA	Aa3	Stable	CA	213,645
Municipal Electric Authority of Georgia - Combined Cycle Project, GA	A1	Stable	GA	197,775
Florida Municipal Power Agency - Stanton Project II, FL	A1	Stable	FL	153,680
Louisiana Energy & Power Authority, LA	Baa1	Stable	LA	147,200

Source: Moody's Investors Service

Moody's Related Research

Outlooks

» 2016 Outlook - US Regulated Utilities: Credit-Supportive Regulatory Environment Drives Stable Outlook, November 2015

» 2016 Outlook - US Unregulated Power and Utilities: Gas and Power Prices Could Be Lower For Longer; Outlook Shifts to Negative

Sector In-Depth

» US Public Power Electric Utilities: Fiscal 2014 Medians Largely Stable, Point to Continued Steadiness, September 2015

» Global Macro Outlook 2015-17: Lacklustre Global Economic Recovery Through 2017 Diminishes Resilience to Shocks, November 2015

» Moody's Approach to Assessing the Credit Impacts of Environmental Risks, November 2015

» US Regulated and Public Power Utilities: In a Major Cyber Attack, the Likelihood Of Government Relief Is High, October 2015

» US Regulated, Unregulated and Public Power Utilities: What Rising Interest Rates Would Mean for US Utilities, September 2015

» Batteries Charge Up For the Electric Grid, September 2015

» US Utilities, US Coal Companies and US States: EPA Carbon Rule Hurts Coal, Boosts Renewables, August 2015

» US Electric Utilities: Coal-Fired Power Plants Won't Soon Be Replaced by Alternative Sources, July 2015

» US Regulated Utilities, Public Power Utilities and G&T Co-operatives: Technology and Nuclear Regulatory Risks Loom Over New Projects, July 2015

» Debt Service Reserve Funds: Sometimes Critical, Sometimes Immaterial, April 2015

» US Public Power Electric Utilities: Public Power Utilities with the Strongest Credit Profiles Share Key Characteristics, October 2014

Rating Methodologies

» US Public Power Electric Utilities with Generator Ownership Exposure, December 2011

» US Municipal Joint Action Agencies, October 2012

» US Municipal Utility Revenue Debt, December 2014

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

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U.S. Public Power: Despite Fuel Price Volatility and Regulatory Pressures, The Outlook Is Stable

12-Jan-2016

The public power sector has long been characterized by solid credit quality and stable ratings. Following this trend, Standard & Poor's Ratings Services expects 2016 to be another year of stable credit quality for the public power sector. Despite some inevitable exceptions, as seen in 2015 with **Puerto Rico Electric Power Authority** (CC/Watch Neg), we believe that widespread rate-setting autonomy, coupled with the lack of competition for retail customers, will continue to provide a supportive base for the credit quality of the public power sector. This outlook is our view of possible rating performance within the sector or specific geographic region over the intermediate term as gauged in part by the ratio of upgrades versus downgrades, the trend of positive versus negative outlooks, as well as key broader trends and issuer-level credit drivers.

The macroeconomic conditions and general financing conditions in North America, as well as those risks identified by Standard & Poor's credit conditions committees, provide the foundation for our U.S. Public Finance sector outlooks (see "**Volatility Risk Lingers As North America Readies Itself For Less Accommodative Credit Conditions**," published Dec. 4, 2015, on the Global Credit Portal). Our outlooks are informed by our macroeconomic forecast of the U.S., and the regional and sector level, if applicable (see "**U.S. Public Finance 2016 Credit Conditions Outlook: Expect Growth But Hold The Cheer**," published Jan. 11, 2016). Our focus here is on those major industry trends that can have broad impacts across our rated universe, as well as developments we are seeing at the issuer level that could drive credit quality.

Overview

- Utility ratings should remain stable for 2016.
- Utilities have generally priced in regulatory costs and forward gas prices into their projections for 2016.
- Risks could arise from an unanticipated gas price hike and transmission capacity.

