



FIRE
APPARATUS
MANUFACTURERS'
ASSOCIATION

The Fire Apparatus Industry: An Update

Developed By: Sage Policy Group, Inc.
for the Members of FAMA

Confidential Draft

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Submitted by:
Sage Policy Group, Inc.

Submitted to:
The Fire Apparatus Manufacturers' Association
(FAMA)

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The Fire Apparatus Industry: An Update

Executive Summary

- Complete Recovery Remains Elusive

The Fire Apparatus Manufacturers' Association (FAMA) tasked Sage Policy Group, Inc. (Sage) with organizing and analyzing FAMA data in order to generate insights regarding observed industry trends and likely future performance. There are two key questions that this analysis endeavors to answer:

- a. Why has the North American firefighting fleet failed to recover in conjunction with the broader economy in terms of units booked?
- b. What can the industry expect in light of economic forecasts and known demographics?

The market for new fire apparatus achieved its peak during the 2006-2008 period when more than 6,000 new apparatus were booked in North America. As the Great Recession began to take its toll, municipal budgets were devastated and fire departments were required to truncate their budgets and forestall capital expenditures. The impact was gradual and grinding as opposed to sudden. Sales did not attain a cyclical nadir until 2012.

The market has generally improved since, but complete recovery remains elusive. Recent data indicate units booked were down 16.7 percent from a year ago during 2018's final quarter and sales remain low by historic standards. Average sales during Q1:2018-Q4:2018 were 2.6 percent below the quarterly average observed over the past 15 years.

The study team has identified four primary explanatory factors for the lack of complete recovery despite a U.S. economy now in its 10th year of economic expansion:

1. State and local governments are collectively taking on less debt to finance capital expenditures in part because of rising Medicaid expenditures and still underfunded pensions. Accordingly, between 2006-2016, total fire protection capital outlays fell by 0.3 percent annually after rising at a 4.4 percent annual rate during the prior decade;
2. Federal Assistance to Firefighters Grants (AFG) program funding has shrunk dramatically since FY2009. That year, grants totaled more than \$500 million. By FY2017, grant funding was a bit more than \$310 million;
3. There have been sharp declines in units booked per 100,000 housing units in many parts of the American Midwest and South as many shrinking communities have lost the financial capacity to re-invest in fire safety and emergency response;
4. Many communities do not have a fire safety equipment replenishment plan. In place of defined strategies, many communities simply apply for federal grants. Waiting for federal monies can result in years of under-investment in firefighting technology and massive deterioration in responsiveness, reliability, and capacity.

- Looking Ahead

The most likely outcome is for units booked to stay relatively flat over the next few years with the likely and notable exception of communities recently ravaged by wildfires and/or those associated with surging metropolitan area populations (e.g. Dallas, Nashville, Phoenix). While state and local government budget health has generally been improving in recent years, many state/local budgets have tilted heavily toward other priorities and that is unlikely to change. Few policymakers appear willing to raise taxes or fees to finance capital expenditures.

Introduction

- Analyzing an Industry Critical to Public Safety

The Fire Apparatus Manufacturers' Association (FAMA) tasked Sage Policy Group, Inc. (Sage) with organizing and analyzing FAMA data in order to generate insights regarding observed industry trends and likely future performance. This report is organized as follows:

1. A discussion of the performance of FAMA members relative to historic norms along key dimensions like orders/sales;
2. A discussion of FAMA's industry outlook survey;
3. An analysis of the state of the U.S. firefighting fleet;
4. An identification of economic, demographic and policy factors that appear to be shaping industry performance.

- Two Primary Research Questions Addressed

There are two key questions that this analysis endeavors to answer:

- a. Why has the North American firefighting fleet required such a lengthy period to recover in terms of units booked?
- b. What can the industry expect in light of economic forecasts and known demographics?

One can, of course speculate on causal factors. There are a number of candidates, including the slow and erratic pace of economic recovery that prevailed during the early years of the economic expansion, concomitant slow recovery in public revenues, or a perception that existing equipment has not yet sufficiently depreciated to justify significant new investment in additional capital.

While these explanations are conceivable, there exist reasons to at least partially dismiss them. First, while the economic recovery had not been particularly robust during much of its initial 8 years, it has been protracted. As of this writing, the U.S. economy has completed nearly 10 years of economic expansion, rendering it the second longest in American history. While output growth has been erratic, the nation has created nearly 21 million jobs since the end of the downturn, recently enjoyed a nearly 50-year low in unemployment and has experienced a surge in wealth creation due to booming equity markets and a recovering housing market. After a period of economic softness during the middle years of the current decade, the Canadian economy has also begun to recover more aggressively, particularly in large metropolitan areas like Toronto and Vancouver.

In short, the broader economic context in which the North American fire apparatus manufacturing segment operates has become quite positive. While there are concerns about the future as the global economy continues to slow and evidence of weakness surfaces in U.S. manufacturing and other segments, to date, the level of economic strength would lead one to believe that the fire apparatus industry should be thriving presently. The question is, "is it?"

I. FAMA Industry Performance

Current & Historic Performance

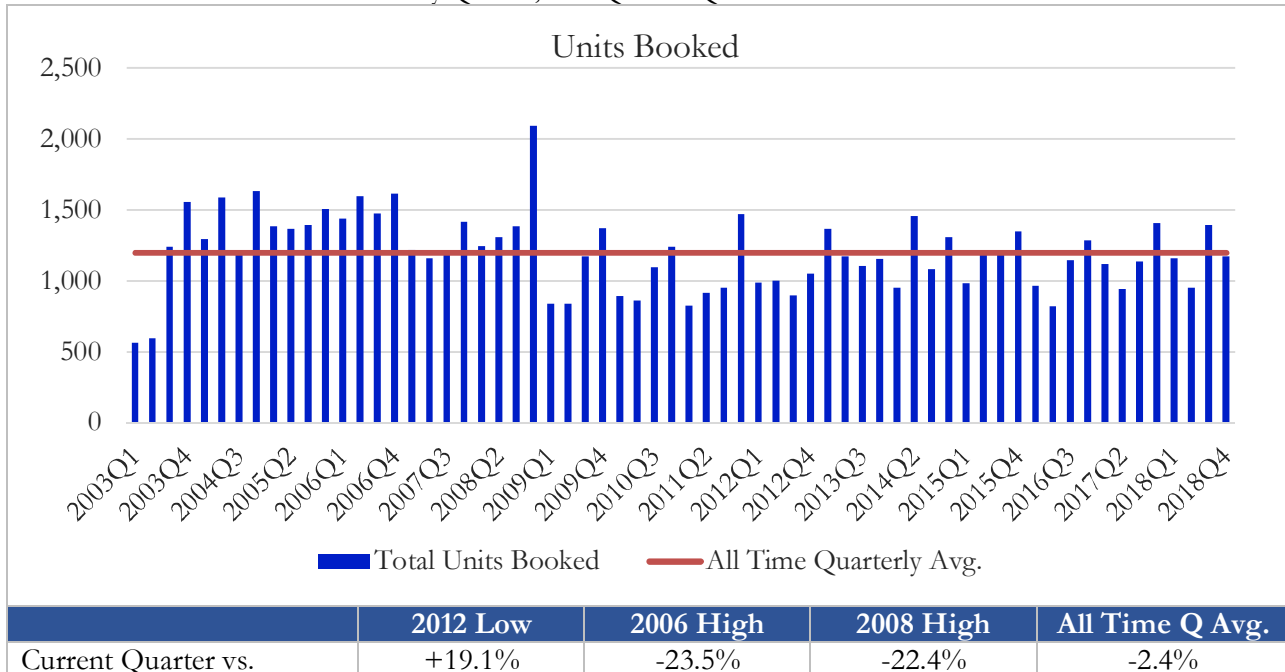
The market for new fire apparatus achieved its peak during the 2006-2008 period when more than 6,000 new apparatus were sold (measured as units booked) in North America (FAMA members). As the Great Recession began to take its toll in earnest after the failure of Lehman Brothers on September 15, 2008, municipal budgets were devastated and fire departments were required to truncate their budgets and forestall capital expenditures.¹ The impact was gradual and grinding as opposed to sudden. Sales did not reach a cyclical nadir until 2012. By that point, bookings were down 35 percent from their pre-established peak.

Exhibit 1. FAMA Members' Units Booked: Recent Historic Highs & Lows

	Time Period	Units Booked
Low	2012 Quarterly Average	982
	2006 Quarterly Average	1,529
Highs	2008 Quarterly Average	1,507

The market has generally improved since, but complete recovery remains elusive. While total sales of new fire apparatus in North America (measured in terms of units booked) had been increasing since 2012 for a period, they declined 11 percent in 2016.

Exhibit 2. Total Units Booked by Quarter, 2003Q1-2018Q4



Source: FAMA; Sage

¹ FAMA. "Big Data in The Fire Service" https://www.fama.org/forum_articles/big-data-fire-service/.

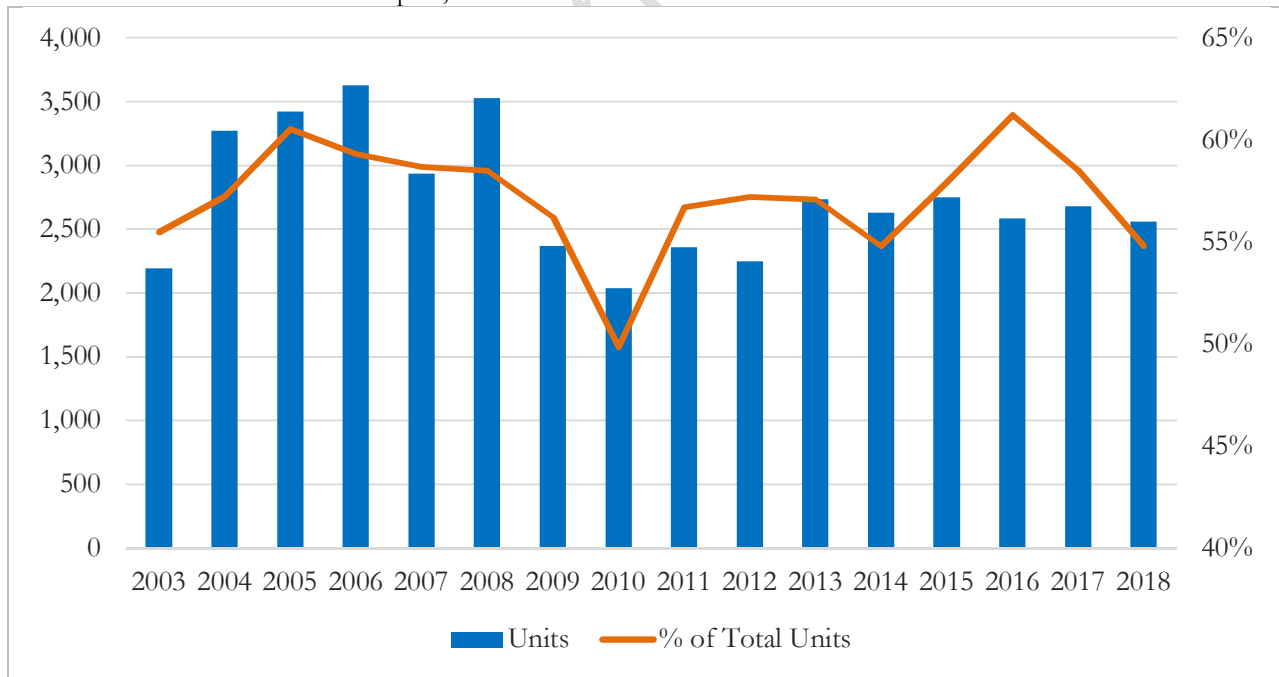
Recent data indicate that units booked declined 16 percent during 2018’s final quarter after increasing by more than 46 percent during the third. Units booked were down 16.7 percent from a year ago during last year’s fourth quarter, and sales remain low by historic standards. Average sales during Q1:2018-Q4:2018 were 2.6 percent below the quarterly average observed over the past 15 years.

This seems remarkable given not only the improved performance of the economy and state/provincial/local budgets, but also given the significant attention given to wildfires in California and elsewhere in recent years. Moreover, with more North Americans aging, the demand for emergency response of various types is on the rise. One might think that that by itself would have triggered more aggressive recovery in units booked by FAMA members.

Vehicle Class

Pumpers represent the majority of sales, historically around 57 percent of all units booked. There has been a declining sales trend for pumpers overall, however, with sales down 2.9 percent annually on average from 2006-2018 (compound annual growth rate). After experiencing a compound annual growth rate (CAGR) of -7.2 percent from 2006-2011, pumpers recovered slightly and grew at a 3.6 percent CAGR from 2012-2017. However pumper sales declined in 2018, lowering the average growth rate for the past 5 immediate years (2013-2018) (see Exhibit 5 below).

Exhibit 3. Units Booked: Pumpers, 2003-2018



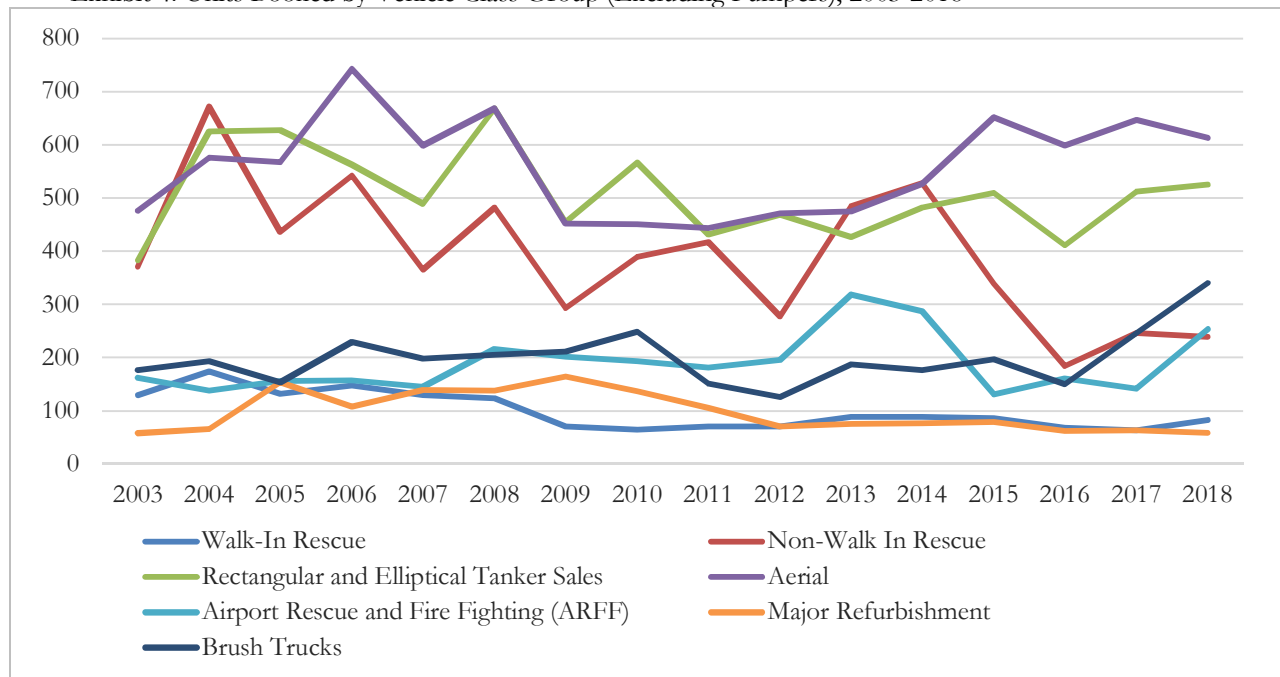
Source: FAMA; Sage

Aerial apparatus, rectangular and elliptical tankers, and non-walk in rescue collectively represent the next largest source of sales. Aerial apparatus is one of the only categories to experience significant growth in sales in recent years, with units booked expanding 5.2 percent annually on average from 2013-2018 (CAGR).

Rectangular and elliptical tanker sales have also grown, experiencing a 4.2 percent annual growth in booking activity during the 2013-2018 period. Within that category, rectangular tankers have far outpaced elliptical tankers. Elliptical tankers have declined from around 46 percent of tanker sales in 2003 to just 7.6 percent of tanker sales in 2018, while rectangular tankers have grown from around 54 percent to 92 percent of tanker sales. This may be because rectangular tankers can provide more capacity.²

Non-walk in rescue had been growing steadily, largely in response to the shift toward firefighters responding to more medical emergencies.³ However, sales of non-walk in rescue declined significantly in recent years, particularly from 2014-2016.

Exhibit 4. Units Booked by Vehicle Class Group (Excluding Pumpers), 2003-2018



Source: FAMA; Sage

² FAMA. “Changes in Fire Apparatus Now and in the future”. https://fama.org/wp-content/uploads/2015/09/1441730972_55ef119c7b1f3.pdf.

³ Ibid.

Exhibit 5. Units Booked by Vehicle Class, Compound Annual Growth Rate (CAGR) Over Select Periods

Vehicle Class	CAGR	
	2007-2012	2013-2018
Pumpers	-5.2%	-1.3%
Walk-In Rescue	-11.5%	-1.4%
Non-Walk In Rescue	-5.3%	-13.2%
Rectangular and Elliptical Tanker Sales	-0.9%	4.2%
Aerial	-4.7%	5.2%
Airport Rescue and Fire Fighting (ARFF)	6.2%	-4.5%
Major Refurbishment	-12.6%	-4.7%
Brush Trucks	-8.6%	12.7%
Total Units Booked	-4.7%	-0.5%

Source: Fama; Sage

The most recent full year of data indicates an overall increase in units booked of 1.5 percent across all vehicle classes. Orders for brush trucks, which had been steady for a number of years, experienced the second largest increase, expanding by nearly 40 percent from 2017 to 2018. Brush trucks also experienced the fastest rate of growth in booking over the past five years among all types of apparatus. Undoubtedly, this is largely in response to historic wildfires, including in California.

Wildfires are hardly novel. The Peshtigo Fire in 1871 represents the deadliest wildfire in U.S. history. That fire burned through 1.2 million acres in Wisconsin and killed 1,200 people. The Cloquet Fire of October 1918 ravaged 250,000 acres in Minnesota and proved fatal to 450 people.

Tragedy has continued into contemporary times. As an example, the 2013 Yarnell Hill Fire in Arizona burned through 8,400 acres and killed 19 members of the Granite Mountain Hotshots, a team within the Prescott Fire Department with a mission to fight wildfires. Violent wildfires have been ravaging California with regularity since at least 1990.

