MUNICIPAL CREDIT OUTLOOK 2020

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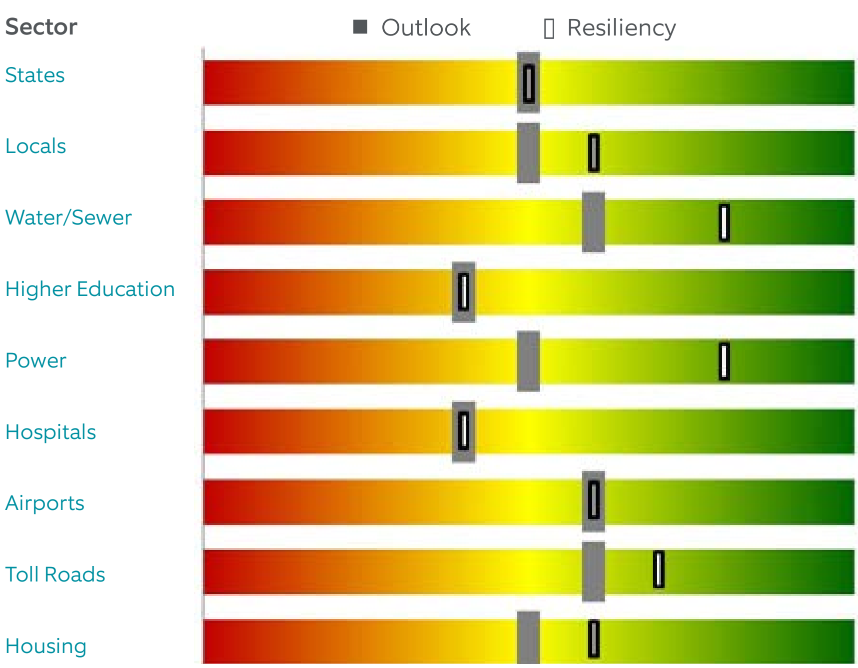
Most municipal borrowers positioned adequately for economic slowdown; climate risks highlighted

Northern Trust's 2019 Capital Market Assumptions projects slowing growth averaging 1.7% annually over the next five years. It calls for continued stuckflation below 2% tied to a peak in globalization and trade as a percentage of GDP. Slowing key indicators including job gains, wage growth, and home values, are reflected in late 2019 revenue collections for many municipal borrowers.

The near-term economic outlook calls for continued steady growth and an overall stable outlook for municipal credit. At the same time, unexpected economic risks can have material impacts on this expectation. Particular sensitivity is around trade uncertainty, recession fears, and stock market weakness.

The vast majority of municipal issuers have utilized the last decade of economic expansion to position for future volatility by growing reserves and deleveraging. This positioning supports improved resiliency indicators. A subset of the market remains more vulnerable today than pre-recession. This group is exceptionally vulnerable to stock market declines, particularly in relation to pension liabilities.



Summary	Page

Sector outlooks reflect our base case expectation for modest additional growth in economic activity and GDP over the next 12-18 months. See page 14 for definitions of outlook and resiliency.

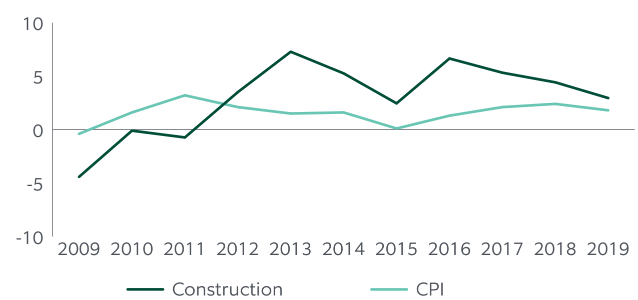
ENVIRONMENTAL RISKS

Consideration of climate risks embedded in research process.

