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Moody's Utilities Update
SURFA 51st Financial Forum

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Access is everything™

Expertise
A comprehensive view of the global markets through our ratings and research.

Credibility
Over 100 years of experience delivering forward-looking, independent, stable and transparent opinions.

Engagement
Meaningful interactions across multiple channels between our analysts and market participants.

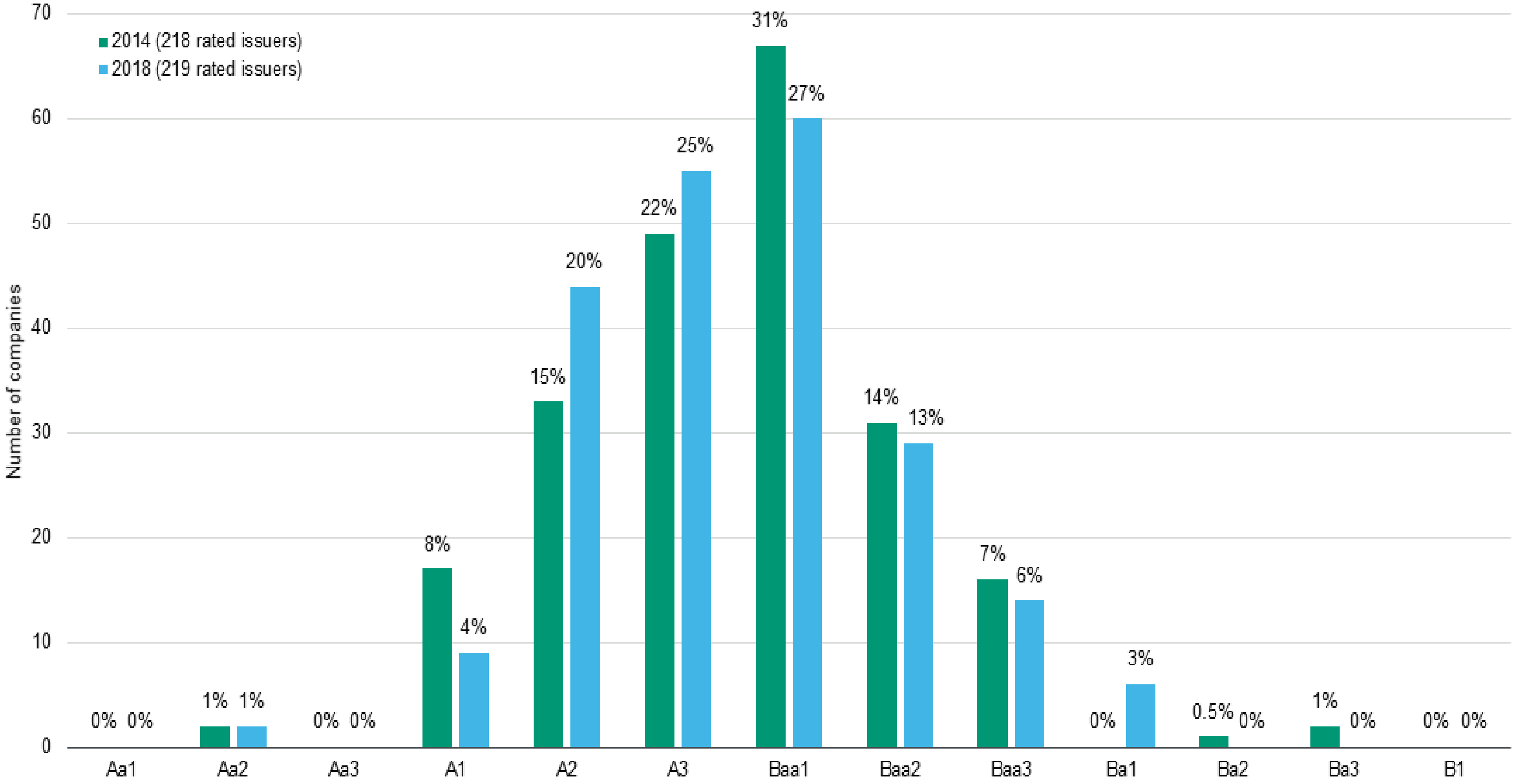
Default Risk Differs by Asset Class

- We publish detailed analytics of default rates, by rating, over time
- Sectors/Asset classes default differently
- 10-year Average Cumulative Default Rates
- Recoveries vary by sector, and where they default in the cycle