Exhibit 6. Units Booked by Vehicle Class, 2017 v. 2018

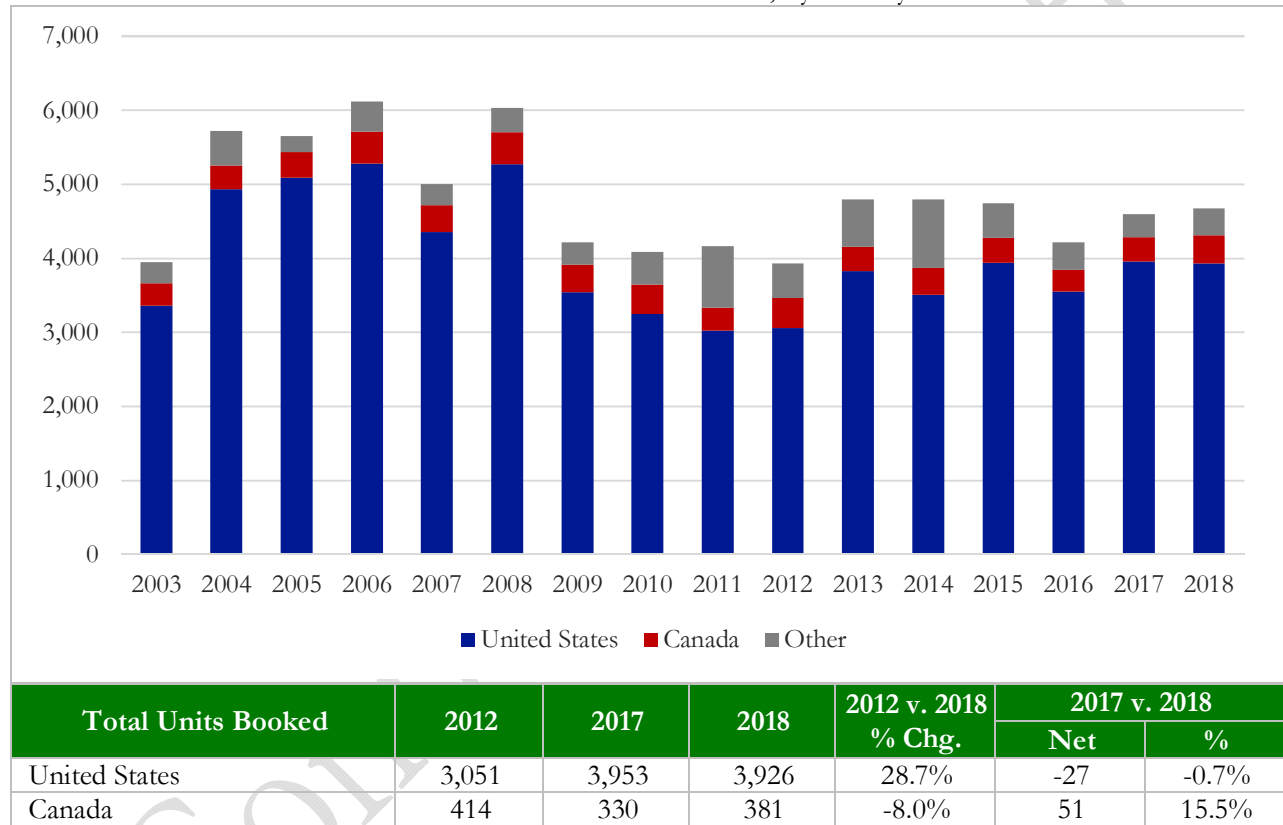
Vehicle Class/Units Booked	2017	2018	2017 v. 2018	
			Net	%
Pumpers	2,678	2,556	-122	-4.6%
Walk-In Rescue	63	82	19	30.2%
Non-Walk In Rescue	246	239	-7	-2.8%
Rectangular and Elliptical Tanker Sales	512	525	13	2.5%
Aerial	647	613	-34	-5.3%
Airport Rescue and Fire Fighting (ARFF)	141	253	112	79.4%
Major Refurbishment	63	59	-4	-6.3%
Brush Trucks	246	340	94	38.2%
Total Units Booked	4,596	4,667	71	1.5%

Source: Fama; Sage

State, Provincial & Regional Trends

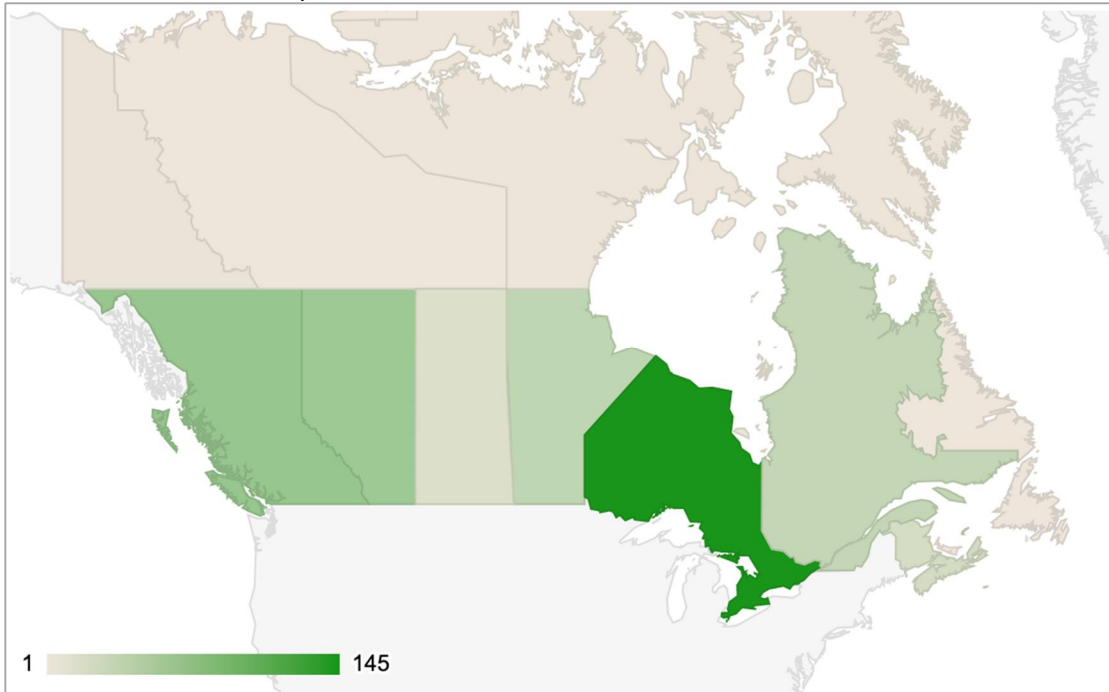
Given the fact that the U.S. is the largest economy in the world and Canada is tenth, it comes as little surprise that the majority of sales in North America originates in the U.S. Sales in the U.S. have been relatively steady, declining by less than a percentage point in 2018. Canadian economic growth picked up sharply in 2017 after stumbling in 2015 and 2016. As a result, more local governments may feel empowered to move forward with equipment purchases. But Canadian GDP growth slowed yet again in 2018. Still, units booked in Canada were up by more than 15 percent in 2018.

Exhibit 7. 2003-2018 Historic Performance: Total Units Booked, By Country



Canada. Within Canada, apparatus sales tend to be concentrated in Ontario, Alberta, and British Columbia. This is also hardly shocking given that many of the nation’s primary metropolitan areas, including Toronto, Ottawa, Calgary, Edmonton, and Vancouver are in these populous provinces. Ontario represented the bulk of the growth in Canadian units booked from 2017 to 2018.

Exhibit 8. Units Booked by Canadian Province, 2018



Source: FAMA; Sage.

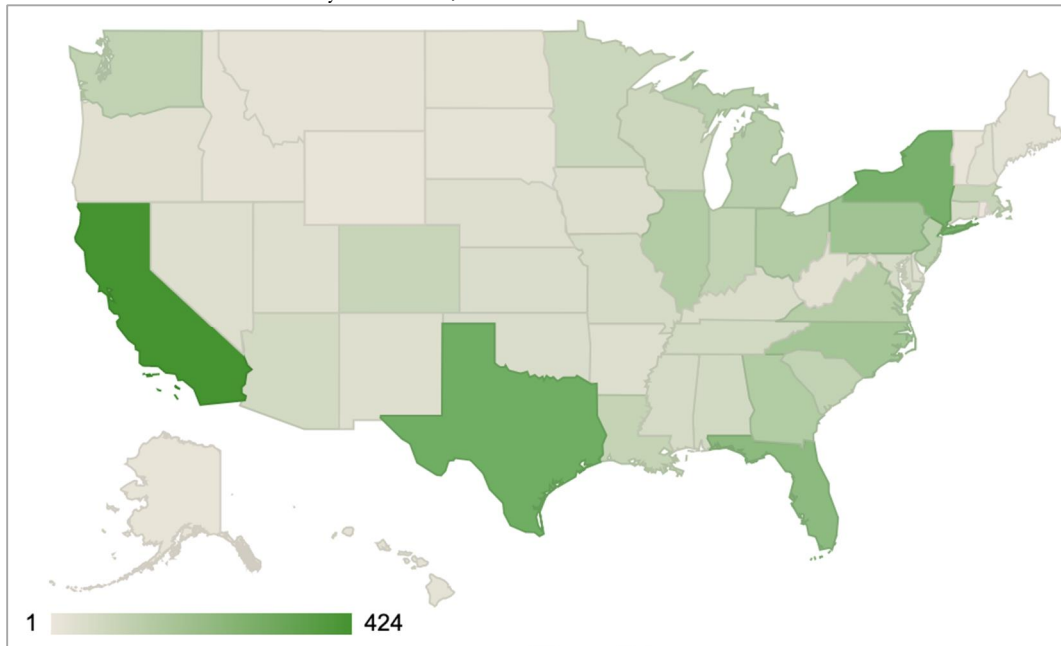
Exhibit 9. Units Booked by Canadian Province, 2017 v. 2018

State	2017	2018	2017 v. 2018	
			Net	%
Alberta	50	53	3	6.0%
British Columbia	59	59	0	0.0%
Manitoba	22	32	10	45.5%
New Brunswick	21	18	-3	-14.3%
Newfoundland and Labrador	3	2	-1	-33.3%
Nova Scotia	14	19	5	35.7%
Northwest Territories	0	2	2	-
Nunavut	1	3	2	200.0%
Ontario	116	145	29	25.0%
Prince Edward Island	2	1	-1	-50.0%
Quebec	27	29	2	7.4%
Saskatchewan	10	14	4	40.0%
Yukon	5	4	-1	-20.0%
Total Canada	330	381	51	15.5%

Source: FAMA; Sage.

United States. Within the U.S., large states like California, Texas, New York, and Pennsylvania unsurprisingly represent large shares of total sales. Washington and California, which have both been plagued by wildfires in recent years, experienced the largest net increases in units booked from 2017-2018. Three East Coast states, Maryland, North Carolina, and New Jersey, experienced the largest net declines.

Exhibit 10. Units Booked by U.S. State, 2018



Source: FAMA; Sage

Exhibit 11. Units Booked by U.S. State, 2017 v. 2018

Rank	State	Chg. in Units Booked	Rank	State	Chg. in Units Booked	Rank	State	Chg. in Units Booked
1	Washington	35	17	Utah	10	34	New Mexico	-7
2	California	34	17	Virginia	10	36	Minnesota	-9
3	South Carolina	24	20	Alabama	7	36	Vermont	-9
4	Colorado	23	21	Kentucky	4	38	District of Columbia	-13
4	Delaware	23	22	Iowa	1	38	Maine	-13
6	Texas	18	22	Indiana	1	38	Michigan	-13
7	Georgia	17	22	Nebraska	1	38	Pennsylvania	-13
7	Illinois	17	22	Wyoming	1	42	Massachusetts	-16
9	Mississippi	16	26	Ohio	-2	42	Oregon	-16
10	Nevada	15	26	South Dakota	-2	44	Idaho	-17
11	New York	14	28	Arkansas	-4	44	Wisconsin	-17
11	Hawaii	14	28	Tennessee	-4	46	Missouri	-20
13	Arizona	13	30	Alaska	-5	47	Florida	-23
14	Montana	11	30	Kansas	-5	48	Louisiana	-25
14	North Dakota	11	32	Rhode Island	-6	49	New Jersey	-28
14	New Hampshire	11	32	West Virginia	-6	50	North Carolina	-38
17	Oklahoma	10	34	Connecticut	-7	51	Maryland	-49
							Total U.S.	-27

Source: FAMA; Sage. Notes: 1. There were 0 units booked in 2017 and 2018 for the following areas: American Samoa, Guam, Puerto Rico, Virgin Islands, and Northern Marianas (1 unit in 2017). 2. See Appendix for more data regarding units booked by state in 2017-18.

Industry Outlook Survey

Profile of Responding Departments

FAMA has been surveying fire departments regularly in recent years, thereby supplying industry stakeholders and others with an enormously valuable body of information. Almost 700 fire department decisionmakers responded to FAMA's 2018 industry outlook survey. The majority of FAMA respondents' organizations are volunteer/paid on-call departments (62.8%) or combination career/volunteer departments (20.1%). In general, this neatly reflects the overall U.S. fire fleet. The U.S. Fire Administration (USFA) National Fire Department Registry indicates that fire departments are predominately volunteer (70.8%) or mostly volunteer (16.0%).⁴ A slightly larger share of FAMA survey respondents are from career fire departments compared to the national average (14.2% v. 8.7% nationally).

Almost 90 percent of responding departments service populations of 50,000 people or less. Departments serving communities of less than 5,000 people made up 38.7 percent of the survey responses and those serving communities of 5,001-50,000 represented 51.1 percent of responses.

More than 75 percent of surveyed departments have combined front line and reserve fire apparatus fleets of less than 10 vehicles. This appears to align with statistics reported by the National Fire Protection Association (NFPA). The NFPA's Fourth Needs Assessment of the U.S. Fire Service indicates that the average fleet size per department was 7.94 vehicles in 2015.^{5,6} Small fleet sizes make sense given that most departments are volunteer and serve small-to-medium sized communities.

Respondents were also asked about the average age of their department's front-line apparatus. Most respondents report having apparatus that is at least 10 years old, and more than a quarter report that their department's apparatus is at least 16 years old. In 2015, approximately 43 percent of all fire department engines and pumpers in the U.S. were at least *15 years* old according to NFPA estimates.⁷

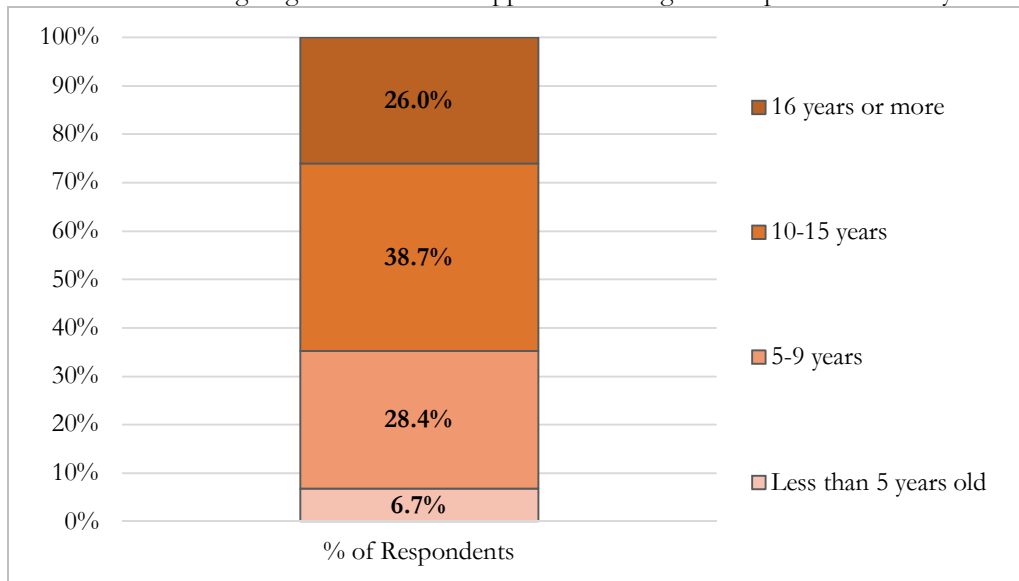
⁴ U.S. Fire Administration (USFA). "National Fire Department Registry quick facts".

⁵ NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. 124.

⁶ Including in-service and reserve apparatus. Apparatus includes engines, ladders, tankers, ambulances, and other patient transport vehicles.

⁷ NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016.

Exhibit 12. Average Age of Front-Line Apparatus Among Fire Departments Surveyed



Source: FAMA; Sage

Apparatus Replacement Plans

Departments surveyed were asked about their apparatus replacement plans and processes. Asked whether their fire department maintains a formal or written apparatus replacement plan or process, only 35.4 percent indicated “yes”. According to the NFPA, fewer than half of all departments in the U.S. have plans for replacing apparatus on a regular schedule (43% in 2015).⁸

FAMA survey results indicate that fewer departments had apparatus replacement plans compared to previous survey years. However, the phrasing of the 2018 survey question may have contributed to the decline in respondents answering “yes” to this question.

The survey questions were phrased as such:

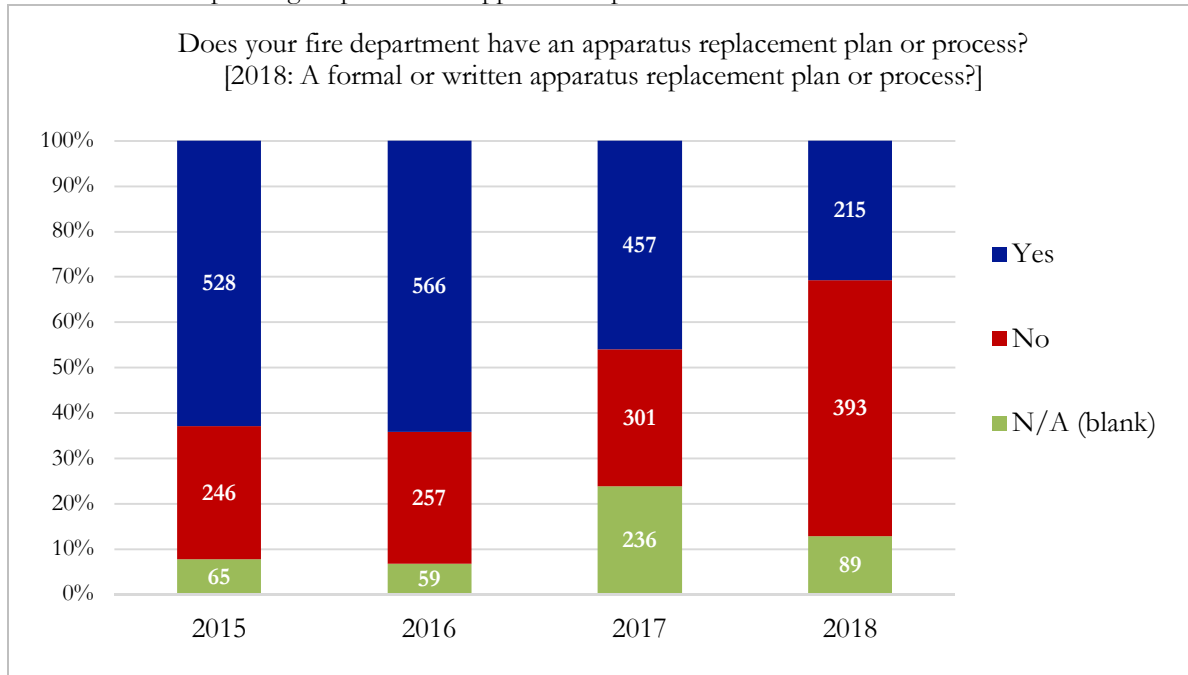
Survey years 2015-2017: “Does your fire department have an apparatus replacement plan or process?”

Survey year 2018: “Does your fire department have a formal or written apparatus replacement plan or process?”

It may be that more departments have replacement plans, but those plans are not necessarily formalized in an official or written way.

⁸ NFPA. “Fourth Needs Assessment of the U.S. Fire Service”. November 2016. p. 127.

Exhibit 13. Responding Departments: Apparatus Replacement Plans



Source: FAMA; Sage

Respondents were asked how their department determines that an apparatus is ready for replacement. Among responding departments (approximately 27 percent of respondents left this question blank), age of apparatus is the primary determinant of replacement (57% of respondents), second to cost of maintenance (40%). The NFPA notes that while vehicle age alone is not sufficient to confirm the need for replacement, it is indicative of a potential need, which should be examined.⁹ Furthermore, age and cost of maintenance are likely closely related, as the cost of maintenance presumably increases with the number of years apparatus has been in service.

⁹ NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. 124.