Key Outlook Drivers

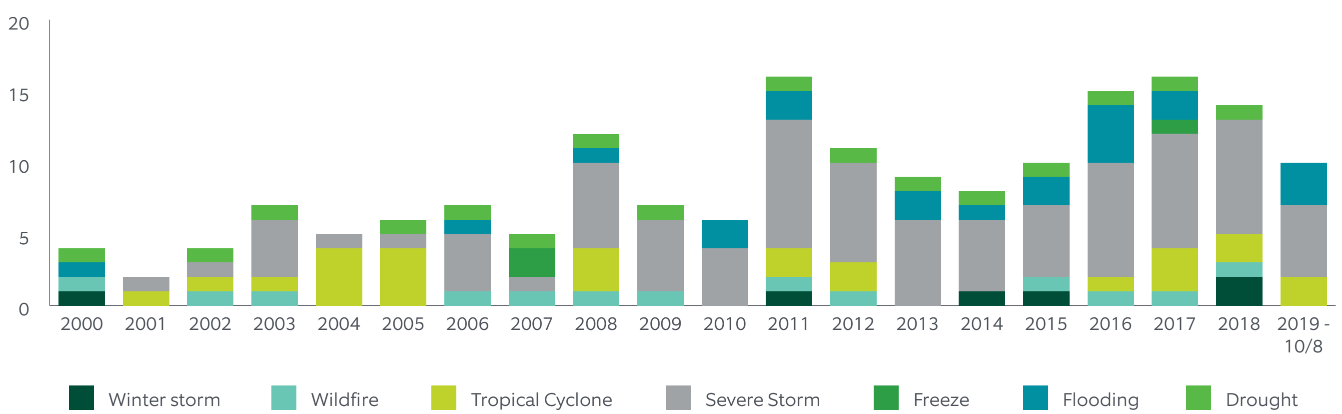
- **Emphasis on reduction of carbon and growth of clean energy:** A 2018 Consumer Reports Survey found that an overwhelming majority of Americans support greater reliance on cleaner and renewable energy sources, even if it means higher energy bills. The Yale Program for Climate Change Communication report noted that 95% of Democrats and 71% of Republicans were in favor of policies requiring utilities to produce 100% of electricity from renewable or clean sources by 2050. Many states have implemented targets aligned to clean energy goals. Our research integrates the view that clean energy will increasingly drive policy and consumer action. Review of capital and carbon plans is integral to fully assessing credit risk.
- **Sea level rise:** The Center for Climate Integrity projects that over 60,000 miles of sea wall will need to be constructed over the next 20 years for an estimated price tag of $416 billion. Florida and Louisiana may bear the brunt of these costs, with projections at $75 and $38 billion, respectively. This equates to approximately 1.5 times FY2018 own-source revenues for each state. While cost estimates are considerable, they will vary significantly over time and should be considered as part of the comprehensive credit profile. An appropriate cost share between state, federal and local sources may dramatically lower the liability for any individual issuer. Also, a healthy pension system, low debt profile, or strong economic growth may support an issuer's capacity for such investment relative to peers.
- **Increasing incidence of high-cost storms:** In the last ten years, damage costs from storm events have increased in incidence and severity. Development in high risk areas has kept pace with or outpaced the nation. A recent report by the National Oceanic and Atmospheric Administration noted that Florida's coast line counties have experienced near 15% population growth from 2000 to 2016, slightly above the

CONSTRUCTION INFLATION OUTPACES CPI



Source: U.S. Census

BILLION-DOLLAR DISASTER EVENT TYPES BY YEAR (CPI-ADJUSTED)



Source: National Oceanic and Atmospheric Administration

U.S. average. Gulf Coast population increased by 25% over the same period. At the same time, construction inflation has outpaced Consumer Price Index (CPI) by three times over the last five years. Higher risk exists for large-scale storm damage and recovery costs. These considerations are integrated into our research opinions.

In assessing environmental risks to bondholders, our research includes at least the following:

- How the carbon footprint of the entity is evolving to meeting new federal, state, and societal standards
- Risk of and projected severity of storms and climate events
- Preventative measures taken: i.e. capital investment in managing water run-off, water storage, levies, or retrofitting buildings for extreme weather.
- The extent that capital plans consider sustainable building practices and energy efficient policies
- Whether building codes and capital plans consider climate/event risks
- Plans to address sea level changes
- Capacity for recovery in the face of climate events
- Economic diversity and risks to key industries (supply chain disruption)
- Presence of insurance
- Transparency and disclosure practices with respect to environmental risks

While green bonds should produce a favorable environmental outcome, our proprietary credit research will assess borrowers from a holistic perspective. Ultimately, Green Bonds are on equal footing with past and future bond issues with the same security provisions.

STATES

Expense flexibility and growing reserves support improved resiliency despite anticipated revenue slowdown, but a handful of states are vulnerable.

Key Outlook Drivers

- **States anticipate subdued revenue growth** as the longest lasting economic expansion faces mixed economic signals. Modest U.S. GDP growth, slowing wage growth, and job growth numbers are contributing to lower revenue growth estimates in fiscal 2020.
- **Expense flexibility** allows states to manage through moderate volatility. Key categories that may be reduced are Higher Education, K-12 funding, transportation and Medicaid. However, more than a decade after the recession, many state governments have not yet fully recovered from spending cuts. This limits options for materially reducing spending without economic impact or competitive disadvantage.

2020 AGGREGATE REVENUE GROWTH EXPECTED TO DECELERATE

(Year over year % change)

Source: U.S. Census

- **State budgets are generally balanced.** Spending demands are tied to rising pension costs, Medicaid, infrastructure needs and healthcare costs. These remain long-term challenges.
- **State reserves are highest in 20 years,** a practical sign of preparation and readiness for the next economic downturn. The median rainy day fund balance improved to 7.5% of general fund expenditures in fiscal 2019, surpassing the pre-recession median of 4.8%. The majority of state budgets project reserves to rise.
- **The number of highly vulnerable states** fell by three from 2019 and by six from 2018. Alaska, Louisiana, and Oklahoma clearly benefitted from the rise in oil prices, yet continue to be vulnerable to energy sector volatility. Weak pension systems, growing pension liabilities and high fixed costs are the primary risk factors for the states highlighted. Stock market volatility and/or economic downturn will exacerbate already weak fundamentals and resiliency.