Credit Trends And Impacts

Trend/credit driver	Credit impact
Natural gas prices	Neutral to positive
Clean power plan/environmental regulation	Negative
Diminished fuel diversity	Negative
Modest economic growth/capital pressures	Neutral

Key Trends And Credit Drivers

Our expectation of rating stability in the public power sector is based on:

Fuel price volatility, particularly for natural gas, is a key risk, but we expect prices to remain at relatively low levels. Natural gas prices are a key driver of the costs associated with producing electricity. Gas prices, which rose in 2014, fell steadily in 2015, averaging $2.75 per million Btu (mmBtu), continuing the recent low price trend. We are projecting that Henry Hub will average $3.00 per mmBtu in 2016, $3.25 per mmBtu in 2017, and $3.50 per mmBtu in 2018, which should once again make natural gas the fuel of choice. The New York Mercantile Exchange (NYMEX) forward price curve projects that natural gas prices will remain below $5.00/mmBtu through 2027. At lower prices, utilities have the ability to absorb other cost pressures (such as those associated with environmental regulation) rather than passing them onto consumers while mitigating the financial impact of lower electric sales caused by a combination of the slow recovery of the economy and fluctuating weather conditions.

Compliance with U.S Environmental Protection Agency (EPA) regulations passed within the past five years have imposed a manageable burden, but uncertainty regarding the EPA's Clean Power Plan (CPP) is a looming concern. We believe that carbon-intensive utilities will likely face obstacles in complying with new EPA regulations targeting carbon dioxide emissions at existing power plants, which could result in plant closures or curtailments and higher operating costs, as well as threaten grid reliability. On Aug. 3, 2015, the EPA announced the CPP, which seeks to reduce carbon emissions by 32% by 2030, with interim reduction targets in the time frame spanning from 2022 to 2029. We believe that the higher the carbon footprint of a utility, the more it is at risk of being affected by CPP regulations, and, therefore, these utilities have lowered potential for upward rating movement. Because we believe that compliance costs cannot be estimated until state implementation plans are formulated over the next couple of years, we have not factored the impact of the plan into our ratings at this time. As these issues play out over the next year, we will begin to assess the credit impact.

Although expectations are that the U. S. economy will experience solid stronger growth in the coming year, we do not project that this growth will translate into a commensurate increase in electric demand for 2016. This is largely due to the fact that, relative to other sectors, public power is characterized by demand inelasticity, making the sector resilient to economic fluctuations. We expect U.S. GDP to expand by 2.5% and 2.7% in 2015 and 2016, respectively. In conjunction with GDP growth, we anticipate solid job and moderate wage growth in the coming year (see "**U.S. To Get *NSync And Move In One Direction (Up) Next Year**," published Dec. 3, 2015). Although electricity demand from industrial customers typically benefits from improving economic growth and lower unemployment, electric demand for residential customers is most significantly affected by weather. The U.S. Department of Energy's Energy Information Administration (EIA) expects weather patterns at near-normal levels in 2016 (consistent with 2015, but in contrast to 2014, which was unusually cold).

Modest economic growth should limit capital and operational burdens. In 2015, electric sales growth was typically flat to slow, suggesting the potential for modest load growth as the U.S. economy continues to improve. However, some of this load growth is being offset by energy conservation measures. The EIA projects electric sales will increase just 0.5% in 2016, which would be largely consistent with year-over-year 2015 results. Many of the utilities we rate project that the modest load growth trend will continue in 2016, but we note some exceptions, such as in Florida where utilities are beginning to see a more significant rebound. We believe that the modest growth environment benefits utilities because it largely eliminates capital spending requirements associated with more robust growth and will allow resources to be allocated toward other needs.

In addition to these key drivers, we are paying particular attention to the following issues. Although not applicable to all utilities, they continue to pose challenges for some.

Fixed costs. With uncertainty regarding environmental regulation, many utilities have opted to enter into power purchase agreements (PPAs) rather than build generation. However, these contracts often include fixed capacity or demand charges, which we consider to be debt-like, and we include these in our fixed cost coverage calculation, a key credit metric.

Off-system sales. Aggressive budgeting of surplus sales margins can result in negative budget variances. Unless a utility recovers the variance through increased rates on native customers, weaker coverage and/or liquidity can ensue, potentially pressuring credit quality.

Electricity and natural gas transmission constraints. Whether as a result of increasing environmental regulation or favorable commodity prices, the electric utility industry is shifting toward a greater reliance on natural gas and renewable energy. However, we note that pipeline capacity has lagged shifting demand, and electric transmission infrastructure has received insufficient investment to seamlessly accommodate the shift. The effect of this was seen most acutely in 2014, but we believe that it will continue to present challenges in the coming years.