Choosing Equipment & Apparatus

Surveyed departments were asked to rank certain factors in order of how important those factors are in selecting a new piece of equipment or apparatus. Specifically, questions were asked regarding sources of information, brand loyalty, and service/manufacturer attributes.

Sources of Information. When seeking information regarding apparatus and equipment, person-to-person interaction or word of mouth appears to be the most important source of information. Respondents were asked to rank seven sources of information and a plurality (26.7%) ranked word of mouth/colleagues as the number one most important source. Almost 43 percent of respondents ranked word of mouth/colleagues as 1st or 2nd. The second most important source of information was manufacturer/dealer salespersons, with a bit more than 23 percent of respondents ranking this source of information as the most important and more than 44 percent ranking it as 1st or 2nd.

Trade publications and manufacturer/dealer websites appear to be less important than word of mouth information, and social media appears to be the least important source of information for departments considering new equipment or apparatus. More than half of respondents (51.5%) ranked social media as the least important source of information (7th) and almost 64 percent ranked it 6th or 7th.

Exhibit 14. Most Important Sources of Information on Apparatus & Equipment

Source	% of Respondents			
	Ranked 1 or 2	Ranked 3-5	Ranked 6-7	Total
Trade publications	17.7%	50.2%	32.2%	100%
Trade shows	31.0%	40.2%	28.8%	100%
Word of mouth, colleagues	42.7%	41.7%	15.7%	100%
Manufacturer/dealer websites	29.2%	56.3%	14.5%	100%
Manufacturer/dealer salespersons	44.3%	42.0%	13.7%	100%
Social media (Facebook/Twitter, etc.)	10.0%	26.3%	63.7%	100%
Fire industry website articles	25.2%	43.3%	31.5%	100%

Source: FAMA; Sage.

Brand Loyalty-Equipment. Departments were asked to rank how certain factors contributed to their brand loyalty when purchasing a new piece of equipment. Quality appears to be the most important aspect related to brand loyalty for departments purchasing a new piece of equipment, followed by service, and then price.

Nearly 70 percent of respondents (68.4%) ranked quality as 1st or 2nd as explaining their loyalty to a particular brand. Other popular responses were service (54% indicated this as a 1st or 2nd factor) and price (45%). Delivery timeframe and availability of customized options appear to play the smallest roles in terms of shaping brand loyalty in the context of new equipment purchase.

Exhibit 15. Most Important Aspects Related to Brand Loyalty When Purchasing New Equipment

Aspect	% of Respondents			
	Ranked 1 or 2	Ranked 3	Ranked 4-5	Total
Service	53.9%	29.8%	16.2%	100%
Price	45.4%	35.2%	19.3%	100%
Quality	68.4%	18.0%	13.6%	100%
Availability of customized options	16.7%	13.1%	70.2%	100%
Delivery time frame	15.6%	3.8%	80.7%	100%

Source: FAMA; Sage.

Service/Manufacturer Attributes-Apparatus. Respondents were asked to rank the importance of service/manufacturer attributes in purchasing new apparatus. When selecting new apparatus, after-sales service and parts is the most important service/manufacturer attribute among departments surveyed. Almost 36 percent of respondents ranked this attribute as the most important, and a full 58 percent ranked it as 1st or 2nd. Approximately 23 percent of survey participants ranked the existence of a local dealer 1st. About 20 percent of respondents ranked customer service experience 1st. Brand appears to be the least important factor in choosing new apparatus, suggesting that brand loyalty is rather weak.

Exhibit 16. Most Important Service/Manufacturer Attributes in the Purchase of New Apparatus

Service/Manufacturer Attribute	% of Respondents			
	Ranked 1 or 2	Ranked 3	Ranked 4-5	Total
Local dealer	39.2%	17.0%	43.8%	100%
Brand	25.6%	17.9%	56.6%	100%
Relationship with sales person	26.7%	31.8%	41.5%	100%
Customer service experience	50.3%	20.3%	29.3%	100%
After-sales service and parts	58.2%	13.0%	28.9%	100%

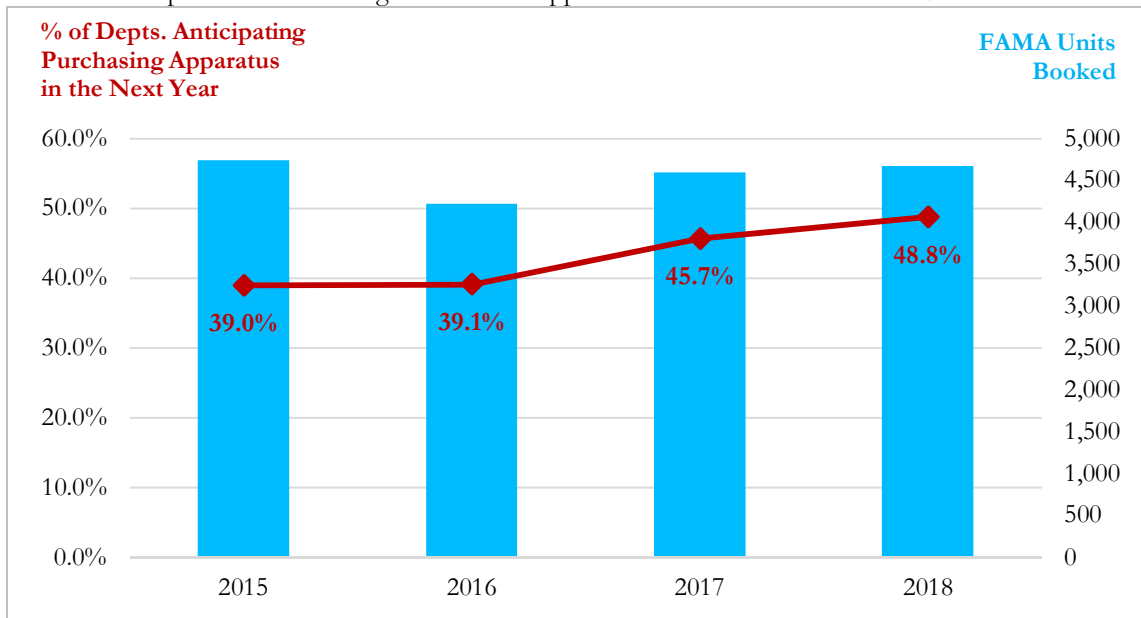
Source: FAMA; Sage.

Industry Outlook

Respondents were asked whether they anticipated purchasing various supplies/inputs (apparatus, equipment, training, etc.) during the fiscal year to come. More than 71 percent of respondents (about 75 percent of respondents answered this question) indicated that their department plans to purchase equipment during the next fiscal year. Nearly 49 percent plan to purchase apparatus, almost 47 percent plan to invest in training, and about a third of respondents plan to acquire computer hardware/software. Relatively few departments expect to spend a portion of their budgets to acquire new fire station furnishings (20.2%) or whole fire stations (13.3%).

In recent years, an increasing share of departments have indicated intentions to purchase apparatus, perhaps a reflection of improved state and local government finances. The number of units booked has also increased.

Exhibit 17. Departments Intending to Purchase Apparatus v. FAMA Units Booked



Source: FAMA; Sage

Among the 49 percent of departments planning to purchase apparatus, 50 percent indicated an intention to purchase pumpers, which translates into approximately a quarter of total respondents (see Exhibit 18 below). While pumper sales have been on the decline over the past decade, they still represent the largest share of sales. What's more, pumpers are the most common type of apparatus respondents intend to purchase in the next year. Intention does not necessarily translate into purchases though. For example, more than a quarter of total departments responding in 2017 planned to buy pumpers in the next fiscal year. However in 2018, units booked for pumpers declined slightly.

Funding uncertainty is one perpetual reason that large purchases may not ultimately transpire. For example, in 2017 departments were asked about applications for/awards of FEMA grants. More than 1-in-5 departments said they had applied for a grant for apparatus in the previous two years (from FEMA or other grant sources), but only 3.4 percent of departments reported receiving a FEMA grant to support the purchase of apparatus.

Economic conditions represent another source of uncertainty. In 2017 departments were asked if they expected to need to take certain actions in response to current economic conditions. Top responses related to apparatus were: “refurbish existing apparatus rather than purchase it new” (13.6% of respondents), “reduce number of planned purchases” (14.6%), and “postpone planned purchases” (20.7%).¹⁰

Exhibit 18. Apparatus Purchase Plans Among Fire Departments Surveyed

Which of the following apparatus do you anticipate purchasing in the next fiscal year?	% of Depts Intending to Purchase
Pumper	24.8%
Other	13.3%
Tanker	12.5%
Rescue	10.6%
Command Vehicle	10.3%
Wildland / Brush Truck	9.5%
Pre-Owned / Used	9.3%
Aerial	7.7%
Refurbished Vehicle	4.3%
UTV	2.9%
ARFF (Airport Rescue Firefighting)	0.6%

Source: FAMA; Sage. *Percentages do not sum to 100 because respondents may indicate intending to purchase multiple types of apparatus.

Finally, fire department decisionmakers were asked about their expectations for staffing and funding levels over the next two years (2018 and 2019). More than half of those who responded expect staffing levels to remain the same over the next two years (61.5%). Almost 30 percent (28.6%) expect staffing levels to increase, and fewer than 10 percent (9.9%) expect to see the size of their staff shrink.

Similar to expectations regarding staffing, a minority of respondents expect budgets for apparatus to decrease over the next two years (8.1%). Most respondents expect budgets to be the same (65%), and more than a quarter (27%) expect budgets to increase. Expectations for overall equipment budgets (excluding capital purchases like apparatus) are generally the same as expectations for apparatus budgets.

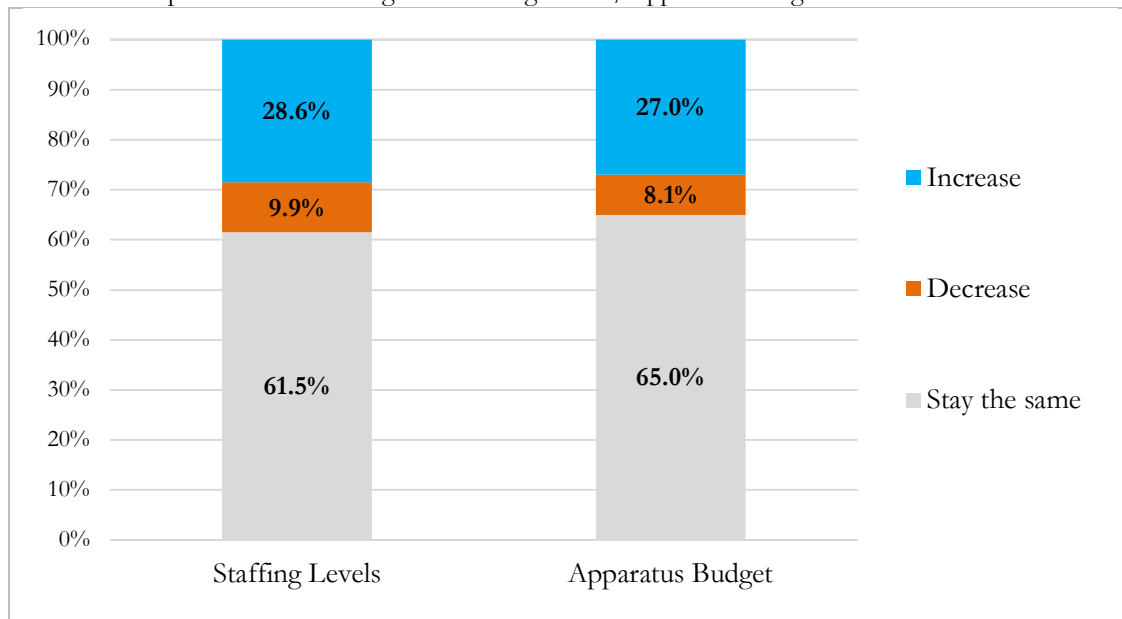
¹⁰ The 2018 survey did not include questions regarding grant funding or actions taken in response to economic conditions.

An analysis of prior survey results regarding expectations for spending on apparatus may be instructive as a leading indicator and to put the latest survey results in a more refined context. In 2016, FAMA asked fire departments if they anticipated their apparatus budgets to increase, decrease, or stay the same over the next two years, which would implicate the years 2016 and 2017. Nearly 11 percent (10.7%) of respondents indicated that they expected their apparatus budgets to decrease, down from 15 percent of those asked during the previous survey year. Indeed, there was predictive power in that response, with FAMA members booking more units in 2017 after declines registered in 2015 and 2016.

When asked the same question in 2017, nearly 12 percent indicated an expectation that their apparatus budgets would decline, consistent with the notion that units booked would slow in 2018. This is precisely what occurred in 2018, with units booked expanding by only 1.5 percent.

This year, only about 8 percent of departments indicated that their apparatus budgets would decline. This, however, does not imply that budgets will necessarily expand. Nearly two in three respondents indicated that they expect their apparatus budgets to remain roughly unchanged over the next two years. This represents the highest proportion of people responding to the question in this fashion in many years. This is consistent with an expectation that units booked will rise modestly in 2019 and 2020.

Exhibit 19. Expectations for Changes to Staffing Levels/Apparatus Budgets over the Next 2 Years



Source: FAMA; Sage

II. Industry Performance in Context

Why has Industry Performance Lagged Broader North American Recovery?

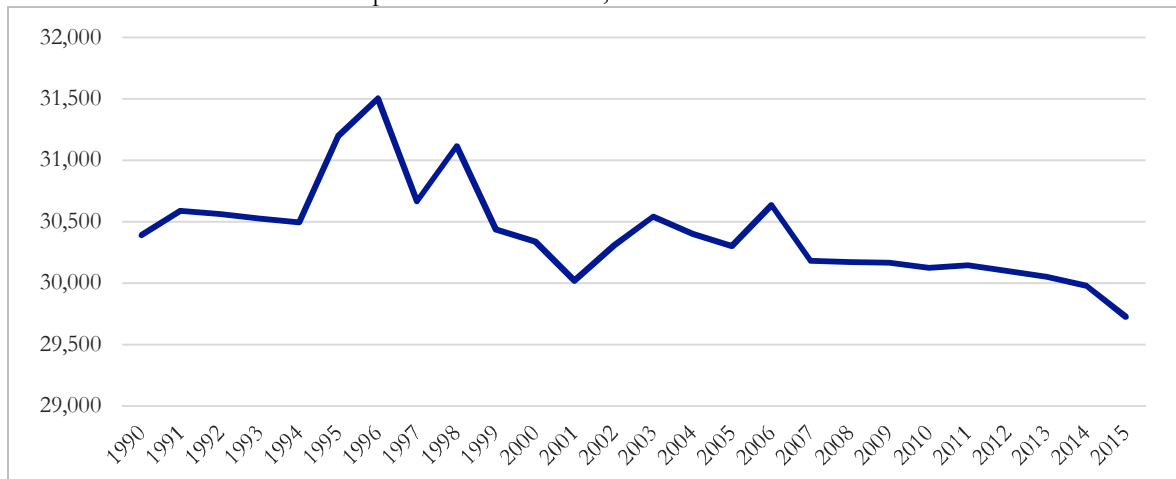
To put FAMA member performance in context, one must consider a range of influencing factors. These include the prevailing condition of the U.S. fire fleet, patterns of government spending, and other demographic and fiscal factors. This part of the report is devoted to considering these and other salient issues.

Most of the data referenced here comes from two publications by The National Fire Protection Association (NFPA): “U.S. Fire Department Profile-2015” (April 2017) and “Fourth Needs Assessment of the U.S. Fire Service” (November 2016). Newer editions of these publications have not been released since the 2017 edition of this report.

The U.S. Fire Fleet

Fire Stations. According to National Fire Protection Association (NFPA) Fire Service Inventory as well as surveys of fire departments, there were 29,727 fire departments in the U.S. as of 2015 (see Exhibit 20 below). As of January 2018, there were more than 27,000 fire departments listed with the U.S. Fire Administration (USFA) National Fire Department Registry, representing about 92 percent of all U.S. fire departments. Registration for the list is voluntary, which is one reason USFA estimates differ from NFPA estimates. Registered fire departments represent more than 51,000 fire stations. While the majority of fire departments have just one station, approximately 17 percent of fire departments have two stations and 14 percent have three or more stations.¹¹

Exhibit 20. Number of Fire Departments in the U.S., 1990-2015

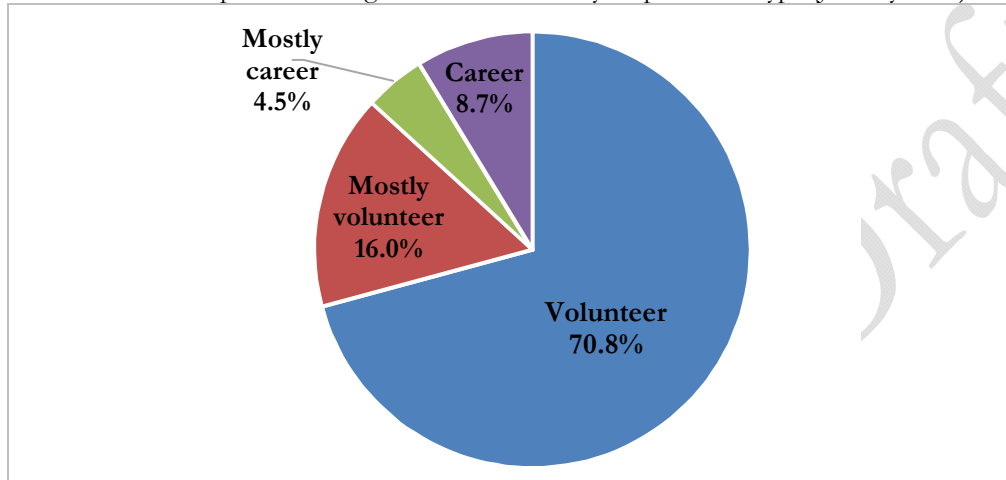


Source: 1. Sage; 2. National Fire Protection Association (NFPA). “U.S. Fire Department Profile-2015”. April 2017. Note: A fire department is a public or private organization that provides fire prevention, fire suppression and associated emergency and non-emergency services to a jurisdiction such as a county, municipality, or organized fire district.

¹¹ U.S. Fire Administration (USFA). “National Fire Department Registry quick facts”.

Local fire departments (which include career, volunteer, and combination departments) represent 96 percent of registered fire departments. Four percent of registered fire departments in the U.S. are state and federal government fire departments, contract fire departments, private or industrial fire brigades, and transportation authority or airport fire departments.¹² Fire departments are predominately volunteer (70.8%) or mostly volunteer (16.0%). The propensity to operate primarily volunteer fire departments varies greatly by state as reflected in Exhibit 22.

Exhibit 21. Fire Departments Registered in the U.S. by Department Type (January 2018)



Source: 1. Sage; 2. U.S. Fire Administration (USFA).