STATES WITH MORE THAN THREE HIGH RISK AREAS ARE EXPOSED TO COMPOUNDING IMPACT

	Economy[1]	Population[2]	Tax Climate[3]	Commodity Reliance[4]	Debt[5]	Pension[6]	Fixed Costs[7]	Budget[8]	Weak Resiliency[9]
Connecticut	X	X	X		X	X	X		X
Hawaii					X		X		X
Illinois		X			X	X	X	X	X
Kentucky						X	X	X	X
Massachusetts					X	X	X	X	X
New Jersey			X		X	X	X	X	X

1 GDP growth below 75% of the U.S. for trailing three years ending Q1 2019; Bureau of Economic Analysis
2 Annual population growth below 1% from 2010 to 2018; United States Census Estimates
3 Bottom 10 states per "2019 state business tax climate index"; Tax Foundation
4 Commodity concentration above 5% of state GDP; Bureau of Economic Analysis
5 Debt above $2000 per capita and 5% of Personal Income; Moody's State Debt Medians
6 Unfunded liability greater than two times state own-source revenue; Moody's State Pension Medians
7 Fixed costs greater than 20% of own-source revenue; Moody's State Pension Medians
8 Imbalanced budget outlook; "State Budgets in 2020" Northern Trust
9 Challenged or very weak resiliency; "State Budgets in 2020" Northern Trust

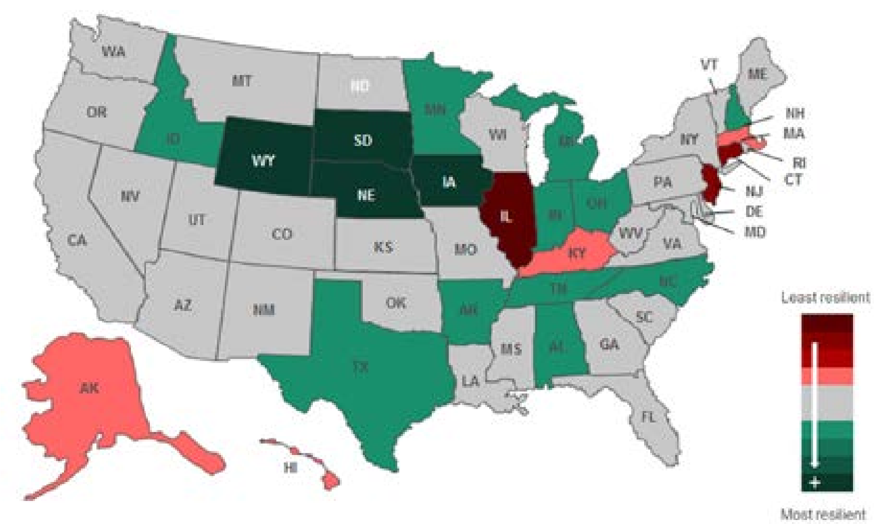
- **Uncertainties for fiscal 2020.** Volatility associated with the trade tensions and the upcoming election may result in increased stock market risk. Business capital and infrastructure spending is historically low leading into a presidential election. States with elevated trade risks include KY, LA, MI, SC, TN, and TX.

Majority of States showing improved resiliency, though some remain weak

Relative to the prior year, improved reserve levels and various expense cutting options give the majority of States an increased measure of resiliency. While median reserve levels across the sector surpassed previous recession levels, the majority of states remain vulnerable to income and sales tax volatility due to states implementing increasingly progressive tax rates. State government investment infrastructure spending relative to GDP has not kept pace with economic growth since the recession. The ability to utilize spending cuts in Higher Ed, K-12 and infrastructure may be limited. Increased pension exposure to equities and alternatives leaves states exposed to stock market volatility despite strong reserve levels.

MAJORITY OF STATES RESILIENT

Reserves, Revenue Volatility, Fixed Cost Burden



Source: Northern Trust, National Association of State Budget Officers, Pew Charitable Trusts, Moody's

LOCAL GOVERNMENTS

Revenue growth will slow; most locals well positioned for modest downturn.

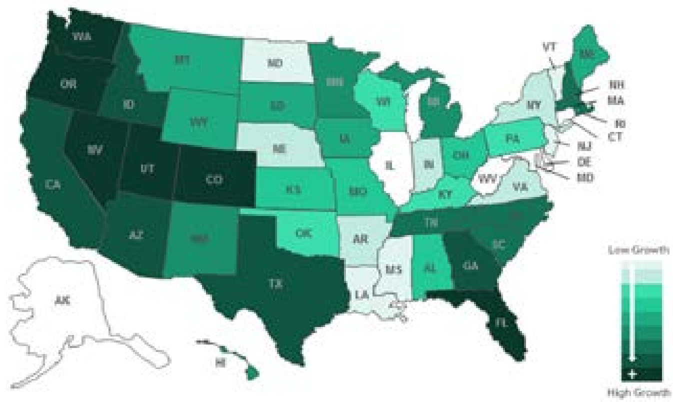
Key Outlook Drivers

- **Revenue growth will soften in 2020** compared to previous years as home value appreciation slows. Sales tax growth will also slow, in line with employment and wage growth, but remain positive. According to the National League of Cities, almost two thirds of finance officers in large cities are predicting recession in 2020.
- At the median, **reserves are strong**. However, local entities face **rising funding pressures** for infrastructure, pension and retiree healthcare. Many entities have increased contributions, lowered discount rates, and implemented reforms. Unforeseen costs due to natural disasters would add to fiscal pressure.
- **Economics and demographics continue to outperform in the West and Southeast.** The Midwest, particularly manufacturing and agriculture, continues to show comparative weakness. Trade disputes add to uncertainty.