Sector	Years	Investment Grade	Speculative Grade	All
Municipals	1970 - 2017	0.1%	7.6%	0.2%
US Municipal Infrastructure Debt Securities	1983 - 2017	0.1%	9.2%	0.2%
Total Infrastructure Debt Securities	1983 - 2017	0.5%	15.7%	1.1%
Corporate Infrastructure Debt Securities	1983 - 2017	1.7%	16.7%	3.5%
Global Corporates	1970 - 2018	2.3%	28.8%	10.2%
Non Financial Corporate Issuers	1983 - 2017	1.9%	33.9%	14.4%
Unrated Project Finance Bank Loans	1983 - 2017			5.6%

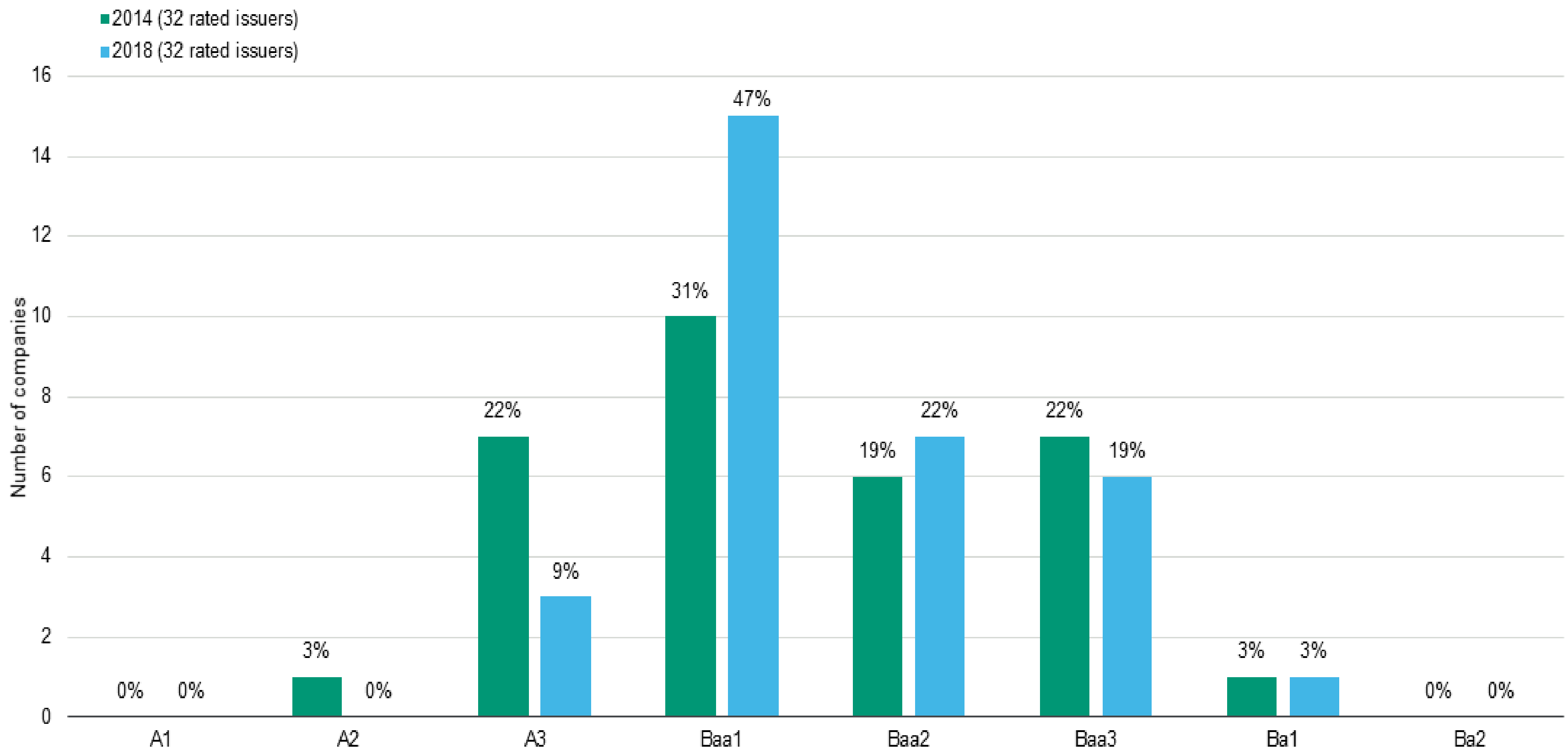
Source: Moody's Investors Service

US regulated utilities portfolio* ratings distribution remains relatively the same over the last four years