Exhibit 22. Percentage of Registered Depts by Volunteer/Career Status, Top 20 States by Rank (Jan. 2018)

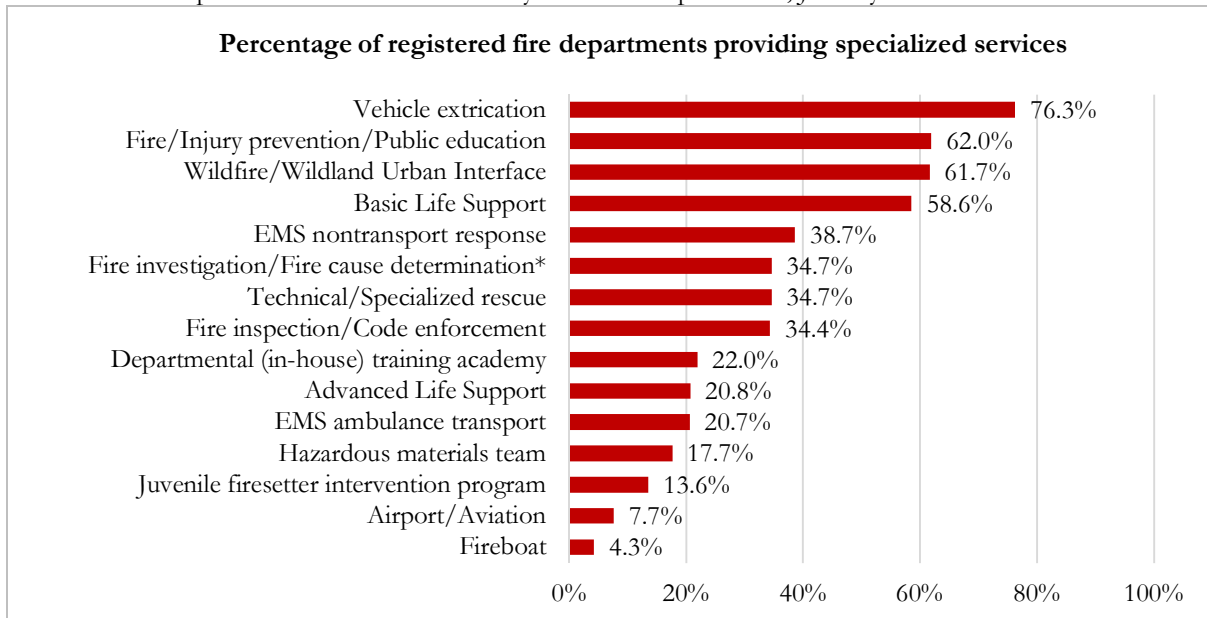
Volunteer & Mostly Volunteer			Career & Mostly Career		
Rank	State	%	Rank	State	%
1	Delaware	98.2%	1	District of Columbia	100.0%
2	Minnesota	97.4%	2	Hawaii	90.9%
3	Pennsylvania	97.0%	3	Florida	52.3%
4	South Dakota	96.6%	4	Massachusetts	45.0%
5	North Dakota	96.6%	5	Arizona	42.3%
5	Vermont	96.6%	6	California	41.6%
7	Nebraska	96.2%	7	Rhode Island	38.1%
8	Iowa	95.9%	8	Georgia	24.8%
9	West Virginia	95.6%	9	Colorado	22.7%
10	New York	94.6%	10	Washington	20.1%
11	Maine	94.3%	11	Nevada	20.0%
12	Montana	93.6%	12	Illinois	19.4%
13	Arkansas	93.5%	13	South Carolina	18.3%
14	Wisconsin	92.5%	14	Ohio	17.0%
15	Oklahoma	91.8%	15	Connecticut	15.2%
16	North Carolina	91.2%	16	Texas	15.1%
17	Kentucky	90.8%	17	Missouri	14.9%
18	Oregon	90.3%	18	New Hampshire	14.6%
19	Kansas	90.1%	19	Louisiana	14.2%
20	Idaho	89.7%	20	Mississippi	13.3%

Source: 1. Sage; 2. U.S. Fire Administration (USFA).

¹² U.S. Fire Administration (USFA). “National Fire Department Registry quick facts”.

Exhibit 23 supplies statistical detail regarding the share of registered fire departments in the U.S. that supply a particular specialized service. With respect to emergency medical services (EMS), nearly 60 percent of all departments offer basic life support and just over 20 percent offer advanced life support. The most common specialized service is vehicle extrication, a service provided by more than 76 percent of registered fire departments.

Exhibit 23. Specialized Services Provided by U.S. Fire Departments, January 2018

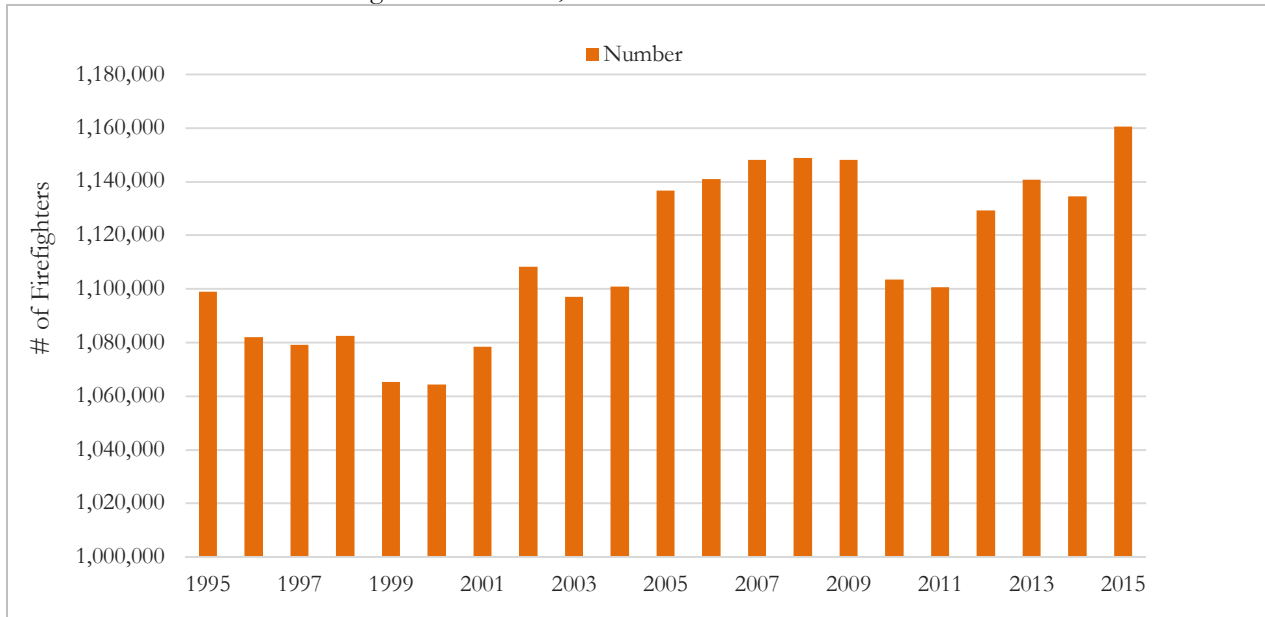


Source: 1. Sage; 2. U.S. Fire Administration (USFA). Notes: EMS: Emergency Medical Services. *Of the departments that provide fire investigation/fire cause determination services, 18 percent have sworn investigators with power to arrest.

Firefighters. The National Fire Protection Association (NFPA) conducts a number of surveys of fire departments that generate data characterizing the active American fire fleet. Data characterizing firefighters and fire apparatus in this section of the report are sourced from NFPA reports and their extrapolations based on survey results.

According to NFPA estimates based on 2015 National Fire Experience Survey data, the number of firefighters in the U.S. expanded 2.3 percent in 2015 to 1,160,450. Perhaps predictably, few firefighters fall beyond the ages of 20 and 59 years old. Thirty to thirty-nine year olds represent the largest share of firefighters (26.7%). Approximately 24 percent of firefighters fall in the 40-49 age group and approximately 21 percent fall in the 20-29 age group.

Exhibit 24. Number of Firefighters in the U.S., 1995-2015



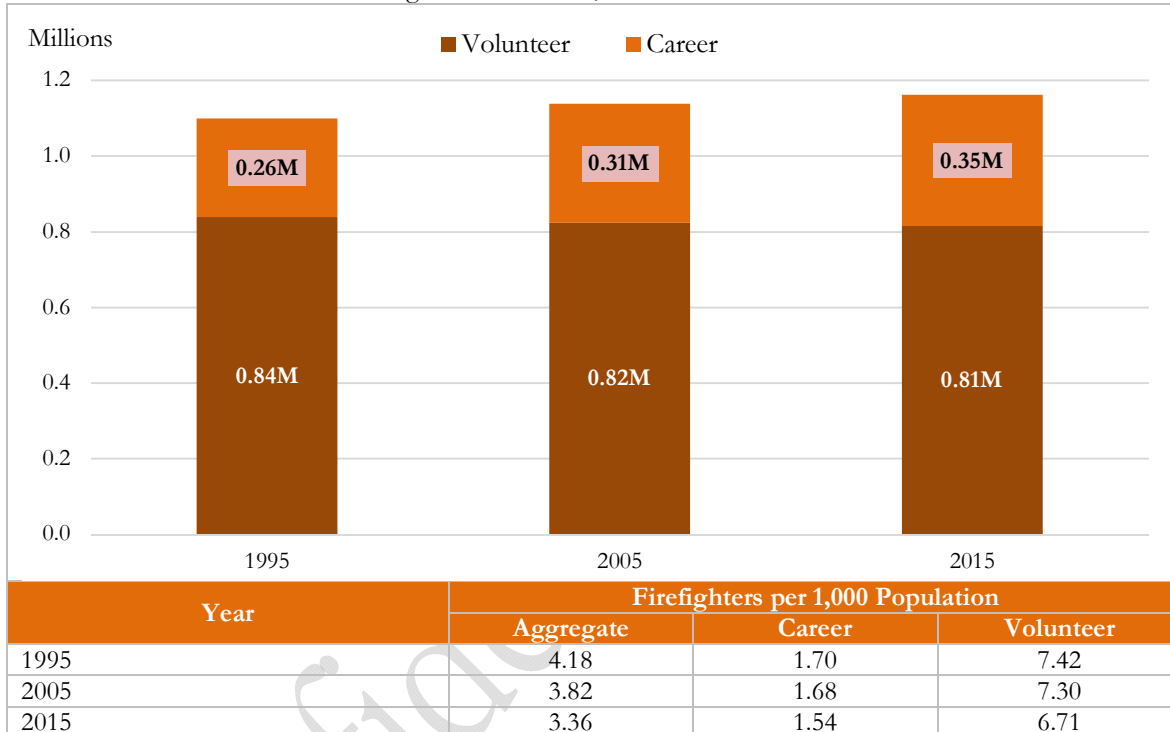
Source: 1. Sage; 2. National Fire Protection Association (NFPA). “U.S. Fire Department Profile-2015”. April 2017. Note: The NFPA’s “U.S. Fire Department Profile” is based on two data sources: the annual NFPA Survey for U.S. Fire Experience, 2015, and the NFPA Fire Service Survey, 2013-2015. The U.S. Fire Experience Survey utilizes a sample of fire departments in the United States to generate national projections. The sample is stratified by the size of the community protected by the fire department. All U.S. fire departments that protect communities with a population of more than 2,500 are included in the sample. (National Fire Protection Association (NFPA). “U.S. Fire Department Profile-2015”. April 2017. p. 2).

According to NFPA, approximately 70 percent of firefighters are volunteers with the balance being career firefighters as of 2015. The number of career firefighters in the U.S. has tended to increase steadily and peaked in 2013 at 354,600. The number of volunteer firefighters declined during the late 1980s and late 1990s before reaching a high of 827,150 in 2008. The number of volunteers dipped after that, likely due to volunteers pursuing paid work during the recession and its aftermath. The number of volunteer firefighters has been expanding since 2012.

The number of firefighters has been expanding even as the number of fire departments has been in decline. There are a number of possible explanations. One may be the ongoing consolidation of fire departments in pursuit of the operational efficiencies wrought by economies of scale and scope. Moreover, volunteer firefighters often work on a part-time basis only. Therefore it may take more volunteers than career firefighters to staff a department, especially in a good economy offering plentiful job opportunities that cut into a volunteer’s available time. Other potential explanations for the number of firefighters growing faster than the number of departments include the shortening of the length of the work week as well as expanded EMS responsibilities, which results in the need to increase staffing. The implication is that each fire department is associated with more workers on average.

According to data reported to the NFPA, as of 2015 the median number of career firefighters per 1,000 population in the U.S. was 1.54, while the median number of volunteer firefighters per 1,000 population was 6.71. One reason for the higher rate of volunteer firefighters is that smaller communities often rely exclusively on this type of personnel, and there needs to be a minimum number of firefighters to staff a department irrespective of the size of community. Furthermore, because volunteer firefighters are often available only on a part-time basis, it may take more volunteers to ensure adequate response to each call.¹³

Exhibit 25. Volunteer/Career Firefighters in the U.S., 1995-2015



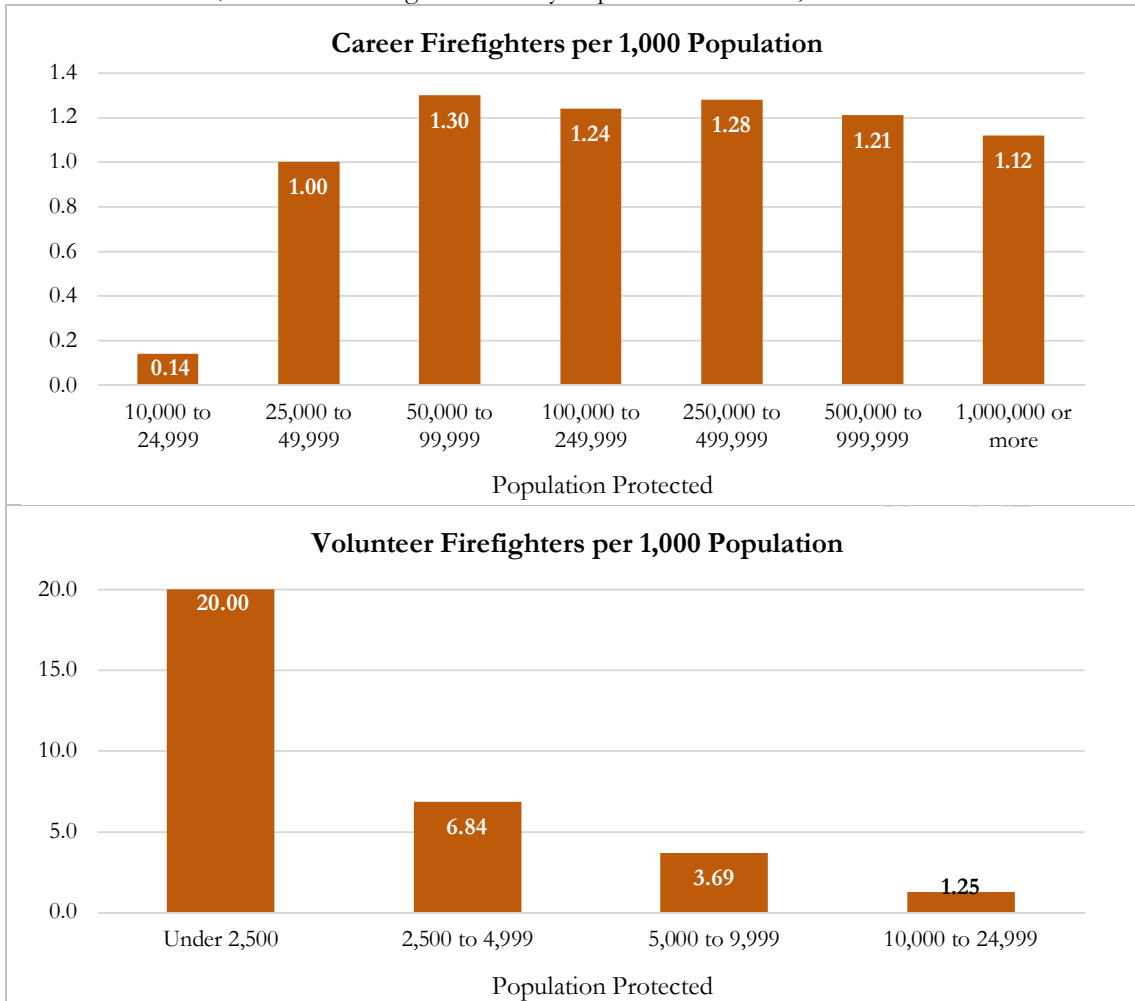
Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2015". April 2017

The rate of firefighters per capita can vary substantially by community size because departments in different communities may "face great variation in their specific circumstances and policies including length of work week, unusual structural conditions, types of service provided to the community, geographical dispersion of the community, and other factors."¹⁴ Exhibit 26 shows the range of rates for career firefighters per 1,000 people in departments protecting at least 10,000 people and for volunteer firefighters in departments protecting a population less than 25,000 people.

¹³ National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2015". April 2017.

¹⁴ National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2015". April 2017. p. 10.

Exhibit 26. Career/Volunteer Firefighter Rates by Population Protected, 2015



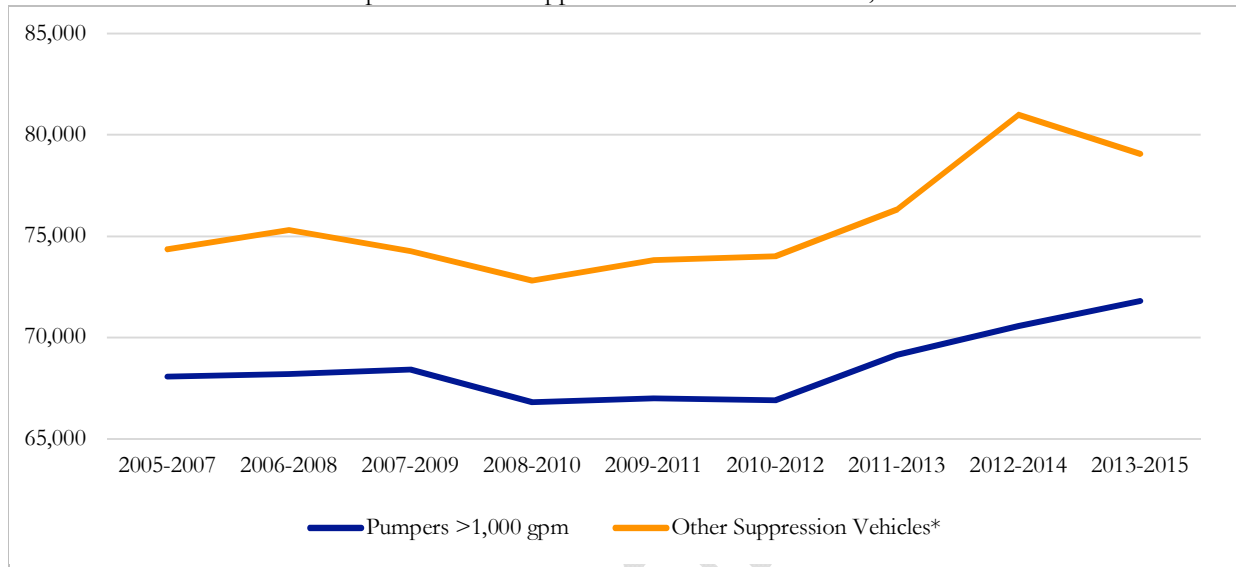
Source: 1. Sage; 2. National Fire Protection Association (NFPA). “U.S. Fire Department Profile-2015”. April 2017.

Fire departments protecting communities of 10,000 people or more are associated with median rates of career firefighters per 1,000 people between 0.14 (10,000 – 24,999) and 1.30 (50,000 – 99,999). For fire departments protecting communities with fewer than 25,000 people (where departments are much more likely to be all or mostly-volunteer), the median rate of volunteer firefighters per 1,000 people ranges from 1.25 to 20.0. This wide range reflects the fact that a minimum number of firefighters is needed to staff a department regardless of community size. The median volunteer firefighter rate declines as population protected increases.¹⁵

¹⁵ National Fire Protection Association (NFPA). “U.S. Fire Department Profile-2015”. April 2017. p. 11.

Fire Apparatus. NFPA estimates indicate that the number of fire apparatus in the United States included 71,800 pumpers, 7,300 aerial apparatus, and 79,050 other suppression vehicles as of 2013-2015.¹⁶ While the number of pumpers has exhibited an upward trend in recent years, the pattern of growth in other suppression vehicles has been more erratic as reflected in Exhibit 27.