Good resiliency at the median, with significant outliers

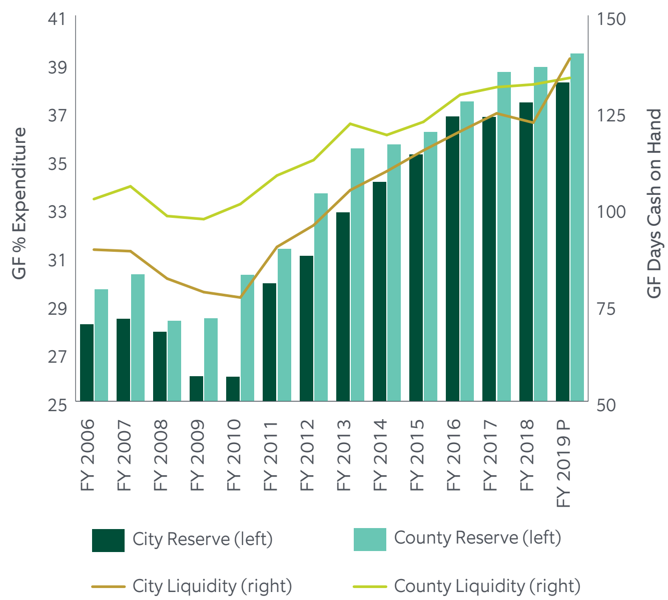
Low volatility of local revenue (including property tax and municipal fees) supports resiliency. At the median, municipals have built-up their financial position during the expansion. General Fund Reserves are at record high. Outliers are significant, and include issuers with declining populations and those where local pension costs are unsustainable (in excess of 20% of spending).

SOUTHEAST AND WEST LEAD GROWTH
2020 Revenue Outlook for Property Tax, Personal Income, Employment



Source: NTAM Municipal Research, Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Housing Finance Agency

RECORD HIGH RESERVES POSITION LOCALS FOR DOWNTURN



Source: Merritt Research Services

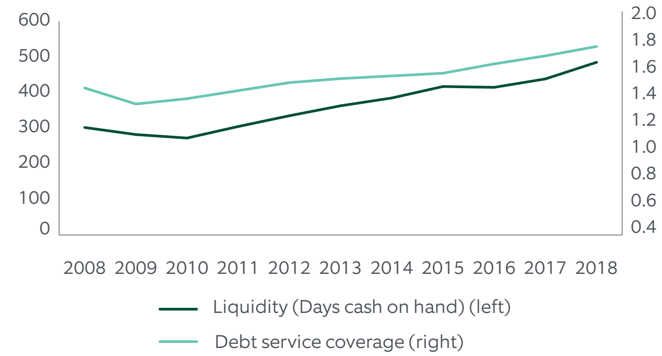
WATER & SEWER

Aging infrastructures push water bills higher.

Key Outlook Drivers

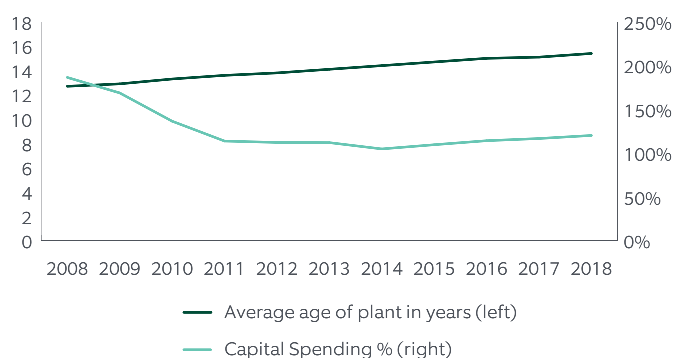
- **Coverage and liquidity levels stable:** Debt service coverage and liquidity levels have improved, boosting balance sheets. Median liquidity has increased 70% in the last decade. We expect stability in 2020.
- **Growth of water rates has slowed, but will continue to exceed inflation:** infrastructure needs are considerable and Environmental Protection Agency (EPA) mandates dictate investment. Rates have increased almost 60% from 2010 to 2018. The average monthly water bill for a family of four, using 100 gallons per day is over $70. The average rate growth in 2018 was just below 4%; down from almost 9% in 2011.
- **Increased federal support:** Water Infrastructure Act is expected to facilitate $12 billion of investment, with $6 billion in direct federal loans. Water infrastructure needs are significantly higher than the plan.
- **Droughts and wildfires pose threat:** Severe drought conditions continue to pose a risk for western and southern states. Wildfires can lead to contaminated water, increased flooding, water shortages, infrastructure damage and force utilities to change treatment processes. A 7-year drought contingency plan is in place for the seven states that draw water from Colorado River: AZ, CA, CO, NM, NV, UT and WY. California, Arizona and Nevada will see reduced water allocations when Lake Mead's elevation falls below a certain threshold. The plan will provide greater certainty regarding future water allocations. Issuers that rely on one water source are especially at risk.

LIQUIDITY AND DEBT SERVICE COVERAGE IMPROVE



Source: Merritt Research Services

RATE OF CAPITAL SPENDING NOT SUFFICIENT TO REVERSE INFRASTRUCTURE AGEING



Source: Merritt Research Services

Resiliency is strong

The sector's strong fundamentals are supported by its essential service nature, monopolistic position, and very high barriers to entry. There is low price sensitivity, strong liquidity and independent rate setting authority. This sector can be considered more insulated from economic cycles than others. Growing infrastructure needs, persistent droughts and wildfires could reduce financial flexibility.