Construction risk. Over the past few of years, we have noted that a number of high-profile projects have experienced construction delays and significant cost overruns, resulting in higher capital and operating costs. With general rate-setting autonomy, affected utilities have, by and large, preserved financial metrics (and their ratings) by passing on these costs to ratepayers. However, such pressures can result in reduced financial flexibility, manifested in uncompetitive power costs, deferred spending on general capital maintenance, and a willingness to budget thinner margins in the future.

Our Outlook For Generation And Fuels

The cost of fuel is the largest operating expense for most utilities (whether directly or indirectly through purchased power agreements)--excluding those that rely entirely on nuclear generation or renewable resources. Specifically, natural gas and coal prices influence the financial profile of most utilities significantly, as these two sources of fuel account for more than two-thirds of the nation's generation.

In 2016, our outlook for commodity costs projects increasing gas prices and stable coal prices. Nevertheless, we note that gas prices are very low relative to historical standards, and expect them to remain so for the next 5-10 years.

Natural gas

For both self-generating utilities, and for those that purchase power, we view natural gas prices as the most significant driver of fuel cost, and hence operating expense, as gas fired generation sets the marginal price of electricity in most markets.

Relative to coal prices, gas prices have always been more volatile, and we project that this trend will continue through 2016. Hydraulic fracturing and horizontal drilling caused a 69% drop in natural gas prices, to $2.75 per mmBtu in 2012 from $8.86 per mmBtu in 2008, as large deposits of natural gas were unlocked from shale formations. Not surprisingly, we saw a shift in generation from coal to natural gas in this time period. In 2012, we noted that gas accounted for 30% of energy produced, up from 21% in 2008, and energy produced from coal dropped to 37% from 48% during this same time period. Despite the fact that gas prices continue to remain low relative to 2008 levels, we note that, since 2012, volatility has continued as the EIA shows 2014 prices averaged $4.52 per mmBtu, up 63% from 2012 levels, before dropping to $2.75 per mmBtu in 2015. In the low gas price environment for 2015, we saw a 19% increase in gas-fired generation; given our expectation of a more modest increase in gas prices for 2016, we expect a more modest increase in gas-fired generation as well.

The discovery of natural gas in shale formations has continued to flourish as oil exploration companies search for higher-priced liquids. We project the price of natural gas at Henry Hub will average $3.00 per mmBtu in 2016 (see "**Standard & Poor's Revises Its Crude Oil And Natural Gas Price Assumptions**," published Sept. 24, 2015).We have noticed that, historically, fuel switching between coal and natural gas peaks when gas prices hit $3.50 to $4.00 per mmBtu. Although gas prices are increasing, the NYMEX forward price curve suggests natural gas prices will remain below $5.00 per mmBtu through 2027.

Past investment in coal-fired generation assets and the prospect of stranded costs prohibits the ability of some utilities to substitute natural gas for coal. Furthermore, a restricted natural gas delivery system, such as limited interstate pipeline networks in some predominantly coal-producing regions, presents a growing credit risk despite the favorable gas commodity prices. Currently, the pipeline infrastructure that is in place is unable to accommodate spikes in natural gas demand. Unlike coal and oil, natural gas is not usually stored on site and is reliant on real-time deliveries.

Increased exposure to higher operating costs is driven by diminishing fuel diversity as utilities shift towards gas-fired generation. Although industry projections are that natural gas prices will be stable, we believe that the return of price volatility is ultimately unavoidable. However, we expect that by passing costs on to ratepayers, most public power utilities will be able to maintain financial flexibility and relative competitive positions, thus retaining their ratings. We believe higher gas prices could return if:

- Demand for natural gas increases due to economic expansion or regulations prompt switching, or
- Natural gas supply decreases, due to some combination of environmental challenges and increased opposition to hydraulic fracking, or low commodity prices serve as a disincentive to oil and gas exploration.

Coal

The EIA notes a 10% drop in coal consumption for 2015 and expects coal consumption to remain stable year-over-year for 2016. The decline in coal consumption has been a function of fuel switching prompted by low natural gas prices, and environmental regulations, most significantly the EPA's Mercury and Air Toxic Standard (MATS) and uncertainties related to the CPP. Similar to what we see with natural gas, coal transportation remains a credit risk in 2016. Coal-dependent utilities, particularly in the Midwest, underwent operational stress in 2014 as coal shipments were displaced by grain and oil deliveries. Usually hovering at 30-45 days, average burn piles fell to as low as 10 days for some utilities. Reduced or curtailed operations of coal-fired units placed upward pressure on operating costs as utilities were forced to conserve inventories. However, we note that coal transportation was a lesser concern in 2015, when coal piles returned to more robust levels.