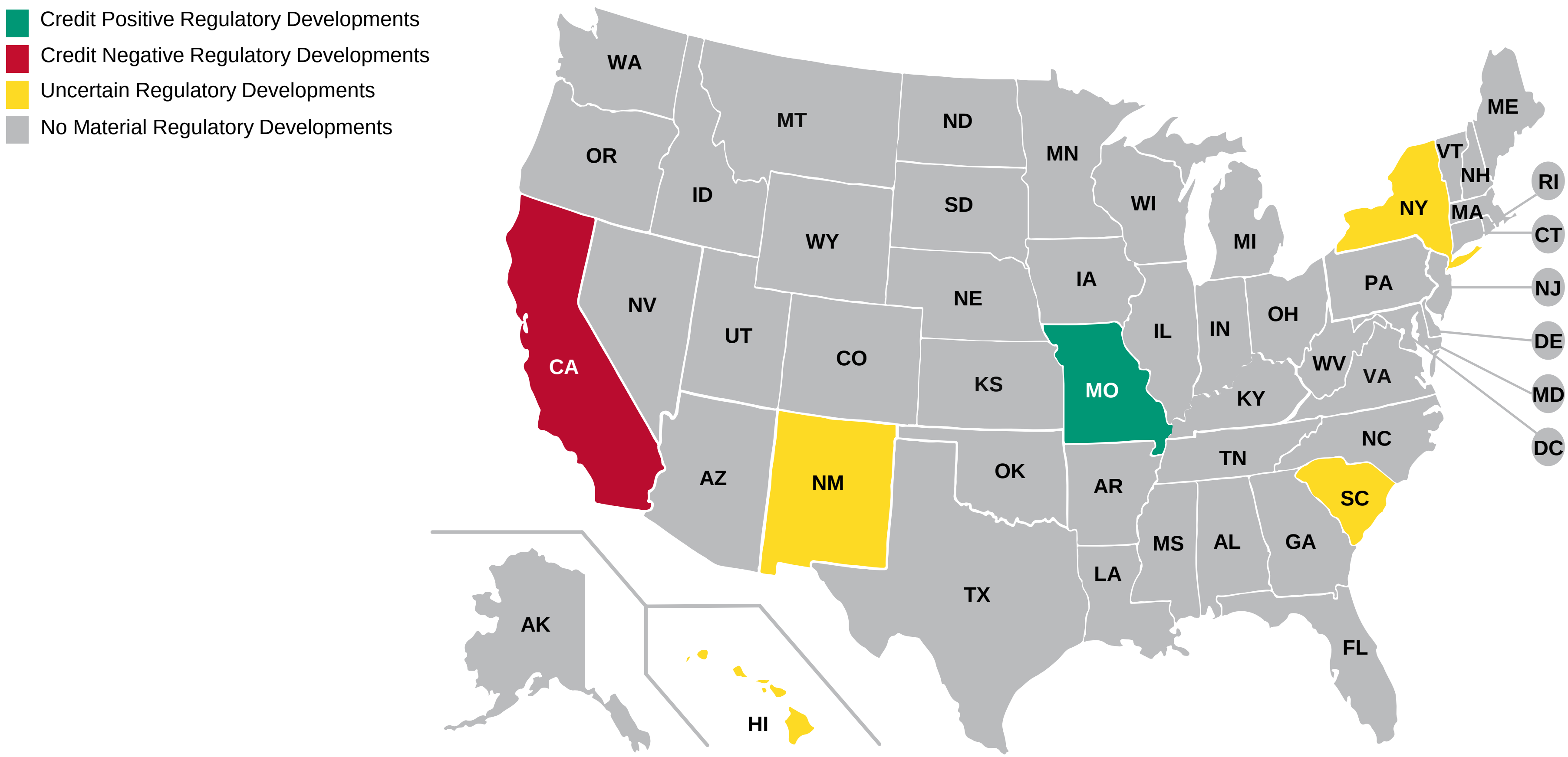
**The portfolio includes all of the rated parent companies and regulated utility operating companies.*
Source: Moody's Investors Service