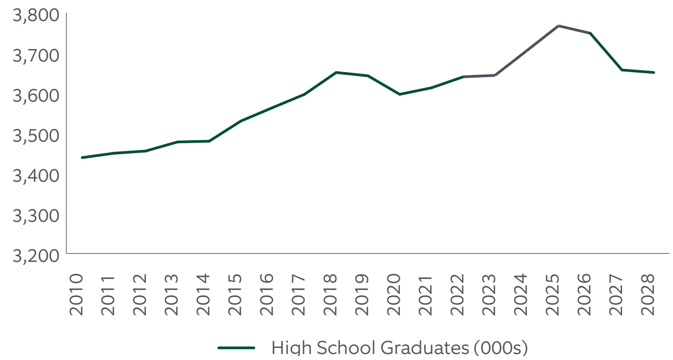
HIGHER EDUCATION

Rising pressure to innovate and discount in the face of stagnant net tuition revenue.

Key Outlook Drivers

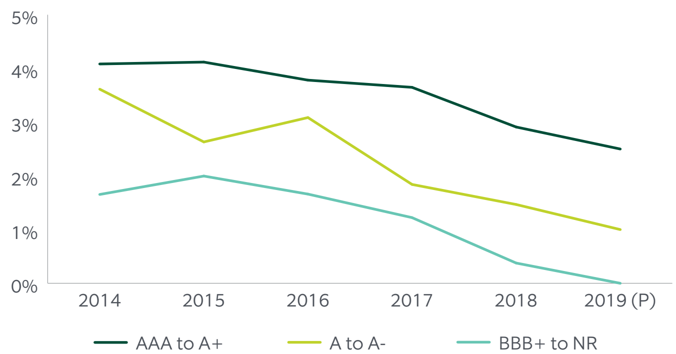
- **Demographics will not support net tuition growth in 2020.** The number of high school graduates is expected to remain flat to modestly increasing over the next decade. We see weakness in international enrollment, and population migration to the south and west. We expect continued pressure for high cost, small schools, particularly those in the Midwest and Northeast. Top tier schools including flagship universities and highly endowed privates will largely be resilient. Regional schools will struggle to attract students. Those that targeted international students struggle against reputable lower cost, local institutions. Professionally oriented schools that target workforce placement, particularly in STEM and medical fields, will likely outperform in the near term, given market demand.
- **Lack of capital investment** due to stagnant student-based revenue will place some schools at a competitive disadvantage. Excessive debt as opposed to investment in annual deferred maintenance will pressure balance sheets and long-term costs. High cost and low demand regional schools are most at risk.
- **Online programs present high margin opportunity if competitive advantage exists.** Schools with brand recognition, a broad geographic draw, and scale to provide low cost, flexible programs have proven most successful. Those with niche programs can be successful on a smaller scale. Those institutions just now instituting online programs in a turn-around initiative will struggle. Online offerings change annually with new entrants given low barriers to entry, but with significant competition for narrowing supply of students who are increasingly price conscious.
- **Longer-term, shifting preferences** among Generation Z students could drive the price-value conversation in higher education, similar to healthcare. As Generation Z begins to fill up classrooms across the country, preliminary research suggests that these students are less willing to take on student loan debt and are more inclined toward degree programs that will help secure employment after college.

PROJECTED HIGH SCHOOL GRADUATES STAGNATE OVER LONG-TERM



Source: National Center for Education Statistics

AVERAGE NET TUITION REVENUE GROWTH SLOWS



Source: Merritt Research Services

Resiliency remains concern for bottom quartile of market

Despite continued near term pressure, the median university is resilient given the demand for education, moderate budget flexibility, manageable leverage, and supportive alumni. Schools with greater diversity in revenue, urban locations, comprehensive offerings, large endowments, and less saturated markets will be better insulated. Resiliency concerns remain for the bottom quartile of the market.

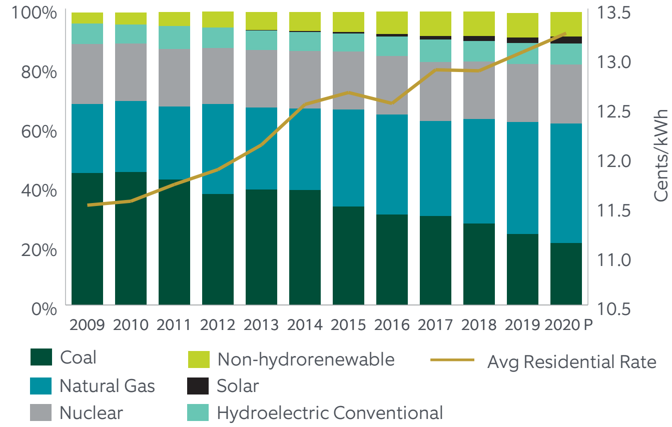
POWER

Rates rise as renewables gain momentum; financial metrics stable.