Overall, cost recovery mechanisms enable public power utilities to pass through fluctuations in fuel and purchased-power costs to ratepayers. The majority of public power utilities Standard & Poor's rates contain some form of cost-recovery mechanism--formal or informal, automatic or discretionary. We view these cost mechanisms as a critical foundation to credit quality although we note that some mechanisms are more effective than others. Standard & Poor's believes that mechanisms that are triggered automatically and recover costs in a shorter time period are strongest. On the other hand, in circumstances in which management plays a decision-making role and does not adequately adjust rates, or in cases characterized by a longer-term recovery, coverage of fixed obligations and liquidity may be at higher risk. Furthermore, Standard & Poor's notes that the independence of a governing board affects credit quality, as political pressures can affect the willingness of management to adjust rates.

Environmental Regulation

With the goal of improving air quality, the EPA has set a number of regulations in the past five years that have placed financial and operational strains on utilities that we view as largely manageable. Despite the uncertainty about how utilities plan to comply with these new measures, particularly the Mercury and Air Toxic Standard (MATS), there has been little impact on credit quality. This is because utilities have largely re-evaluated their power supply portfolios and made decisions whether to retrofit or retire noncompliant units as deadlines for regulation have approached. These decisions are heavily influenced by the current state and outlook for energy demand, future regulation, and natural gas prices. We expect little impact on credit quality going forward as utilities have generally built expected future costs into their financial and capital plans, which Standard and Poor's includes in its assessment of credit quality.

Threatening this assessment, however, is the CPP, issued under authority of Section 111(d) of the Clean Air Act, which looks to impose strict carbon standards for existing power plants. The finalized CPP, released on Aug. 3, 2015, calls for a 32% reduction in carbon dioxide emissions by 2030, with interim reduction targets from 2022-2029. The next steps for the CPP include the development of initial state implementation plans by September 2016. States that choose not to submit their own implementation plan will have to comply with a federal implementation plan, which may not be optimal for that state.

Standard & Poor's believes that it is too early to determine the impact of this regulation on credit quality of individual utilities. Without insight into what the state implementation plans will look like, it is impossible to assess how the CPP will affect the individual utilities we rate. Moreover, since late October, more than 27 states and other plaintiffs--joined recently by two former administrators of the EPA--have brought legal challenges, and we anticipate additional litigation could threaten implantation time frames.

We believe that the phased-in approach, beginning in 2022, allows utilities sufficient time to develop and execute responses to the state or federal implementation plans while limiting the potential for stranded investments. However, we expect that utilities that buy and sell power across state lines will face significantly more challenges compared with utilities operating within a single jurisdiction. The CPP may lead to the creation of multistate carbon trading networks, similar to the Regional Greenhouse Gas Initiative (RGGI) in the Northeast, as a result of both the regional nature of electric markets and the varying paths states will take to achieve carbon reduction. We believe that mass-based plans will facilitate these trading networks.

In our opinion, natural gas prices, as well as the capital costs of zero- and low-emission generating assets, will have a large impact on the magnitude of the effects from the plan. As long as gas prices remain low, the impact should by-and-large be manageable. But should historical volatility return, the financial burden and risk would be greatly magnified.

Infrastructure capacity issues, particularly those tied to the network of natural gas pipeline and the electric transmission grid, will constrain the abilities of utilities to achieve reductions in carbon emissions. Adding capacity to the already strained pipeline system will be necessary to accommodate any shifts towards natural gas that arise as result of the CPP. Similarly, as coal units are retired, the deployment of renewable resources, often located far from load centers, will place a further burden on a transmission network that has received under-investment for years. The burden of transmission issues will vary in magnitude and will be highest for states, such as Florida, that are transmission-constrained.

We have determined, based solely on the developments described herein, that no rating actions are currently warranted. Only a rating committee may determine a rating action and, as these developments were not viewed as material to the ratings, neither they nor this report were reviewed by a rating committee.

Primary Credit Analyst: Jeffrey M Panger, New York (1) 212-438-2076; **jeff.panger@standardandpoors.com**

Secondary Contacts: Peter V Murphy, New York (1) 212-438-2065; **peter.murphy@standardandpoors.com**

Geoffrey E Buswick, Boston (1) 617-530-8311; **geoffrey.buswick@standardandpoors.com**

Maegan Hearney, New York; **maegan.hearney@standardandpoors.com**