More holding companies fall within the Baa range compared to four years ago



Source: Moody's Investors Service

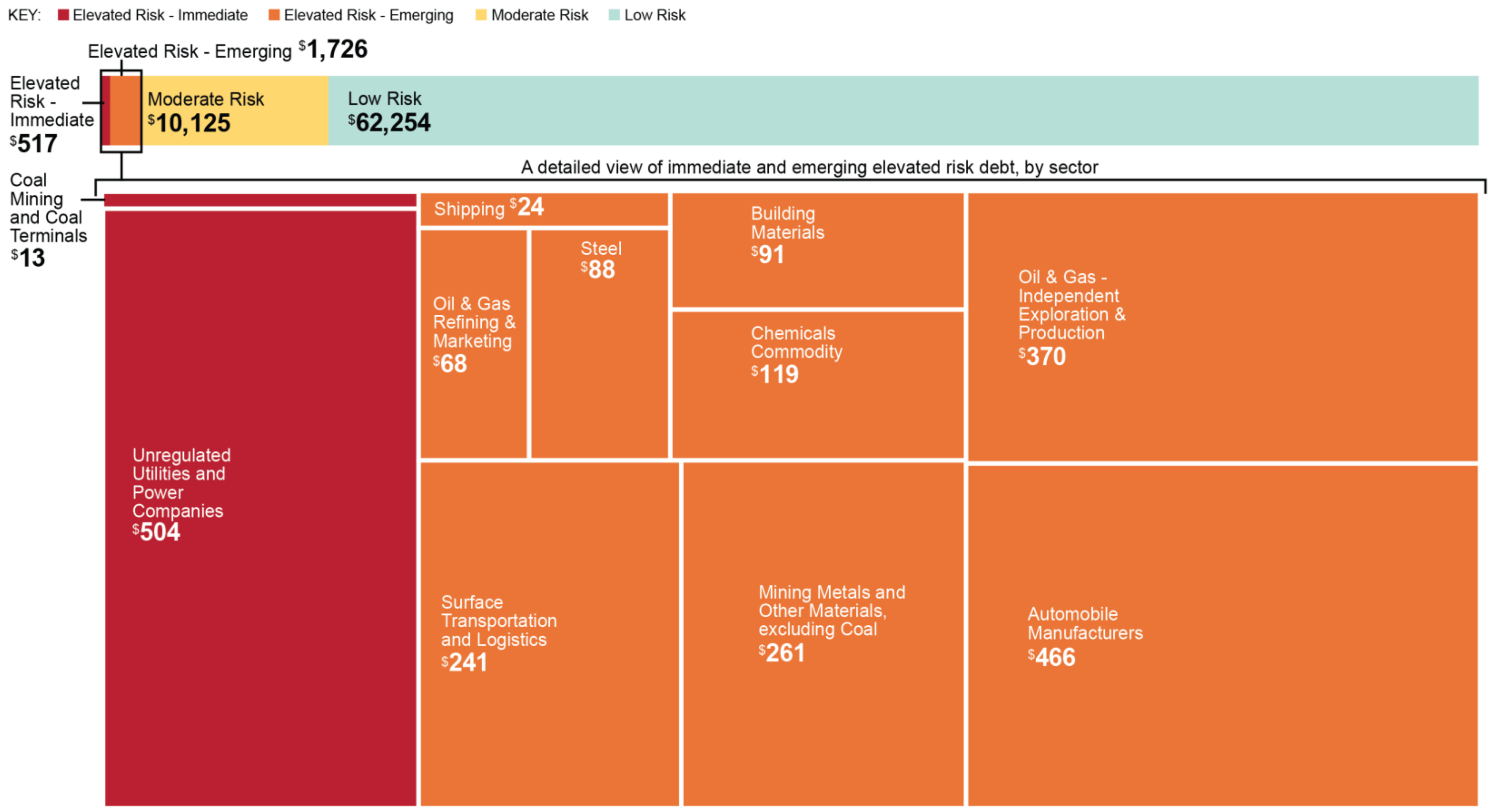
Most states remain credit supportive



Source: Moody's Investors Service

Carbon transition risk: 11 sectors with elevated credit exposure

Sectors collectively account for $2.2 trillion in rated debt



Source: Moody's Investors Service

Cyber Assessment is another example

Four high risk sectors account for ~$12 trln. in debt

Sector	Vulnerability	Impact	Overall	Rated Debt
Banks	High	High	High	11,315,921
Hospitals	High	High	High	250,382
Market Infrastructure Providers	High	High	High	10,400
Securities Firms	High	High	High	91,811