Key Outlook Drivers

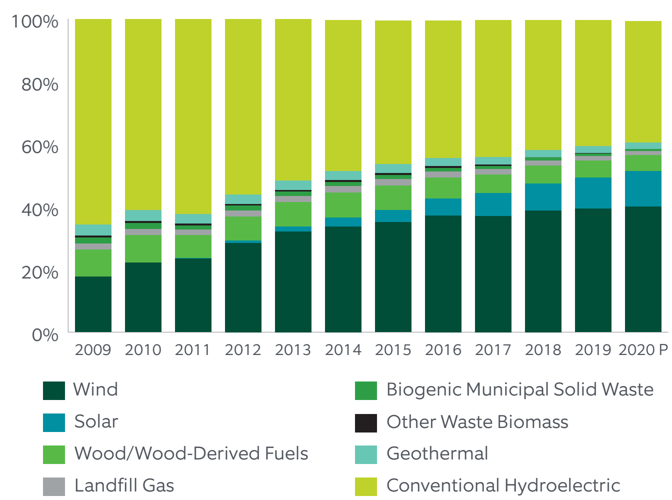
- **Overall credit quality maintained strength** in 2019, with healthy median coverage and liquidity measures. The sector has benefitted from the ongoing economic expansion and resulting consumer strength. We anticipate a stable credit profile again in 2020.
- **Conservation means lower power sales,** but customer growth and rate increases have helped offset the reduction in use. Through August 2019, year-over-year generation declined 1.5%. The desire for cheaper and cleaner sources has helped drive natural gas and renewable generation up 9% and 5.5% respectively, while reducing coal generation by 18%.
- **The cost of renewable sources** continues to decline, yet the higher cost relative to natural gas and coal has put upward pressure on the average cost of residential power. Public utilities continue to offer lower rates versus investor owned utility customers.
- **Renewable sources,** once dominated by hydroelectric, have shifted to wind and solar over the last decade. More recently, the shift to solar has gathered momentum and is likely to continue, given the declining cost and consumer demand. Despite relaxed Federal standards, the decommissioning of coal fired generation facilities is expected to continue, especially in the West.
- **Debt issuance rebounded in 2019.** After three consecutive annual declines (34%, 19%, 35%), debt issuance through August 2019 has increased, eclipsing 2018's total, but remains well off peak levels. The added issuance is not enough to interrupt the modest declines in leverage over the last several years, as a sizeable portion has been for refinancing purposes.
- **Cybersecurity concerns continue to grow** as more providers shift to smart meters. The costs typically get passed on to users through higher rates, while providers are still working on how best to protect their systems.

SHIFT TO CLEANER SOURCES DRIVES RATES HIGHER



Source: Energy Information Administration, NTAM Municipal Research

RENEWABLE SOURCES SHIFT TO WIND AND SOLAR



Source: Energy Information Administration, NTAM Municipal Research

Resiliency is strong

Essentiality, monopolistic nature, and virtually inelastic demand provide strength and stability to public power. Public power issuers have utilized lower fuel costs, economic growth and rate increases to improve financial metrics and cash reserves.

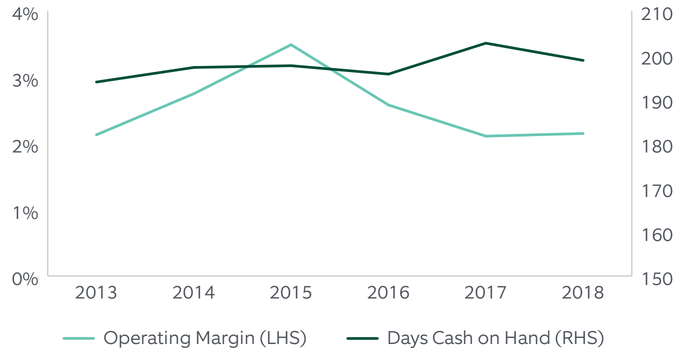
HOSPITALS

Hospitals maintain narrow margins by gaining efficiencies; new entrants, policy changes are threats

Key Outlook Drivers:

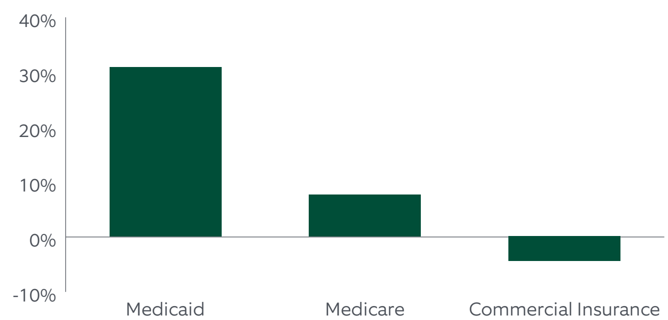
- **Revenue pressure limits positive momentum.** Declining inpatient volumes and downward pressure on insurance rates limits revenue growth. Spending on labor and technology drives expenses. Margins stabilized in 2019, but remain below 2015 levels. We expect narrowly positive margins in 2020.
- **Increased exposure to government payers.** Government payers reimburse at lower rates compared to commercial insurers. As patients age into Medicare, they roll off commercial insurance. The Medicaid population increases as more states expand benefits. Since 2010, payments from Medicare and Medicaid are up 13%, and now are 63% of gross revenues. This shift reduces the potential to boost revenue with commercial insurer contracts.
- **Demand for efficiencies drives consolidation.** M&A activity has moved from traditional horizontal mergers to mega horizontal mergers, vertical mergers with other healthcare players, and non-traditional partnerships. Hospitals also now have to contend with new entrants including Amazon, Walmart, and CVS/Aetna that are attempting to disrupt healthcare and lure patients away from traditional settings. Disruptive change is an existential threat that requires a proactive response. The dominant strategy has been to consolidate.
- **Policy changes are high risk/low probability events.** Healthcare will be a key topic in the 2020 election cycle. Democrats strive to increase public healthcare options, while Republicans continue attempts to dismantle the Affordable Care Act. If either party wins unified control of the government and successfully implements their agenda, that can have a sizeable impact on hospitals. It is likely that any progress on healthcare legislation will be limited in 2020 due to divided government control.

MARGINS AND LIQUIDITY STABILIZE



Source: Merritt Research Services

INCREASE IN EXPOSURE TO GOVERNMENT PAYORS
(Cumulative change since 2010)



Source: Merritt Research Services

Resiliency remains weak.