Exhibit 27. Number of Pumpers & Other Suppression Vehicles in the U.S., 2005-2015



Source: 1. Sage; 2. National Fire Protection Association (NFPA). “U.S. Fire Department Profile-2015”. April 2017. Note: * Other suppression vehicles include apparatus with pumps less than 1,000 gpm, hose wagons, brush fire vehicles, tankers, etc.

NFPA’s Fourth Needs Assessment of the U.S. Fire Service, which is based on surveys sent to all departments in the NFPA fire service inventory and NFPA estimates for nonresponding departments, supplies estimates for apparatus usage by U.S. fire departments.¹⁷ These estimates indicate that for each fire department there are 3.6 engines, 0.8 ladders, 1 tanker, and 1.5 ambulances on average.

Exhibit 28. Average Apparatus Per Department (All Community Populations), 2013-2015

	Average Number Per Department			
	Engines	Ladders	Tankers	Ambulances*
In Service	3.55	0.81	1.05	1.52
In Reserve	0.81	0.16	0.04	n/a

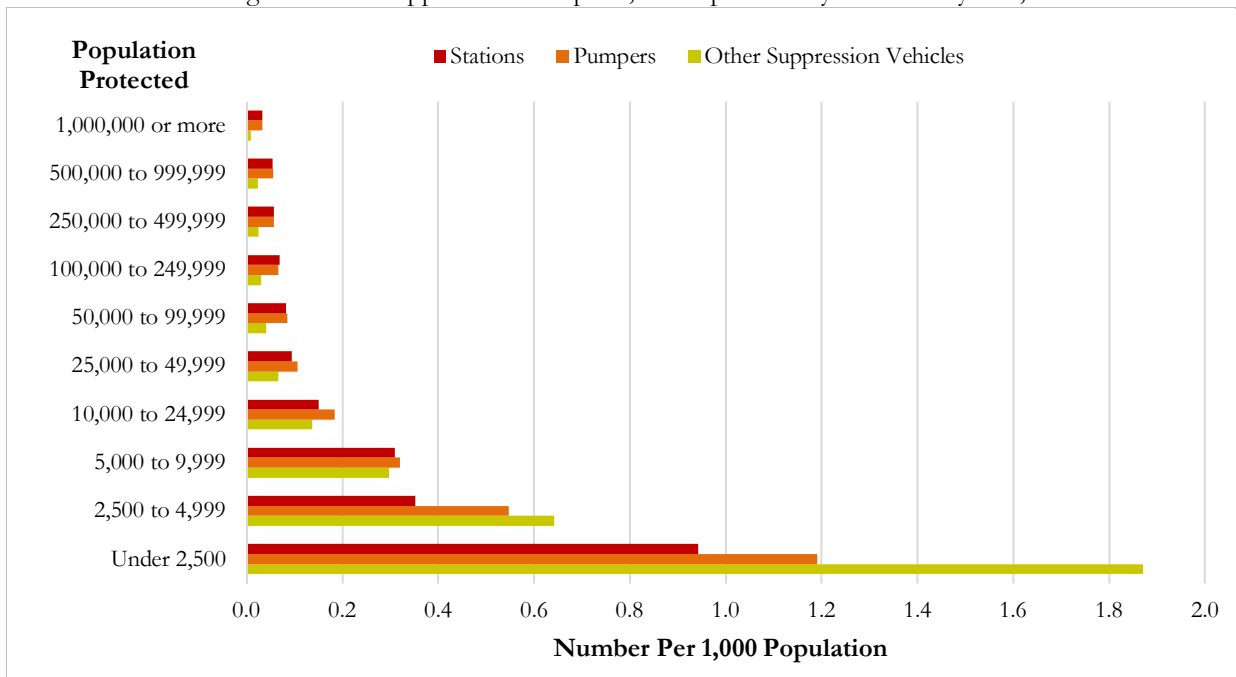
Source: 1. Sage; 2. National Fire Protection Association (NFPA). “Fourth Needs Assessment of the U.S. Fire Service”. November 2016. Notes: *Ambulances include other patient transport vehicles.

¹⁶ National Fire Protection Association (NFPA). “U.S. Fire Department Profile-2015”. April 2017.

¹⁷ The “Fourth Needs Assessment of the U.S. Fire Service” was based on surveys NFPA sent out as a census, meaning that all U.S. fire departments with administrative and fire response responsibilities who were listed in the NFPA fire service inventory were contacted. In all, in 2015, 26,322 fire departments were included in the target population and a total of 5,106 fire departments responded to the survey (19%). In many of the results reported in the “Fourth Needs Assessment of the U.S. Fire Service” the numbers and percentages from respondent departments are projected within population size strata in order to sum to the total of 26,322 known fire departments. This assumes that the survey non-respondent departments are similar to respondents. The projection allows for the calculation of an overall percent, which is based on the sum of the number of projected departments in each population group and not just on those respondent departments. (National Fire Protection Association (NFPA). “Fourth Needs Assessment of the U.S. Fire Service”. November 2016. p. xxxiv).

Average apparatus and station rates differ significantly by community size. Exhibit 29 presents the average number of apparatus per 1,000 people by the size of protected population. Rates of stations, pumpers, and other suppression vehicles per 1,000 people are much higher for departments protecting smaller communities (under 2,500). This is because operating a fire department requires a minimum number of stations and apparatus irrespective of the number of people protected. The NFPA notes that these figures reflect average apparatus and station rates reported to NFPA, and not a recommended rate or defined fire protection standard.

Exhibit 29. Average Station & Apparatus Rates per 1,000 Population by Community Size, 2013-2015

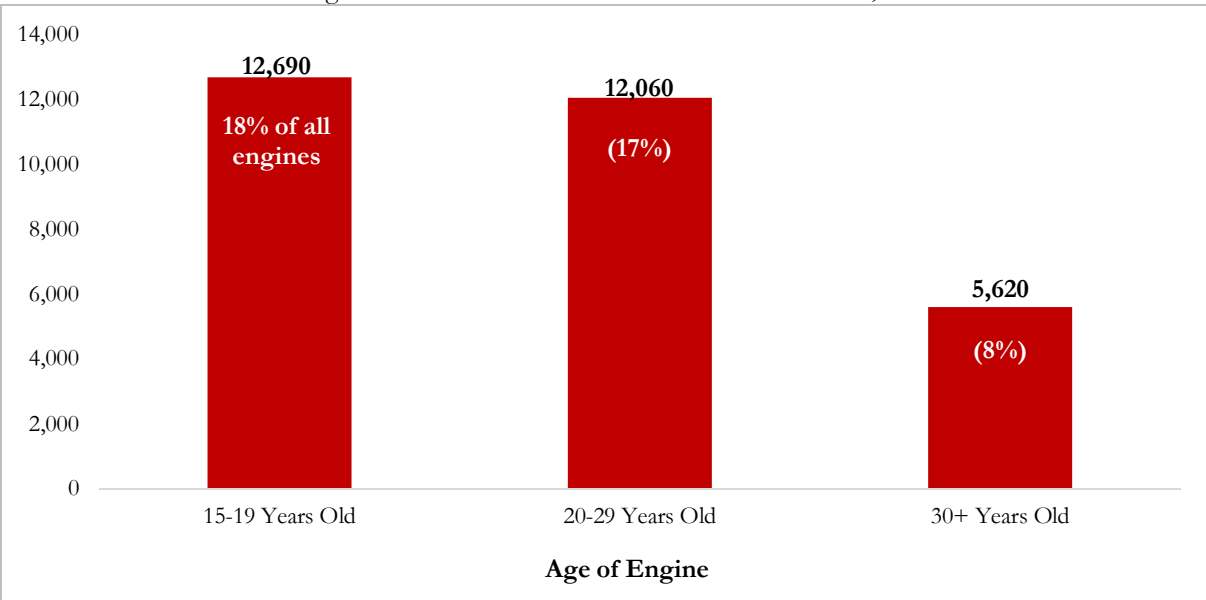


Source: 1. Sage; 2. National Fire Protection Association (NFPA). “U.S. Fire Department Profile-2015”. April 2017.

In 2015, approximately 43 percent of all fire department engines and pumpers were at least 15 years old according to NFPA estimates. A quarter of all units is at least 20 years old. The NFPA notes that while vehicle age alone is not sufficient to confirm the need for replacement, it is indicative of a potential need, which should be examined.¹⁸ Based on this piece of data and others, there is clearly a significant amount of potential need for replacement.

¹⁸ NFPA. “Fourth Needs Assessment of the U.S. Fire Service”. November 2016. p. 124.

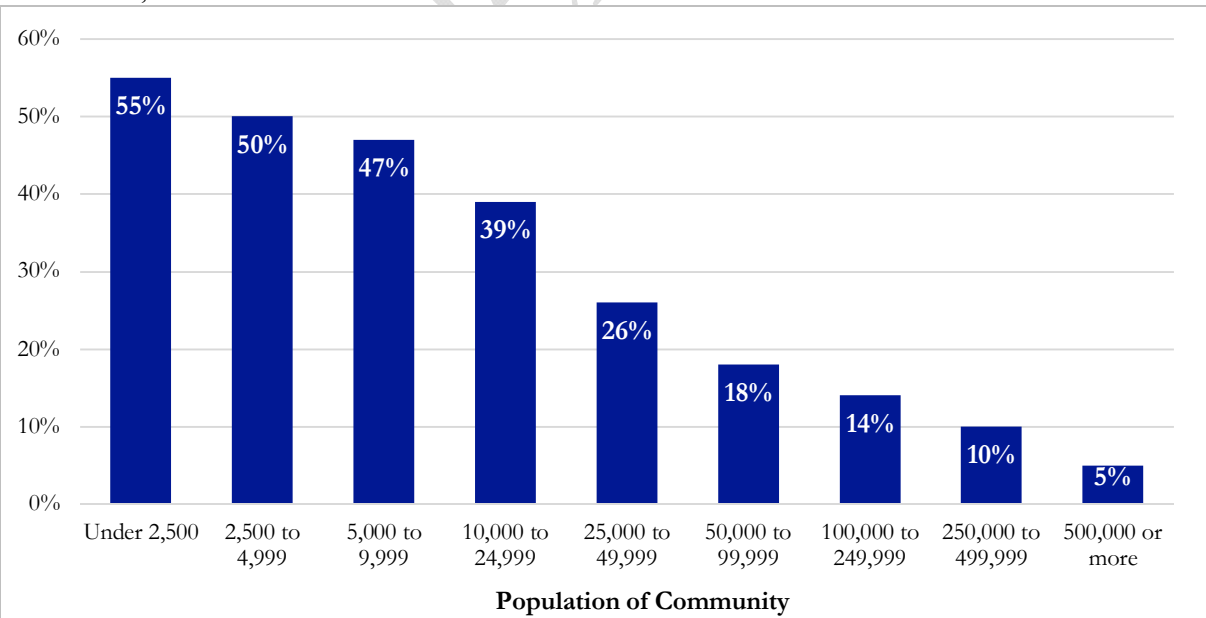
Exhibit 30. Number of Engines in Service that are 15+ Years Old in the U.S., as of 2013-2015



Source: 1. Sage; 2. National Fire Protection Association (NFPA). “Fourth Needs Assessment of the U.S. Fire Service”. November 2016.

As Exhibit 31 indicates, smaller communities are much more likely to have aging fire apparatus relative to larger communities. In communities with fewer than 10,000 people, approximately one-half of engines and pumpers in service are at least 15 years old. The share falls steadily the larger the community on average.

Exhibit 31. Percent of Engines and Pumpers in Service that are 15+ Years Old by Size of Community Protected, as of 2013-2015



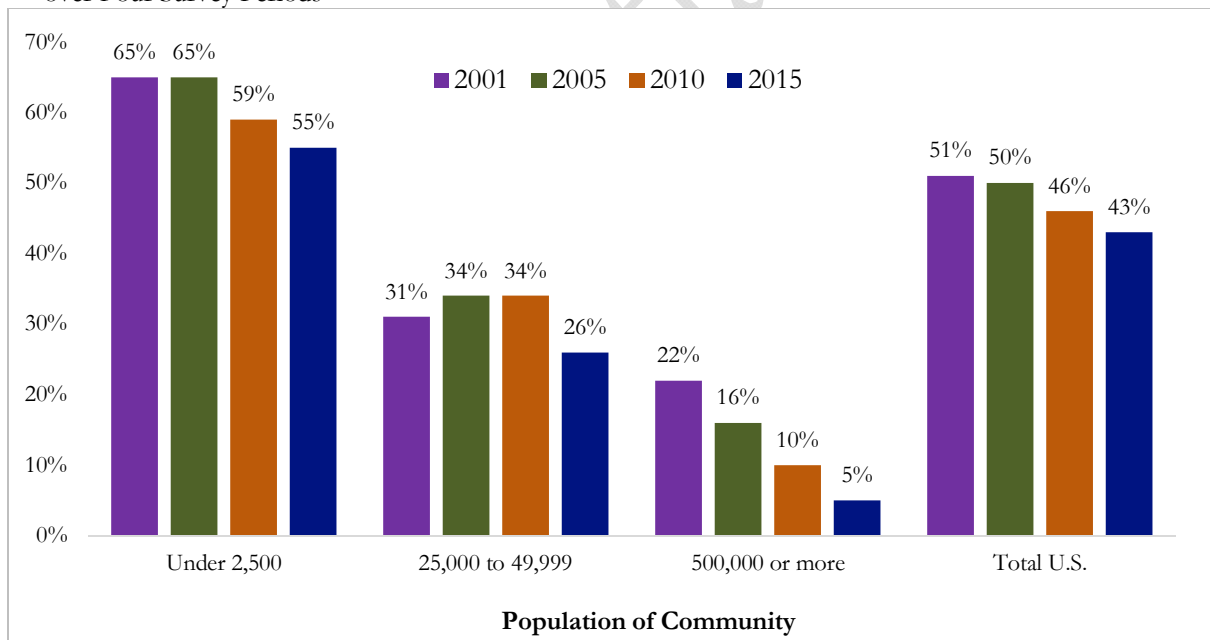
Source: 1. Sage; 2. National Fire Protection Association (NFPA). “Fourth Needs Assessment of the U.S. Fire Service”. November 2016.

- Has a Replacement Cycle Begun in Earnest?

NFPA survey responses collectively hint that there has been some progress in reducing the age profile of the nation’s engines and pumpers in recent years. Across the NFPA’s four Needs Assessment Surveys, the share of engines/pumpers in service that are at least 15 years old has declined from 51 percent in 2001 to 43 percent in 2015. However, this formulation may be misleading and likely understates the level of improvement. This is because a significant amount of replacement is needed simply to hold the age of apparatus constant. According to the NFPA, “without engine replacement nearly all of the 19% of engines that were at least 20 years old in 2005 would have been at least 30 years old in 2015, but the actual percentage of engines that were at least 30 years old in 2015 was 8%.”¹⁹

One of the important benefits of a replacement cycle is that the removal of older fire vehicles from service has the effect of promoting compliance with NFPA 1901, which recommends removing fire vehicles that are over 15 years old from first-line service and calls for departments to replace vehicles over 25 years old.²⁰ Thus, while the number of fire apparatus has not increased as one might have anticipated over time, there is a body of evidence suggesting that there has been a significant amount of turnover in operating units.

Exhibit 32. Percent of Engines and Pumpers in Service 15+ Years Old by Size of Community Protected over Four Survey Periods



Source: 1. Sage; 2. National Fire Protection Association (NFPA). “Fourth Needs Assessment of the U.S. Fire Service”. November 2016.

¹⁹ NFPA. “Fourth Needs Assessment of the U.S. Fire Service”. November 2016. p. 126.

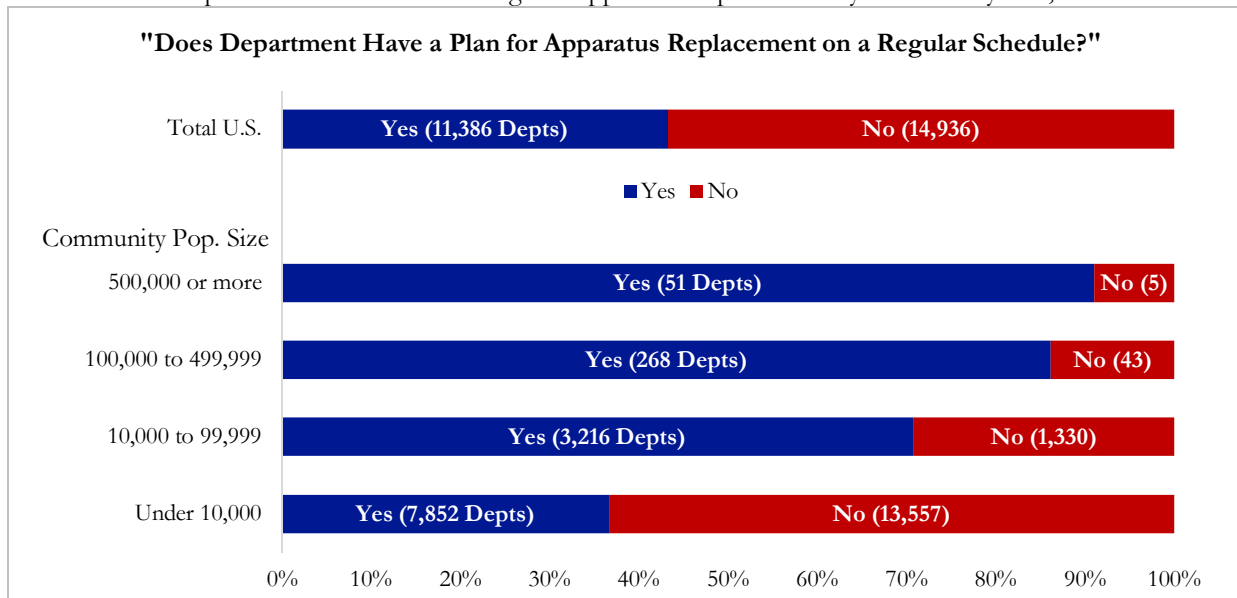
²⁰ Federal Emergency Management Agency (FEMA). “Assistance to Firefighters Grant Program Performance Assessment System”. Fiscal Year 2015 Annual Report to Congress. October 19, 2015.

Exhibit 33 reflects NFPA survey results regarding fire department intentions for planned apparatus replacement on a specified schedule. Nationally, 43 percent of U.S. fire departments have plans to replace apparatus on a regular schedule.

Larger communities are far more likely to maintain regular replacement plans. This is not surprising since larger communities are more likely to be served by career or mostly career fire departments. These departments are more likely to be reflected in annual municipal or county budgets. Department personnel, particularly department leadership, are better positioned to make equipment purchase requests to policymakers in the interests of public safety. These larger communities are also likely to have substantial borrowing capacity and therefore are able to put forth long-range capital improvement plans. For communities where departments are protecting at least 10,000 people, at least 70 percent of departments have established plans for apparatus replacement. That compares to just 36.7 percent for communities under 10,000 population.

Still, there is an observable, upward trend with respect to replacement planning. An expanding share of departments (43%; 2015) have plans for replacing apparatus on a regular schedule, up from 39 percent in 2010 and 35 percent in 2001.²¹ Still, there are nearly 15,000 departments that do not have replacement plans. This means that fewer than half of all departments across the U.S. have replacement plans. Many are likely applying for federal or other grants in the hopes of serendipitous support.²²

Exhibit 33. Departments with Plans for Regular Apparatus Replacement by Community Size, 2013-15



Source: 1. Sage; 2. National Fire Protection Association (NFPA). "Fourth Needs Assessment of the U.S. Fire Service". November 2016.

²¹ NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. 127.

²² Ibid. p. xii.