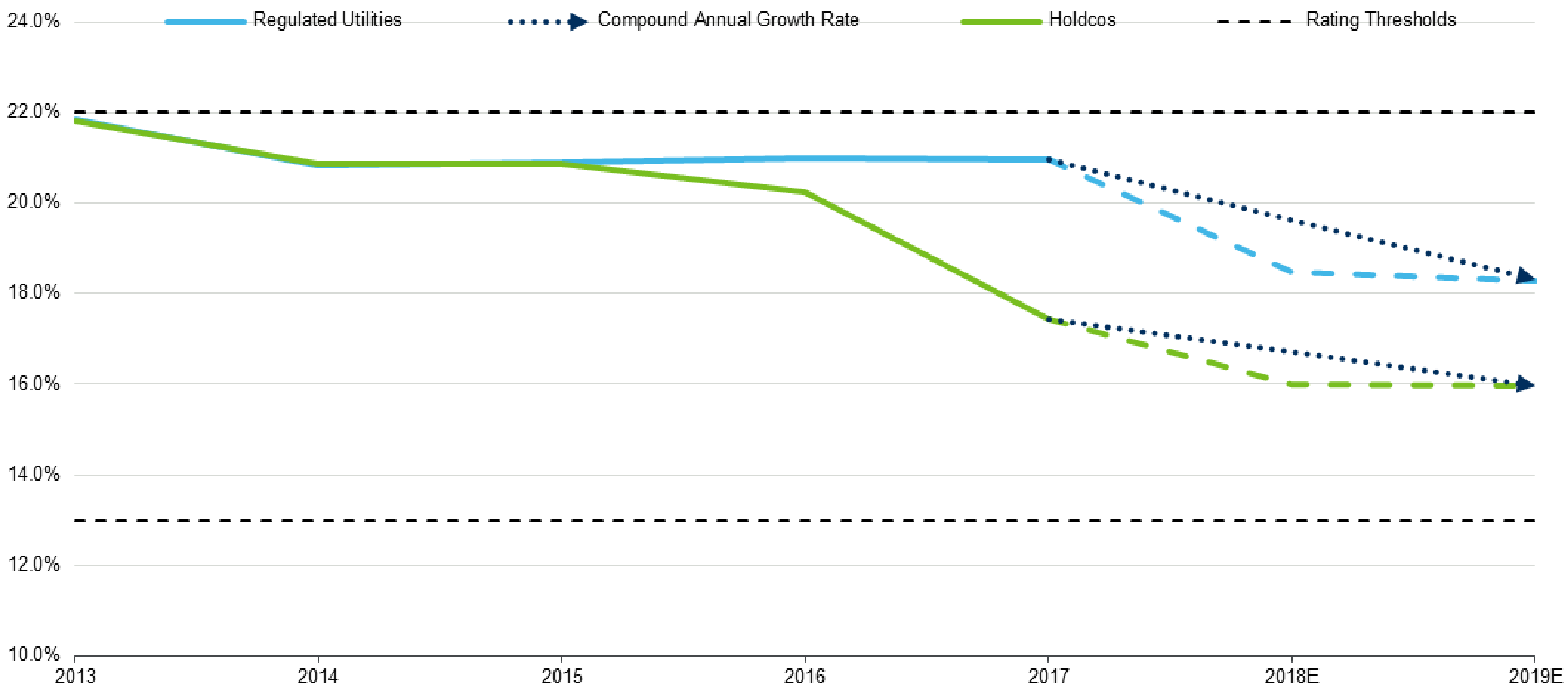
Nine medium-high risk sectors total ~$9 trln. in debt