The hospital sector is subject to a downturn in the economy, as increased unemployment would lead to less commercial insurance and more Medicaid. If the economy were to slow, unpaid hospital bills would also rise, and patients may elect to delay procedures. Reliance on federal and state funding, which may decline in a downturn, leaves hospitals exposed to policy shifts. Additionally, hospitals are impacted by equity market volatility as their non-operating income and investment returns would drop if stocks declined.

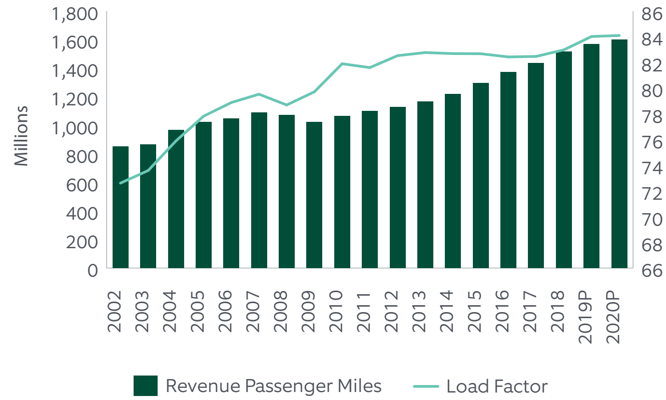
AIRPORTS

Moderating enplanement growth and healthy financial metrics foster stability

Key Outlook Drivers:

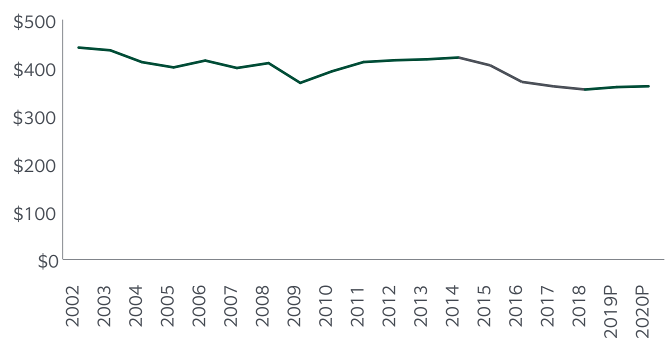
- **Enplanements at record high.** Airlines have enjoyed a decade of profitability.The airline strategy of shifting to larger more fuel efficient planes and fewer flights has paid dividends. Load factors are at all-time highs and 2019 passenger miles is tracking 3.3% ahead of 2018's record. Strong enplanement growth in 2019 allowed airports build stronger cash positions and enhance debt service coverage. Larger planes and heavier passenger traffic have necessitated improvements to terminals at many airports, which has led to higher leverage. Some large hub airports embarking on large capital plans may experience financial pressure if enplanement growth moderates as we expect.
- **Low fares help fuel record passenger traffic.** Average domestic airfare was down 2% in 2018 to $354, which is the lowest inflation adjusted fare since 1991. Increased demand for low cost carriers has helped offset increased fuel costs. The 2019 average fare increased from 2018, as oil prices and seating capacity constraints allowed airlines to boost fares. Absent a spike in oil prices, we expect demand for lower cost providers to continue. This will help moderate fare increases.
- Airports continue to focus on bolstering their financial position by **increasing non-airline generated revenue** such as concessions, parking and ground transportation. Transportation Network Companies (TNC) such as Uber and Lyft have captured demand from other ground transportation options, but the impact to airports has been minimal. They have managed through the shift with higher parking rates and TNC pick-up and drop-off fees.

RECORD PASSENGER TRAFFIC & LOAD FACTOR



Source: Bureau of Transportation Statistics

AVERAGE FARES REMAIN ATTRACTIVE
(inflation adjusted)



Source: Bureau of Transportation Statistics

Resiliency is good.

The sector benefits from essentiality and the consumers' propensity to travel. Airports have used record passenger activity to bolster financial metrics, improve the customer experience, and foster mutually beneficial relationships with airlines..