Trends in Community Fire Protection Spending

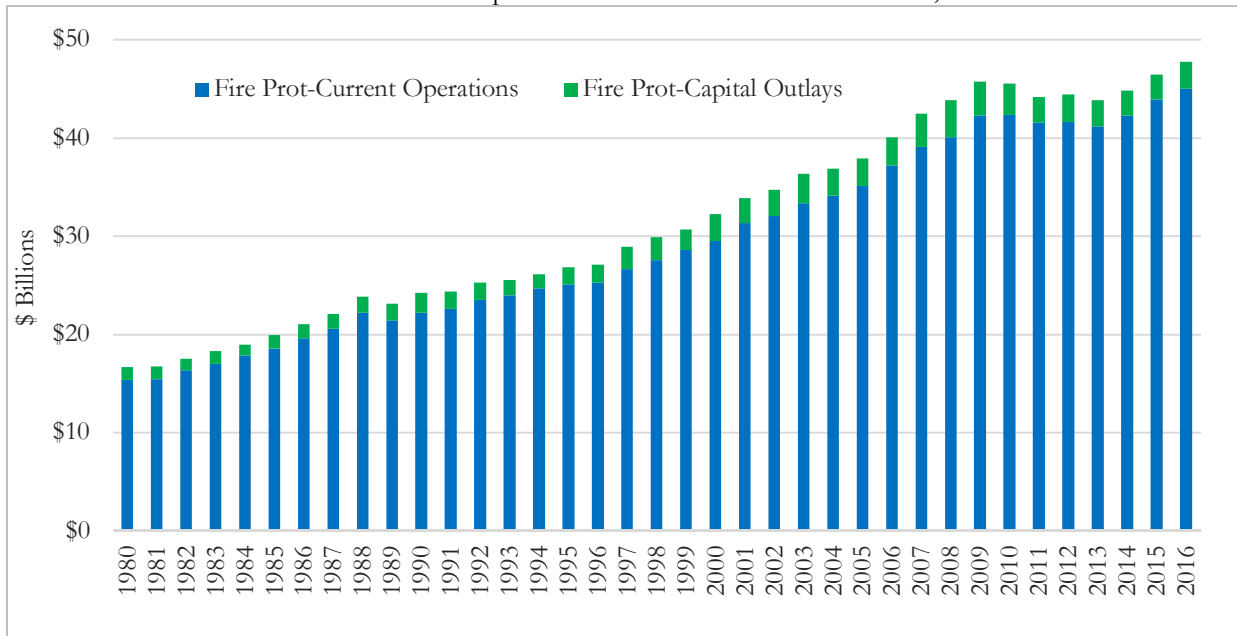
- There Has Been Growth Over Time (Just Not Lately)

Exhibit 34 supplies data characterizing inflation-adjusted local government expenditures on fire protection in the U.S. from 1980 to 2016. Total expenditures grew more than 185 percent from 1980 to 2016, which represents a compound annual growth rate of 3.0 percent in real terms. This trend is not unique to fire protection; other municipal service costs like police protection have also risen in a similar manner. Spending on fire protection declined from 2009 to 2013 before reestablishing an upward trajectory.

Factors driving community fire protection costs higher include: 1) shrinkage of the work week for some departments, resulting in a need to increase staffing and apparatus or to pay firefighters at overtime rates; (2) increasing EMS responsibilities requiring increased staffing and, in some communities, more frequent replacement of apparatus; and (3) rising costs of retirement and health benefits.²³

Historically, capital outlays have represented a small portion of total expenditures on fire protection, but that share has slipped even lower in recent years. From 1980-2016, capital expenditures represented around 7.0 percent of total local fire protection spending on average, but in 2016, capital expenditures represented less than 6 percent of total spending.

Exhibit 34. Local Government Direct Expenditures on Fire Protection in the U.S., 1980-2016

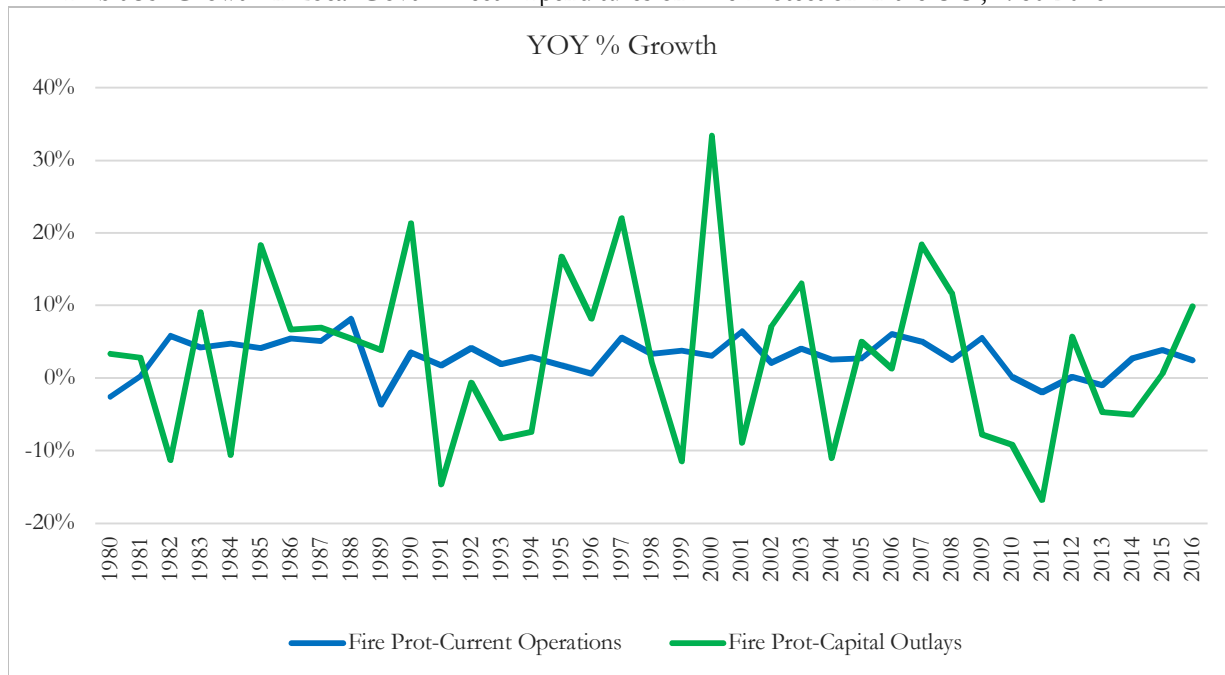


Source: 1. Sage. 2. Urban Institute-Brookings Institution Tax Policy Center. *State & Local Government Finance Data Query System*. Data from U.S. Census Bureau, Annual Survey of State and Local Government Finances. Notes: Figures are in 2016 dollars (inflation adjusted).

²³ National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2015". April 2017.

Exhibit 35 reveals something that should be of enormous interest to fire apparatus manufacturers and distributors. Capital outlays for fire protection are remarkably volatile over time, tending to sag dramatically during and after recessions, and then surging during the very late stages of economic expansion cycles (e.g. 1989-90, 2007). Operating expenses, which tend to heavily reflect spending on human capital, are far more stable from year-to-year.

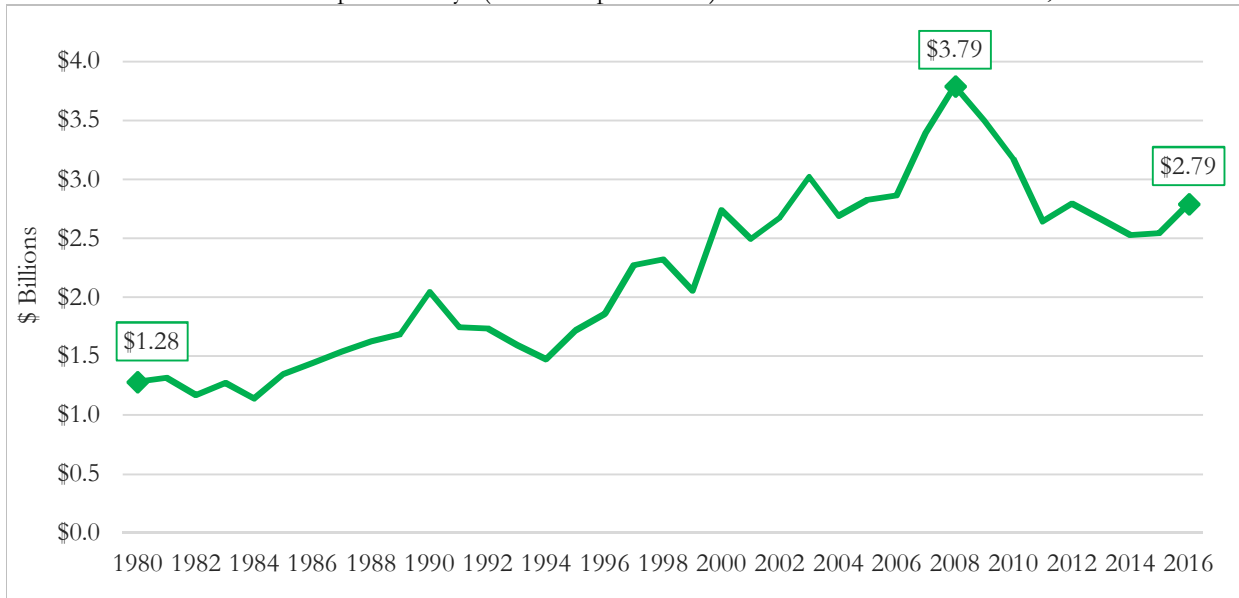
Exhibit 35. Growth in Local Govt. Direct Expenditures on Fire Protection in the U.S., 1980-2016



Source: 1. Sage. 2. The Urban Institute-Brookings Institution Tax Policy Center. *State & Local Government Finance Data Query System*. Data from U.S. Census Bureau, Annual Survey of State and Local Government Finances. Notes: Figures are in 2016 dollars (inflation adjusted).

As reflected in Exhibit 36, local government capital outlays for fire protection in the U.S. peaked in 2008 at \$3.8 billion before declining to \$2.8 billion by 2016. That represents a decline of more than 26 percent.

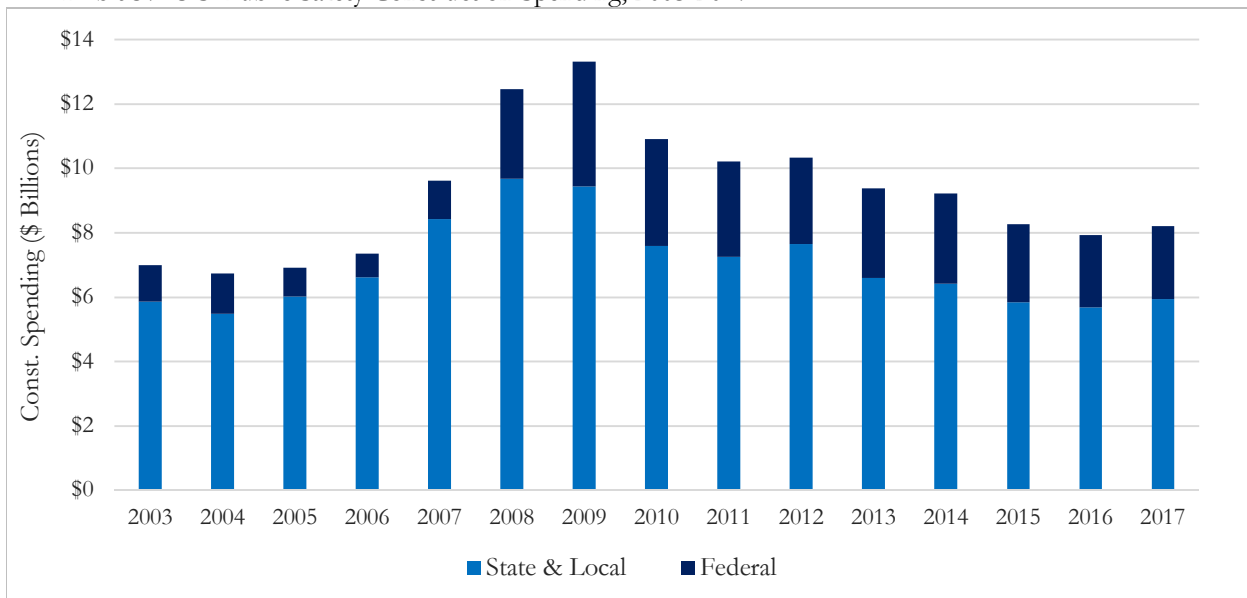
Exhibit 36. Local Govt. Capital Outlays (Direct Expenditures) on Fire Protection in the U.S., 1980-2016



Source: 1. Sage. 2. The Urban Institute-Brookings Institution Tax Policy Center. *State & Local Government Finance Data Query System*. Data from U.S. Census Bureau, Annual Survey of State and Local Government Finances. Notes: Figures are in 2016 dollars (inflation adjusted).

Construction Spending. The lack of public investment is observable in many categories. Spending on many forms of physical infrastructure has been in decline in recent years despite the ongoing economic recovery. This has been especially true in the public safety category -- a category encompassing the construction of new fire stations.

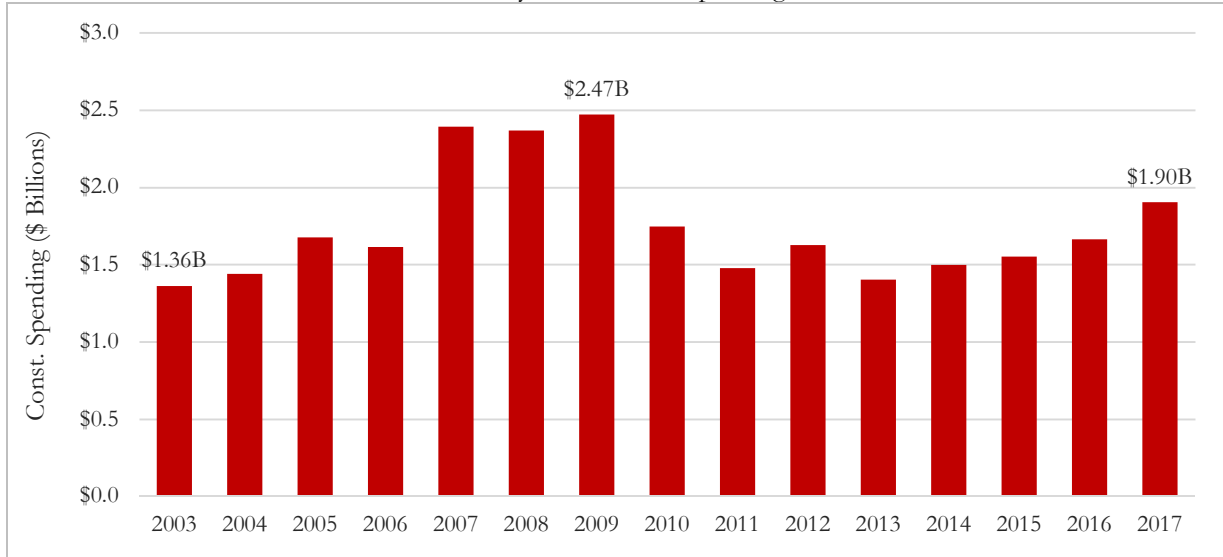
Exhibit 37. U.S. Public Safety Construction Spending, 2003-2017



Source: Sage; FAMA; U.S. Census Bureau

State and local construction spending in the fire/rescue category totaled \$1.90 billion in 2017. That was 23 percent lower than the peak level of spending recorded in 2009, when state/local construction spending in this category approached \$2.5 billion.

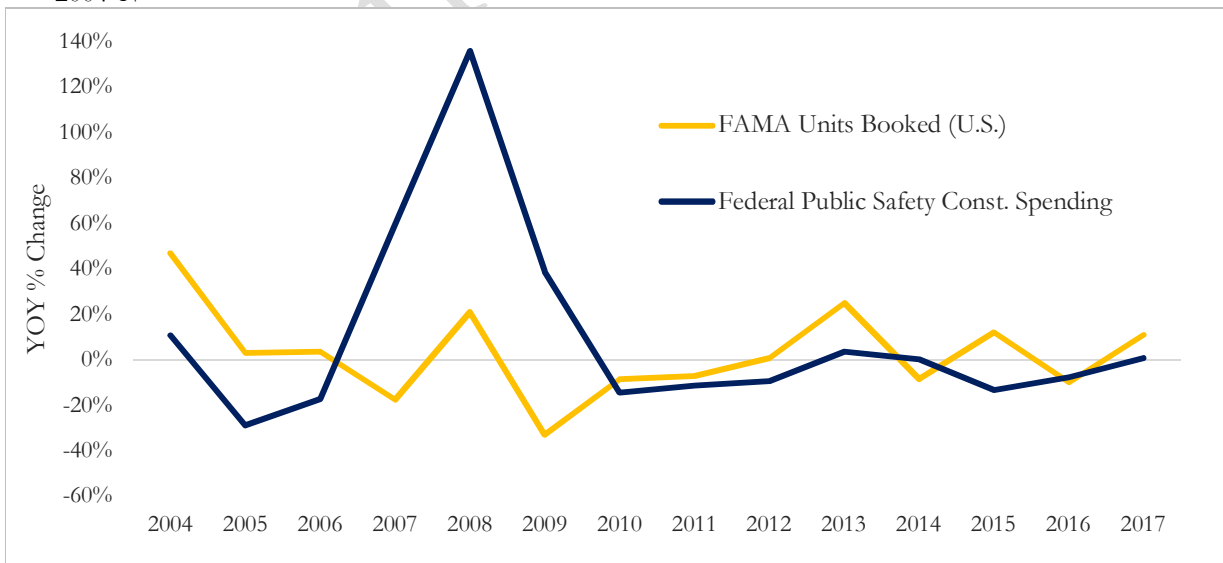
Exhibit 38. U.S. State & Local Public Safety Construction Spending on Fire/Rescue, 2003-2017



Source: Sage; FAMA; U.S. Census Bureau

Interestingly, though virtually all direct spending on fire protection originates at the levels of state and local government, FAMA member performance in terms of units booked seems to closely mimic changes in federal public safety construction spending. This may have much to do with federal grant funding for fire departments that lack a predictable replacement schedule.