Sector	Vulnerability	Impact	Overall	Rated Debt
Electric Utilities	High	Medium	Medium-High	1,824,124
Retail	High	Medium	Medium-High	723,324
Technology	High	Medium	Medium-High	2,219,071
Telecommunications & Media	High	Medium	Medium-High	1,723,916
Lodging, Gaming, and Cruise	High	Medium	Medium-High	86,583
Health Insurance	High	Medium	Medium-High	101,495
Higher Education (US and Sub-sovereign)	High	Medium	Medium-High	310,213
Manufacturing & Autos	High	Medium	Medium-High	1,622,228
Medical Devices	High	Medium	Medium-High	201,289
Transportation Services	High	Medium	Medium-High	413,965

Source: Moody's Investors Service

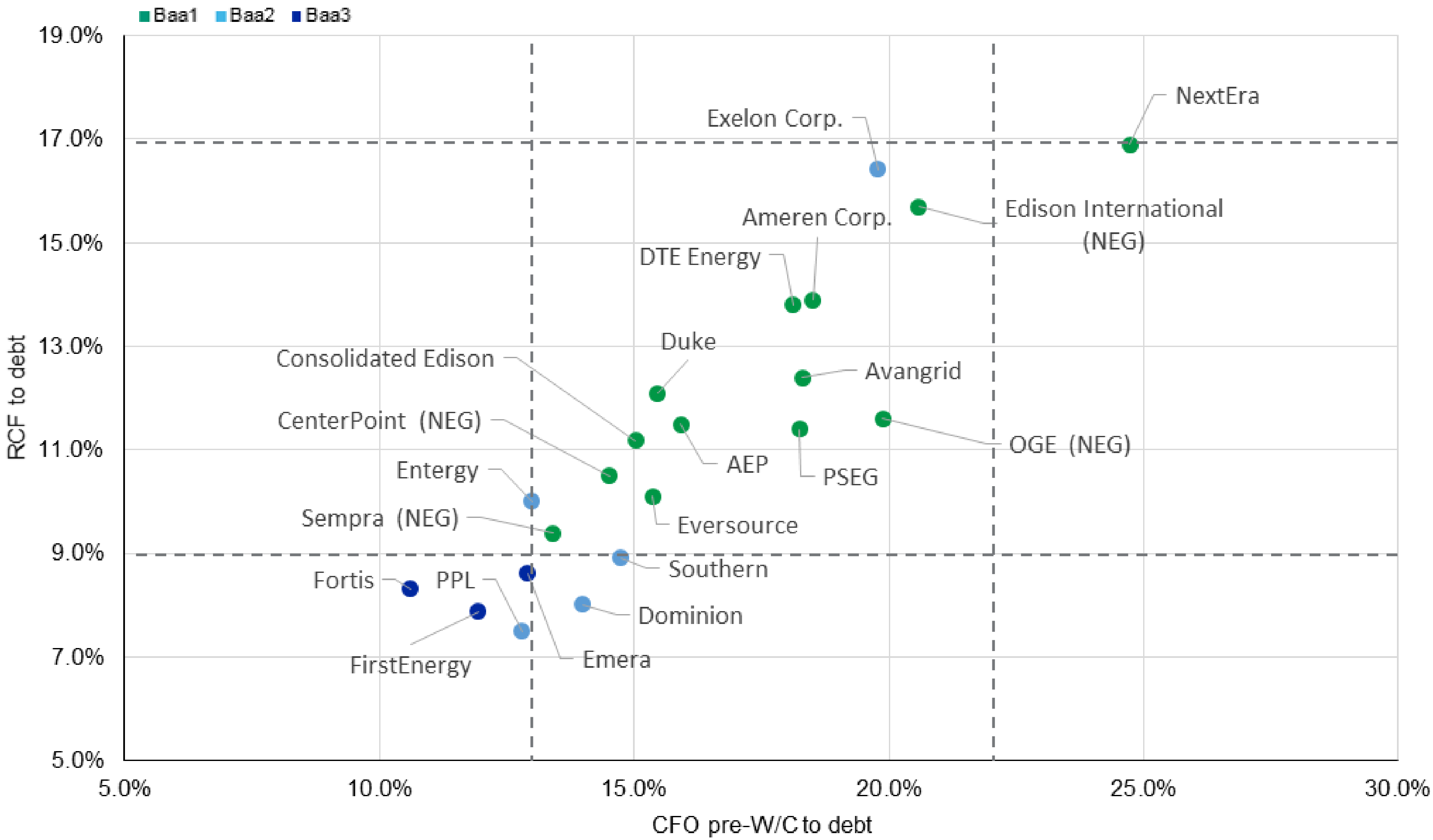
Sector outlooks: regulated utilities are negative