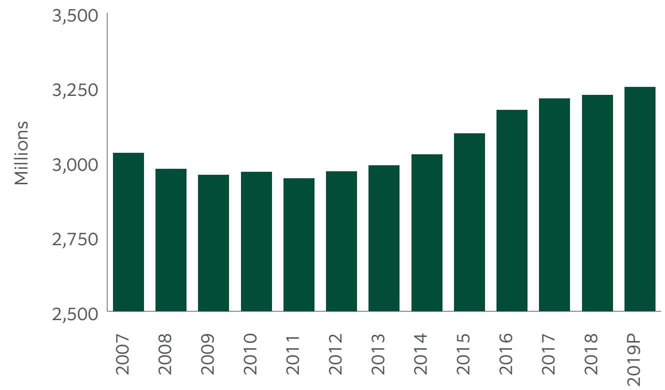
TOLL ROADS

Toll stability supported by high traffic and low fuel prices

Key Outlook Drivers

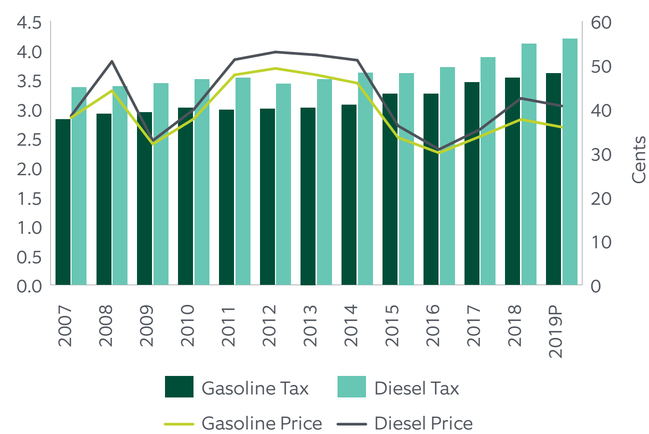
- **Continued economic expansion and strength in the labor market have helped traffic volumes.** Vehicle miles traveled increased each year since 2011, setting records. Affordability has helped drive demand, with low fuel prices contributing to the increased traffic. These trends are likely to continue, but are expected to moderate with the economy.
- **Fuel prices** are expected to be relatively stable in 2020, but uncertainty related to supply increases and slower demand exists.
- **Revenue growth has mostly been driven by increased traffic,** but also by the upward trend in toll rates. The concept of annual inflation adjusted tolls is gaining popularity. Financial metrics have improved with the increased traffic and toll rates.
- The **need for infrastructure improvements,** and the lack of a Federal infrastructure funding plan, has driven states to rely on debt to fund projects. Should this continue in the 2020 election year, we expect debt issuance to grow. The number of miles of toll roads in the U.S. has increased to over 6,000 as of 2017; an increase of nearly 500 miles since 2013. Based on the number of toll road projects in process, this trend will remain intact in 2020.
- **Increased motor fuel taxes.** While the federal gas tax has been constant since 1993, more than half of the states have increased gas taxes since 2013. This helped to fund infrastructure needs and partially offsets the expected revenue decline from fuel efficiency and electric vehicles. While higher taxes tend to put upward pressure on gas prices, reduced demand has acted as a partial offset and kept fuel prices range bound.

VEHICLE MILES TRAVELED HITS RECORD HIGH



Source: Energy Information Administration, Federal Highway Administration

HIGHER GAS TAXES HAVE HAD MINIMAL IMPACT ON GAS PRICES
(Per Gallon)



Source: Merritt Research Services

Resiliency remains strong

Toll roads benefits from essentiality of service, improved financial metrics and the consumer's need and desire to travel. Toll roads generally exhibit enhanced resiliency during periods of economic weakness, as consumers shift some leisure travel to driving verses flying.

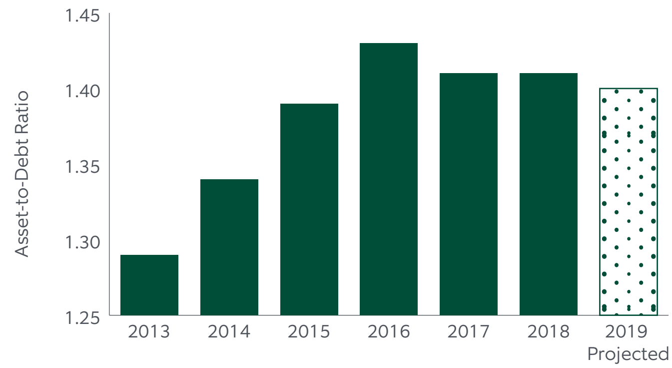
HOUSING (STATE AGENCIES)

Loan origination and Agency margins will moderate with lower interest rates; low affordable supply constrains issuance

Key Outlook Drivers

- **Loan originations will moderate in 2020.** Agencies will find it difficult to offer attractive loan rates as conventional rates trend lower and become more competitive to bond-financed rates.
- **Over-collateralization** (asset-to-debt ratio) is likely to remain steady or increase modestly as prepayments go to bond redemptions as opposed to loan origination, given lower demand.
- **Affordable housing supply remains tight:** High construction costs, increasing home prices, and slow wage growth are contributing to lack of affordable housing supply. This may temper loan origination and Agency margins in the long run.
- **LIBOR transition risk:** Agencies have favored variable rate debt, based on LIBOR. The successor reference rate, SOFR, has been volatile since inception. These issuers have been slow in developing a sound strategy for transition.

ASSET TO DEBT RATIO FLAT AS ISSUANCE MODERATES



Source: Moody's Investors Service

Resiliency is good

Agencies will continue to strengthen their loan portfolio by adding MBS and government insurance, which withstands considerable levels of housing market volatility. Agencies shift toward bond-financed mortgage loans has bolstered balance sheets, providing recurring sources of revenues over the long-term. Additionally, Agencies hold a significant amount of cash and investments (median: 42% of bonds outstanding), which provide support in an economic downturn.

DEFINITIONS

Outlook: The outlook for each municipal sector reflects our opinion on whether key macroeconomic and sector-specific factors will be predominantly supportive or challenging for the sector's fiscal health in the next 12-18 months.

Individual outlooks reflect our base case expectation – a moderation of general economic growth - as well as unique sector-specific factors and trends.

The outlook does not reflect an issuer's ability to navigate these macro factors, nor does it suggest credit trajectory or rating movement for any individual issuer.

The sector outlook considers all issuers in the sector, but is also weighted by market presence. As an example, the state of California (the largest issuer in the market) will impact the State Outlook more than Nebraska (one of the smallest issuers in the market).

Resiliency: Resiliency reflects a sector's relative ability to withstand a material economic downturn within the outlook timeframe. This view specifically considers historical and projected revenue volatility, elasticity of market demand, flexibility of operating costs, fixed cost burden and current reserve position relative to projected need.