Exhibit 39. Annual Growth: U.S. Federal Public Safety Construction Spending & FAMA Units Booked, 2004-17



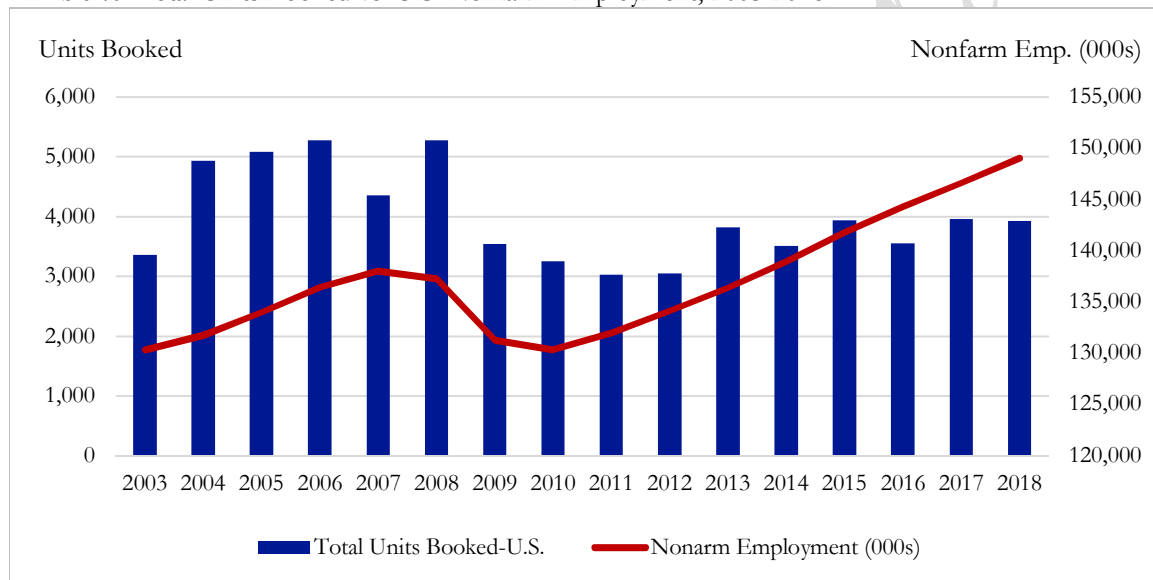
Source: Sage; FAMA; U.S. Census Bureau

Looking for Explanatory Factors: Demographics & Economic Conditions

- Solving the Mystery of Incomplete Recovery in Units Booked

Importantly, while the U.S. economy has gained steam in recent years (e.g. 2015, when U.S. output measured in terms of gross domestic product rose 2.9 percent and then again in 2017 and 2018), the FAMA units booked variable has failed to respond commensurately as reflected in Exhibit 40, which juxtaposes U.S. nonfarm employment with units booked. While this could be easily explained during the early years of economic recovery as reflecting weak state/local government finances or concerns for a double-dip recession, these rationales are far less compelling after nearly 10 years of economic expansion.

Exhibit 40. Total Units Booked vs. U.S. Nonfarm Employment, 2003-2018



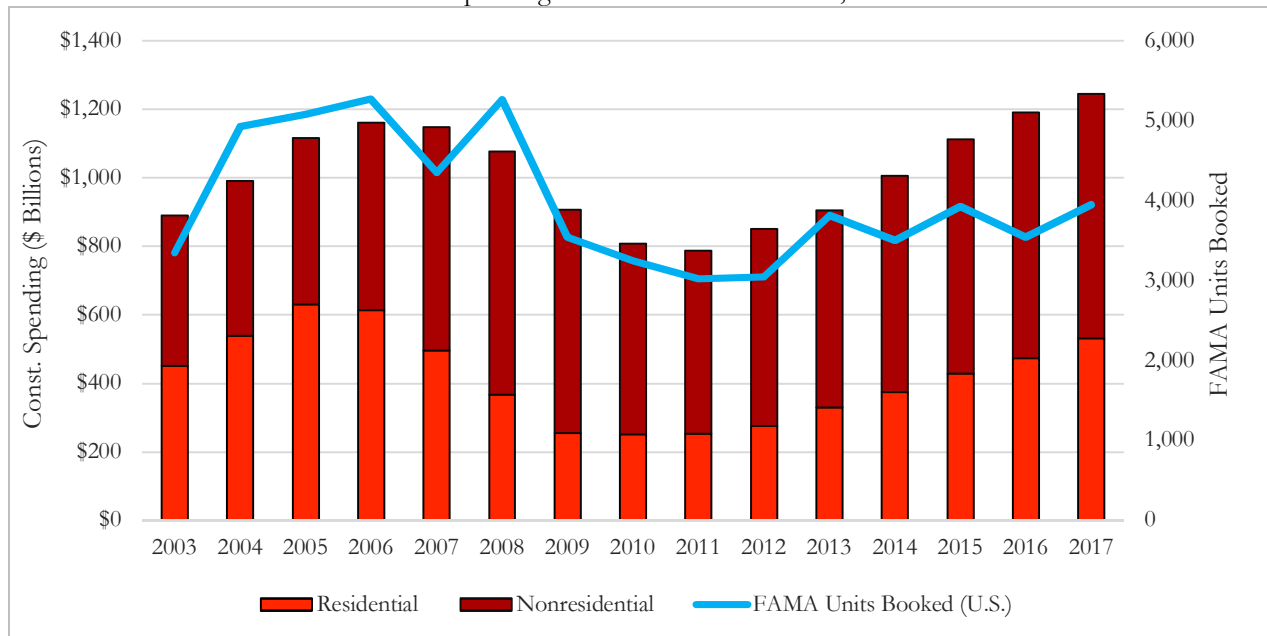
Source: FAMA; U.S. Bureau of Labor Statistics; Sage

This is not merely about available revenues or confidence among those who craft budgets. The current economic expansion has been associated with surging construction of new hotels, office buildings, apartments, casinos, fulfillment and data centers. As construction activity expands, fire departments have a larger stock of buildings to protect, which strongly implies growing demand for both firefighters and apparatus.

Historically, FAMA sales have closely tracked construction activity, but that has not been the case in recent years (since roughly 2013). During the middle years of the current decade, public construction investment in many categories including water supply, flood control, highways/streets, sewage/waste disposal and public safety has been in sharp decline even as private construction spending has accelerated. Since commercial and residential property tax bases have been expanding in recent years in many communities, one would think that rising demand for fire protection combined with expanding public resources would translate into

brisk investment in public safety construction, aggressive hiring of professional firefighters and a sharp upward tilt in apparatus sales. As the data in this report indicate, that has simply not transpired with respect to the key variable of interest – FAMA units booked.

Exhibit 41. Total U.S. Construction Spending and FAMA Units Booked, 2003-2017



Source: Sage; FAMA; U.S. Census Bureau

In much of the U.S., units booked per 100,000 housing units has remained remarkably stable over time. For instance, in the Northeast, units booked per 100,000 housing units stood at 3.36 in 2003. In 2017, the corresponding ratio stood at 3.36, unchanged from fourteen years prior. Similarly, in the western United States, in 2003, the number of units booked per 100,000 housing units stood at 2.46. Fourteen years later, the ratio stood at 2.51. The implication is that in much of the nation, the number of units booked has expanded at roughly the rate of household formation (and household formation has been relatively soft in recent years).

Regional figures often mask more localized trends. For example, while the ratio of units booked per 100,000 housing in the Northeast has been stable, the ratio expanded in the New England subdivision and declined in the Middle Atlantic subdivision. Similar trends in other regions are apparent.

There have been sharp declines in units booked per 100,000 housing units in many parts of the American Midwest and South. In the East South Central sub-region, which includes states like Alabama, Kentucky, and Mississippi, the ratio of units booked per 100,000 housing units fell from 2.95 to 2.21 during the 14-year period analyzed in this report. In the West North Central sub-region, which includes states like Iowa, Kansas, Nebraska, and North Dakota, the ratio declined from 3.62 to 3.20.

Exhibit 42. Units Booked by U.S. Census Bureau Region & Division Per 100,000 Housing Units

Region/Division	Units Booked		Housing Units Estimate*		Units Booked Per 100,000 Housing Units		
	2003	2017	2003	2017	2003	2017	2003 v. 2017
NORTHEAST	763	814	22,703,915	24,229,933	3.36	3.36	0.00
Division I: New England	191	244	6,106,864	6,592,598	3.13	3.70	0.57
Division 2: Middle Atlantic	572	570	16,597,051	17,637,335	3.45	3.23	-0.21
MIDWEST	771	855	28,013,805	30,243,812	2.75	2.83	0.07
Division 3: East North Central	461	551	19,459,396	20,736,966	2.37	2.66	0.29
Division 4: West North Central	310	304	8,554,409	9,506,846	3.62	3.20	-0.43
SOUTH	1,187	1,528	44,996,117	52,855,902	2.64	2.89	0.25
Division 5: South Atlantic	649	888	23,951,411	28,232,320	2.71	3.15	0.44
Division 6: East South Central	225	188	7,627,908	8,525,115	2.95	2.21	-0.74
Division 7: West South Central	313	452	13,416,798	16,098,467	2.33	2.81	0.47
WEST	634	755	25,811,623	30,073,813	2.46	2.51	0.05
Division 8: Mountain	239	240	8,219,835	10,165,676	2.91	2.36	-0.55
Division 9: Pacific	395	515	17,591,788	19,908,137	2.25	2.59	0.34

Source: Sage; FAMA; U.S. Census Bureau, Population Division. Notes: *Estimate as of July 1st.

NORTHEAST Region—Division I: New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont); Division 2: Middle Atlantic (New Jersey, New York, Pennsylvania).

MIDWEST Region—Division 3: East North Central (Illinois, Indiana, Michigan, Ohio, Wisconsin); Division 4: West North Central (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota).

SOUTH Region—Division 5: South Atlantic (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia); Division 6: East South Central (Alabama, Kentucky, Mississippi, Tennessee); Division 7: West South Central (Arkansas, Louisiana, Oklahoma, Texas).

WEST Region—Division 8: Mountain (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming); Division 9: Pacific (Alaska, California, Hawaii, Oregon, Washington).

- Fiscal Considerations

Federal Funding. While funding for firefighting is predominately provided by state and local governments, there are several federal grant programs that support firefighting operations. In many instances, these programs were developed in response to local financial conditions prevailing during the 1990s, which were often characterized by fiscal shortfalls. Before the establishment of these federal grant programs, there had been few if any dedicated funding programs exclusively for firefighting.²⁴

There are three primary firefighting grant programs operated by the Federal Emergency Management Agency (FEMA): 1) the Assistance to Firefighters Grants (AFG) program, 2) the Staffing for Adequate Fire and Emergency Response (SAFER) Grants program, and the 3) Fire Prevention and Safety (FP&S) Grants program. SAFER grants fund the hiring of salaried firefighters and costs of recruitment and retention of volunteer firefighters.²⁵ FP&S

²⁴ Congressional Research Service, “Assistance to Firefighters Program: Distribution of Fire Grant Funding”. October 5, 2017. Author: Lennard G. Kruger, Specialist in Science and Technology Policy. p. 1.

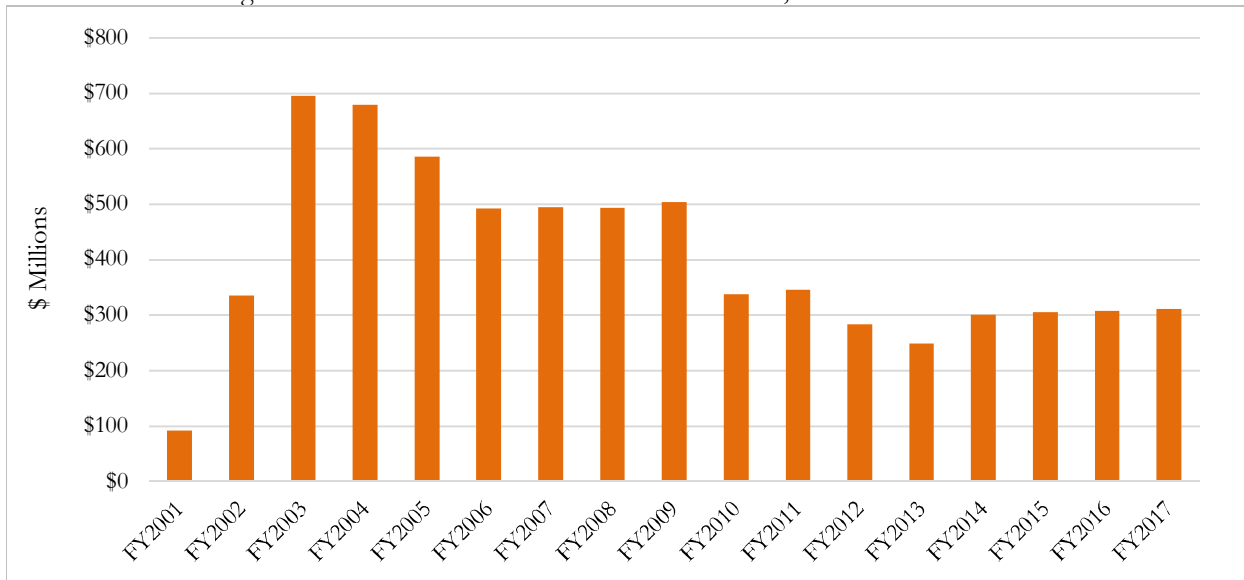
²⁵ U.S. Government Accountability Office (GAO). “FIRE GRANTS: FEMA Could Enhance Program Administration and Performance Assessment”, GAO-16-744. September 2016.

grants are dedicated to projects that enhance the safety of firefighters and the broader public from fire and related hazards.²⁶

The AFG grant program is the most relevant to firefighting apparatus. AFG program funding targets “critically needed resources to equip and train emergency personnel to recognized standards, enhance operations efficiencies, foster interoperability, and support community resilience.”²⁷ Program funds can be used for equipment (such as personal protective equipment, vehicles, and other operational equipment) as well as operational programs (such as projects to modernize facilities, deliver training, and develop health and fitness programs).²⁸

Note that the amount of AFG grants distributed has shrunk dramatically since FY2009. That year, grants totaled more than \$500 million. By FY2017, grant funding was a bit more than \$300 million. Even before FY2009, there had been a decline in funding. In FY2003, which came shortly on the heels of 9/11, AFG grant funding approached \$700 million.

Exhibit 43. Firefighter Assistance: FEMA AFG Grants Distributed, FY2001-FY2017



Source: Sage; Congressional Research Service, “Assistance to Firefighters Program: Distribution of Fire Grant Funding”. Author: Lennard G. Kruger, Specialist in Science and Technology Policy. Notes: AFG: Assistance to Firefighters Grants; Fema.gov.

AFG grants used for vehicle replacement are used to replace sub-standard or unsafe vehicles. These replaced vehicles are typically older vehicles that are permanently removed from service. On average, more than 99 percent of fire vehicles that AFG grant recipients

²⁶ Federal Emergency Management Agency (FEMA). *Fire Prevention & Safety Grants*. <https://www.fema.gov/fire-prevention-safety-grants>.

²⁷ Federal Emergency Management Agency (FEMA). *Assistance to Firefighters Grant Program*. <https://www.fema.gov/welcome-assistance-firefighters-grant-program>.

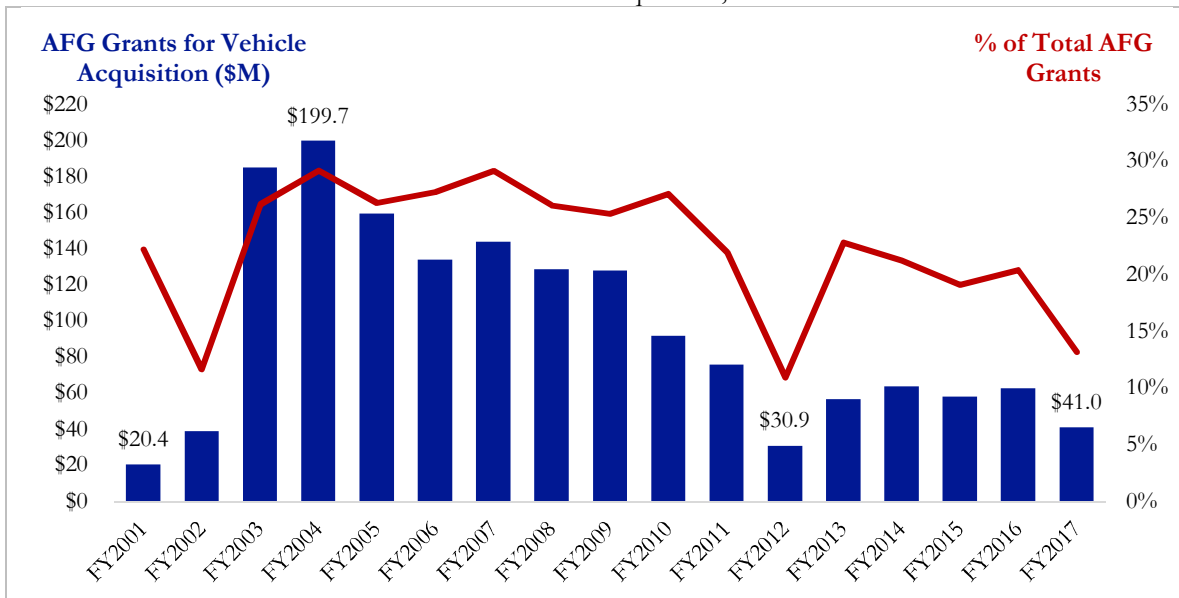
²⁸ U.S. Government Accountability Office (GAO). “FIRE GRANTS: FEMA Could Enhance Program Administration and Performance Assessment”, GAO-16-744. September 2016.

replaced during FY2008-FY2011 were at least 15 years old, and nearly 86 percent were 25 years old or older. Approximately 98 percent of grant recipients indicated that the vehicle had been permanently removed from service.²⁹

AFG funds for vehicle replacement are in high demand. There were 2,585 applications submitted for AFG funds for vehicle acquisition in FY2014 alone. Of those, just 201 applications were awarded grants (7.8%).³⁰ From FY2014-FY2016, funds for vehicles have represented around 44 percent of total funds requested by applicants.³¹ However, no more than 25 percent of available AFG grant funds may be used by recipients for the purchase of vehicles and 10 percent of that amount is set aside for ambulances.³²

The NFPA’s Fourth Annual Needs Assessment states: “Considering AFG funding, approximately 19% of 2011-2014 funds were distributed for vehicle acquisition. While this helps hold the line on the aging of vehicles and apparatus, it is far less than the need.”³³ In FY2017, AFG grants for vehicle acquisition totaled \$41 million and represented 13 percent of all AFG grants awarded (see Exhibit 44).

Exhibit 44. Distribution of AFG Awards for Vehicle Acquisition, FY2001-FY2017



Source: 1. Sage. 2. Fema.gov. “Assistance to Firefighters Grant Awards”.

²⁹ Vehicles that are not permanently removed from service may be placed in reserve status or otherwise removed from front-line operations. (Federal Emergency Management Agency (FEMA). “Assistance to Firefighters Grant Program Performance Assessment System”. Fiscal Year 2015 Annual Report to Congress. October 19, 2015.)

³⁰ U.S. Government Accountability Office (GAO). “FIRE GRANTS: FEMA Could Enhance Program Administration and Performance Assessment”, GAO-16-744. September 2016.

³¹ Mark Price and Brad Cole. “Assistance to Firefighters Grant” Presentation. May 19, 2017.

<https://www.preparingtexas.org/Resources/documents/2017%20Conference/Assistance%20to%20Firefighters%20Grant.pdf>.

³² The Department of Homeland Security (DHS). “Notice of Funding Opportunity (NOFO). FY 2016 Assistance to Firefighters Grants (AFG)”. https://www.fema.gov/media-library-data/1472840920028-6ecc836fb21bf4152f3c06ec942564cb/FY16_AFG_NOFO_final_v3_09_01_2016.pdf.

³³ NFPA. “Fourth Needs Assessment of the U.S. Fire Service”. November 2016. p. xi.

Future of Grant Funding. In January 2018, the President of the United States signed the United States Fire Administration, AFG, and SAFER Program Reauthorization Act of 2017 (P.L. 115-98). The Act extends the AFG and SAFER authorizations through FY2023 and extends the sunset provisions for AFG and SAFER through September 30, 2024.

The Act also: 1) provides that the U.S. Fire Administration (USFA) may develop and make widely available an online training course on AFG and SAFER grant administration; 2) expands SAFER hiring grant eligibility to include the conversion of part-time or paid-on-call firefighters to full-time firefighters; 3) directs FEMA, acting through the Administrator of USFA, to develop and implement a grant monitoring and oversight framework for the AFG and SAFER grant programs; and 4) makes various technical corrections to the AFG and SAFER statute.³⁴

Exhibit 45. Recent and Proposed Appropriations for Firefighter Assistance (Millions of Dollars)

	FY2018		FY2019		
	Admin. Request	Consolidated Approp. Act (P.L. 115-141)	Admin. Request	Senate Approp.	House Approp.
FIRE Grants (AFG)	\$344	\$350	\$344	\$350	\$350
SAFER Grants	\$344	\$350	\$344	\$350	\$350
Total	\$689M	\$700M	\$689M	\$700M	\$700M

Source: Sage; Congressional Research Service, “Assistance to Firefighters Program: Distribution of Fire Grant Funding”. Author: Lennard G. Kruger, Specialist in Science and Technology Policy.