Stagnant cash flow and rising debt will cause financial metrics to remain low in 2019



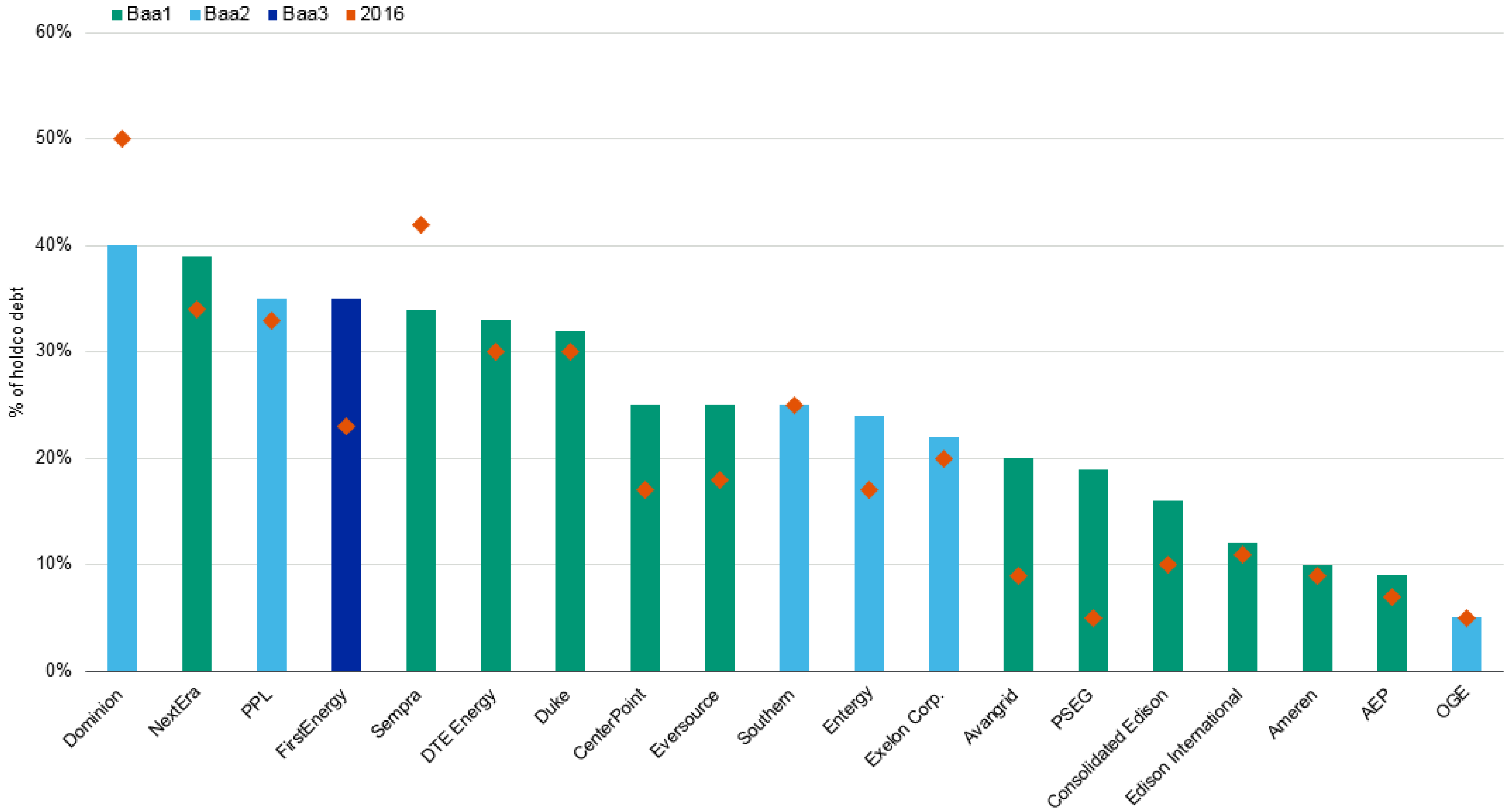
The metric range indicated by the dashed lines represents the Baa range appropriate for the standard business risk.
Source: Moody's Investors Service

Cash flow to debt ratios of holding companies vary widely within Baa reflecting various business risk profile



Note: Data reflects Moody's 2019 projections. Dashed lines indicate standard risk Baa range (low risk range is 11%-19% for CFO pre W/C to debt and 7%-15% for RCF to debt).
Source: Moody's Investors Service

More companies have increased the parent debt level over the last two years



Note: Data as of 9/30/18 (12-18 month forward view).
Source: Moody's Investors Service

John Lonski: 2015

Cost of Capital 2015: More of Mild Rise Than a Jarring Lift-Off

» Prospects for Benchmark Borrowing Costs

– Both Consumers' Income Expectations and Wage & Salary Income Growth Lag Recent Recoveries

» Compensation for Default and Liquidity Risks

– Long-Term Growth Rate for Core Profits Put at 4% to 4.3% -- Same As Nominal GDP

– If the Unemployment Rate Increases by at Least Half of a Percentage Point from a Year Earlier, Recession May Be Underway

» What Drives Credit Spreads?

– High-Yield Bond Spread's Moving Four-Year Average may Not Approach Its Lows of the Previous Three Business Cycle Upturns

» Market Valuation of Common Equity

– Overvaluation of Equities Often Persists Until Profits Shrink ... Profits Growth and Very Low Interest Rates Distinguish 2015 from 2007 and 1998-2000

– Market Value of Common Stock Has Crested Several Years After the Start of Fed Rate Hikes, but Equities Are Now Fully Priced

John Lonski: 2016

Cost of Capital 2016: Credit Risk Outweighs Interest Rate Risk

- 2016 Will Show the Slowest 10-year Average Annual Growth Rate for Real GDP Since the Span-ended 1939
  - Age Distribution of Employment Goes From Being Inflation-Prone in the 1970s to Disinflationary Today
- 2016's Profits Risk Shrinking for a Second Straight Year
  - US Equities are Not Cheap and Could Get Pricier ...
    Higher Interest Rates Slashed the Ratio of Market value to profits from current production from 1971's 10.3:1 to 1978's 3.7:1
- Corporate Credit Is Past Its Prime
  - High-Yield Default Rate Is Likely to Approach 6.0% by Late 2016
- Benchmark Borrowing Costs: New Multi-Decade Lows for Treasury Bond Yields after Next Recession
  - Blue Chip Consensus Expects Averages for Next 10 Years of 4.2% for Nominal GDP and 3.7% for 10-year Treasury Yield

John Lonski: 2017

Cost of Capital 2017: Equity Bubble Elevates Risk of a Jarring Correction

- Don't Expect Much From Revenue-Neutral Fiscal Stimulus ... Despite 2009's more than $800 Billion of Fiscal Stimulus That Approximated 9.8% of GDP, 2010’s Real GDP Grew by Only 2.5%
- US Economy and Real Consumer Spending Are Expected To Grow By Roughly 2% Annually, on average, Through 2027
- Fed Policy Seems Unlikely to Risk an Inverted Yield Curve ... Last Three Recessions Averaged a Five Percentage Point Drop by Fed Funds
- Inevitable Correction of an Overvalued Equity Market Will Drive Treasury Bond Yields Lower
- Recession May Be Present When Unemployment Rate's Moving Three-Month Average Turns Higher Amid a Mature Economic Recovery

John Lonski: 2018

2018: Will Tax Reform and Deregulation End Secular Stagnation?

- Capital Spending Will Make or Break Supply-Side Economics
  - Drop in Top Corporate Income Tax Rate to 21%, Immediate Expensing of Capital Outlays, and Repatriation of Overseas Cash May Keep Real Capital Spending's Underlying Annual Growth Rate Above Long-Term Average of 4%
- Tax Cuts Will Not Make America Young Again
  - Slower Growth of US Labor Force Impedes the Return of 3% to 3.5% Real GDP Growth on a Recurring Basis
- Inflation Fears May Be Overdone
  - Core PCE Price Index Inflation Can Slow When the Average Hourly Wage Accelerates *(correlation = 0.21)*
- Modest Long-Term Outlooks for Bonds and Stocks
  - Blue Chip Consensus Puts Averages for Next 10 Years at 4.2% for Nominal GDP Growth and 3.7% for the 10-year Treasury Yield

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