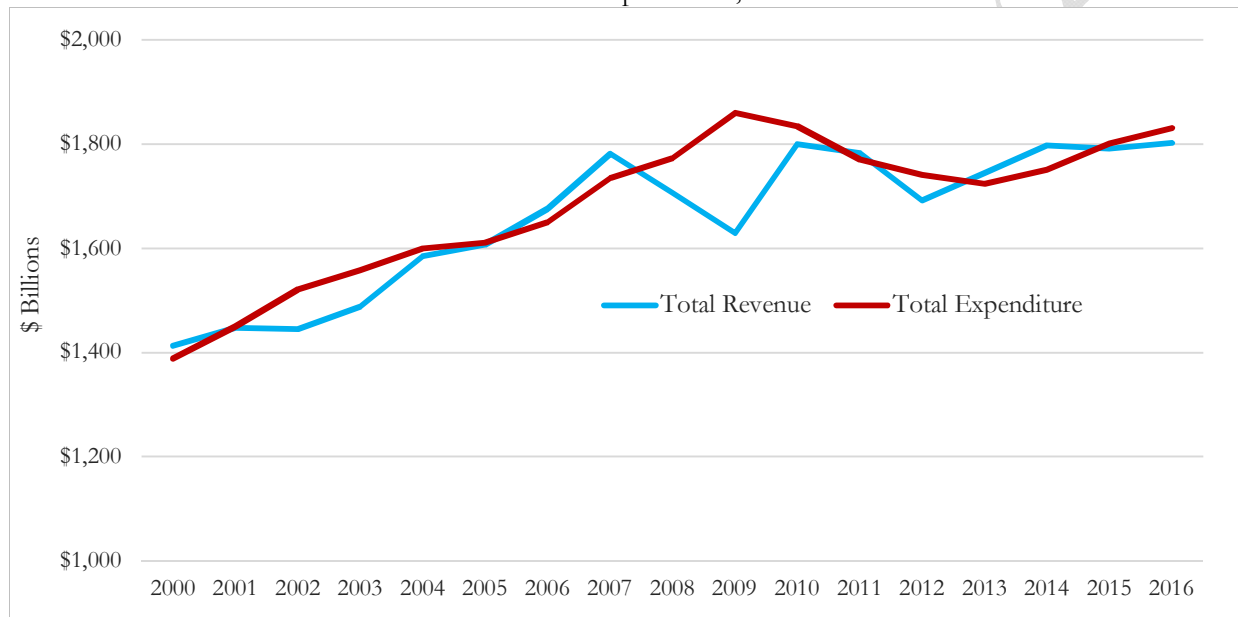
Budget appropriations for AFG and SAFER remains an issue for Congress. As is the case with many federal programs, concerns regarding the federal budget deficit will likely impact AFG and SAFER budget levels. At the same time, firefighter assistance budgets will likely receive increased scrutiny from the fire community in the context of the local budgetary shortfalls that many departments face.³⁵ Exhibit 45 above supplies recent and proposed appropriated funding for the AFG and SAFER grant programs.

³⁴ Congressional Research Service, “Assistance to Firefighters Program: Distribution of Fire Grant Funding”. 8/2/2018. Author: Lennard G. Kruger, Specialist in Science and Technology Policy.

³⁵ Ibid.

State & Local Finances. Funding and overseeing firefighting activities are traditionally the responsibility of state and local authorities.³⁶ Over the past quarter century, total local government expenditures have generally trended higher in America, including during recent years. All things being equal, this should translate into much better units booked readings than are presently observable. There is a strong implication that the share of local government monies being spent on firefighting has declined. In order to determine whether that state of affairs will persist, it is important to understand which categories have been securing greater local government expenditure share.

Exhibit 46. U.S. Local Government Revenues & Expenditures, 2000-2016

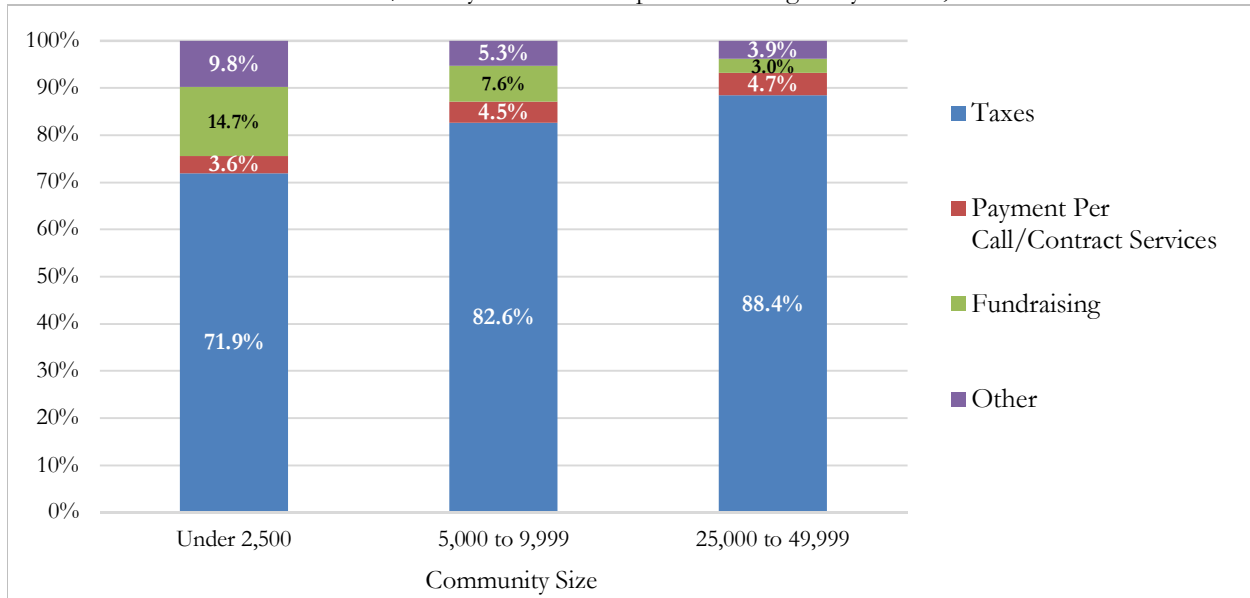


Source: 1. Sage. 2. The Urban Institute-Brookings Institution Tax Policy Center. *State & Local Government Finance Data Query System*. Data from U.S. Census Bureau, Annual Survey of State and Local Government Finances. Notes: Figures are in 2016 dollars (inflation adjusted).

All or mostly-volunteer fire departments (which make up more than 70 percent of all departments in the U.S.) derive a large share of their revenues from local taxes. Exhibit 47 indicates budgeted revenue sources for all-volunteer or mostly-volunteer fire departments by community size. Most revenues for all/or mostly-volunteer departments are covered by taxes, either a special fire district tax or some other tax. The share of revenues from taxes is approximately 72 percent for communities of less than 2,500 people and between 83-88 percent for communities of 5,000 to 49,999 people. Apparatus constitute the principal costs for volunteer departments, so one would expect fire apparatus sales to neatly and predictably correlate with local tax revenues.

³⁶ Congressional Research Service, “Assistance to Firefighters Program: Distribution of Fire Grant Funding”. October 5, 2017. Author: Lennard G. Kruger, Specialist in Science and Technology Policy. p. 1.

Exhibit 47. Share of Volunteer/Mostly-Volunteer Department Budgets by Source, 2015



Source: 1. Sage. 2. National Fire Protection Association (NFPA). "Fourth Needs Assessment of the U.S. Fire Service". November 2016. Note: NFPA analyzed questions regarding revenue only for communities of less than 50,000 in population, which is the maximum community size for which at least 30% of departments are all- or mostly-volunteer.

In response to a number of sources of fiscal stress, state and local governments have been reshaping their finances since the Great Recession. Notable sources of stress include slow tax revenue growth, Medicaid spending growth driven by recession-related enrollment and the Affordable Care Act of 2010, and underfunded pensions. Responses to these strains have included cutting capital spending, cutting infrastructure investment, and cutting other budget categories.³⁷

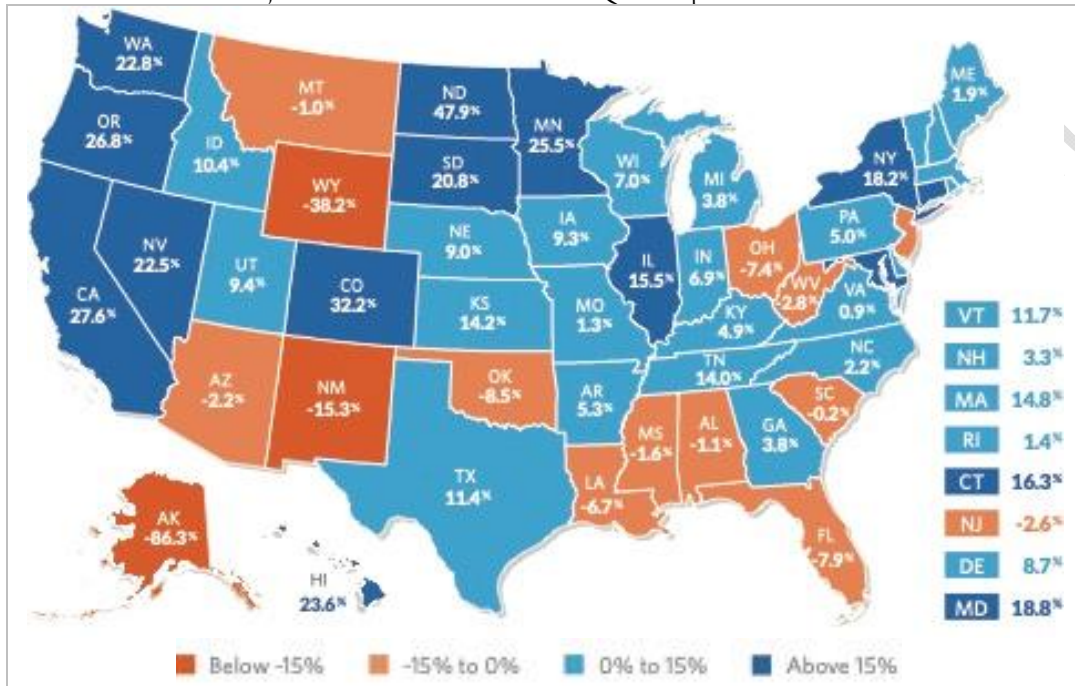
Since the recession in 2007-2009, state tax revenues have been slower to rebound than after any of the three previous downturns and trends have varied widely by state. According to the Pew Charitable Trusts, in early 2017 inflation-adjusted tax revenue was lower in 22 states compared to the peak before or during the recession. More states than at any time since the end of the recession reported midyear budget gaps in fiscal year 2017.³⁸ By mid-2018 tax revenue was lower in only 14 states compared to their peak, the fewest yet.

³⁷ Boyd and Dadayan. 2016. "State and Local Governments Reshape Their Finances". July 1, 2016. <http://knowledgecenter.csg.org/kc/content/state-and-local-governments-reshape-their-finances>.

³⁸ The Pew Charitable Trusts. "Weak Growth in State Tax Revenue Persists in 2017". *Fiscal 50: State Trends and Analysis*. October 17, 2017. <http://pew.org/2il0kwl>.

After the weakest two years of growth (aside from recession) for many states, tax revenue rose sharply beginning in late 2017. Favorable economic conditions, state policy actions, and robust stock market returns all helped boost revenue collections. The federal Tax Cuts and Jobs Act may also have had some short-lived, positive effects on state tax revenues as state deductions tied to federal deductions go by the wayside and as broader economic growth accelerates, at least for a time.³⁹

Exhibit 48. Inflation Adjusted Tax Collections in 2018Q2 Compared with Each State’s Peak



Source: The Pew Charitable Trusts. *Fiscal 50: State Trends and Analysis*. Note: figures are Pew Charitable Trusts’ analysis of data licensed by the Nelson A. Rockefeller Institute of Government, which adjusts U.S. Census Bureau’s quarterly summary of tax revenue.

As states regain ground lost during the downturn, policymakers will face pressure to catch up on spending and investments postponed because of the recession. However, a number of factors suggest that at least some of the recent revenue gains may be temporary and other fiscal pressures may persist.

It is unlikely that revenue growth will be a strong in the future. Economic growth is expected to slow in late-2019 or at some point in 2020. There are many factors worth considering, including a slowing global economy, rising borrowing costs, burgeoning wage pressures, and volatile financial markets. Furthermore, even as states/localities regain fiscal ground lost during the recession, they collectively continue to struggle to cover costs associated with rising Medicaid expenses, deteriorating schools, roads, bridges, water

³⁹ The Pew Charitable Trusts. “State Tax Revenue Makes Biggest Gains in Seven Years”. *Fiscal 50: State Trends and Analysis*. January 22, 2019. <https://pew.org/2RC5Zil>.

systems, wastewater treatment systems, underfunded pensions, rising borrowing costs, and the need to maintain or improve current bond ratings.⁴⁰

There are many indications of the challenges yet to come. For instance, in 2016, total state and local government expenditures were 2.4 percent above 2010 levels, but employee retirement expenditures were 28.4 percent higher.⁴¹ The State of Connecticut has a debt limit tied to tax collections and in 2016 the State was forced to delay selling approximately \$1 billion in bonds due to lower than anticipated tax collections.⁴²

Exhibit 49 reflects the decline in long-term debt issuance since 2007, the year the most recent recession began. Stimulus funds supported debt issuance in 2010, but since then there have been ongoing declines in general. Debt can be used to support many types of expenditures, but undoubtedly public safety spending has been negatively impacted by this trend.

Exhibit 49. U.S. State & Local Governments' Total Long-Term Debt Issued (\$ Billions), 2005-2016



Source: 1. Sage. 2. Urban Institute-Brookings Institution Tax Policy Center. *State & Local Government Finance Data Query System*. Data from U.S. Census Bureau, Annual Survey of State and Local Government Finances. Notes: 1. Figures are in 2016 dollars (inflation adjusted).

⁴⁰ The Pew Charitable Trusts. “State Tax Revenue Makes Biggest Gains in Seven Years”. *Fiscal 50: State Trends and Analysis*. January 22, 2019.

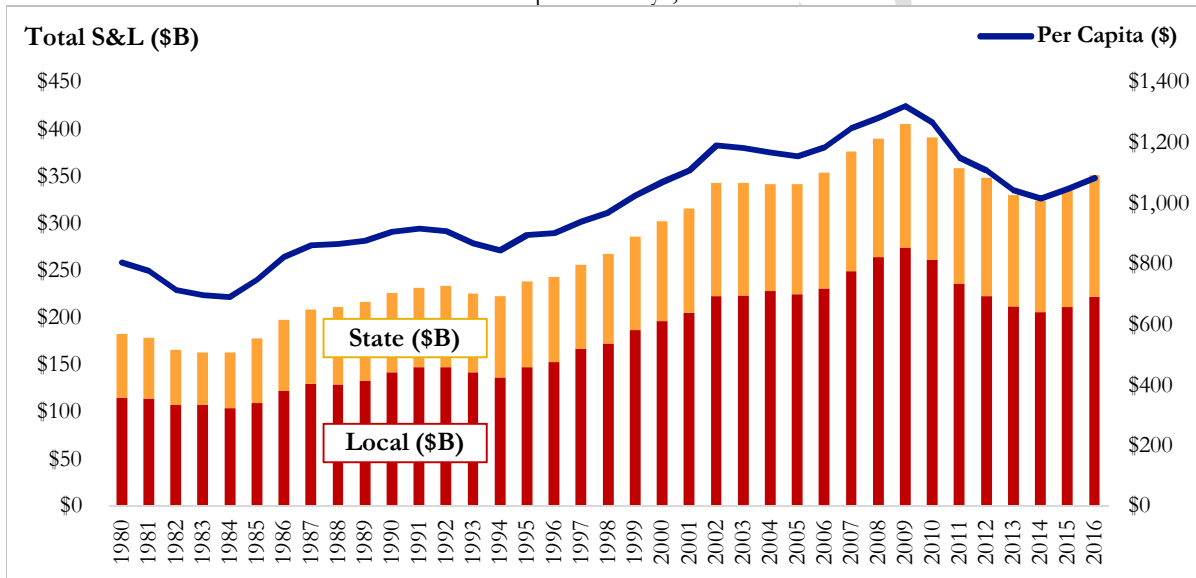
⁴¹ Urban Institute-Brookings Institution Tax Policy Center. *State & Local Government Finance Data Query System*. Data from U.S. Census Bureau, Annual Survey of State and Local Government Finances.

⁴² The Wall Street Journal. 2016. “Slowdown in State, Local Investment Dents U.S. Economy” by Eric Morath and Ben Leubsdorf. October 26, 2016. <https://www.wsj.com/articles/slowdown-in-state-local-investment-dents-u-s-economy-1477495758>.

Past economic expansions gave states the opportunity to build up rainy day funds to buffer against recession and make critical investments. During the recent recovery, this hasn't happened in some states. For example, according to September 2018 analysis by Moody's Analytics, 32 states fell short of having enough reserves to offset even a moderate recession. Seventeen states were significantly unprepared to survive a recession (5 percentage points away from the reserves needed), up from 15 states in 2017.⁴³ This also serves to restrict policymaker appetite for additional indebtedness.

With a few exceptions, state and local governments have responded to sharply constrained resources not by raising taxes, but by slashing capital spending and other areas of the budget.⁴⁴ According to U.S. Census Bureau data, capital expenditure cuts have been widespread. On a per capita basis, the level of real capital outlays by state and local governments was down by more than \$100 per capita in 33 states (2016 compared to 2009 levels). Exhibit 50 supplies relevant statistical and visual detail.

Exhibit 50. U.S. State & Local Government Capital Outlays, 1980-2016



Source: 1. Sage. 2. Urban Institute-Brookings Institution Tax Policy Center. *State & Local Government Finance Data Query System*. Data from U.S. Census Bureau, Annual Survey of State and Local Government Finances. Notes: Figures are in 2016 dollars (inflation adjusted).

⁴³ Moody's Analytics. "Stress-Testing States 2018". September 3, 2018. <https://www.economy.com/stress-testing-state-and-local-reserves>.

⁴⁴ Boyd and Dadayan. 2016. "State and Local Governments Reshape Their Finances". July 1, 2016.

This pattern becomes especially apparent in Exhibit 51. For instance, between 1986 and 1996, total capital outlays in the fire protection category rose 2.6 percent annually. During the ensuing decade, fire protection-related capital outlays expanded at an annual rate of 4.4 percent. But between 2006 and 2016, they fell 0.3 percent per year.

Exhibit 51. Growth in U.S. Local Government Capital Outlays by Function, 1986-2016

Period	CAGR (%)		
	1986-1996	1996-2006	2006-2016
Total Capital Outlays	2.3%	4.2%	-0.4%
<i>Construction</i>	1.6%	5.2%	-0.1%
<i>Other Capital Outlays</i>	4.0%	1.6%	-1.3%
By Function			
Education	7.2%	4.9%	-1.7%
Fire Protection	2.6%	4.4%	-0.3%
Police Protection	4.9%	0.5%	0.6%
Corrections	-0.6%	-2.1%	-3.6%
Financial Admin. & Gen Control	4.9%	3.8%	-2.7%
General Public Buildings	3.7%	2.9%	-2.2%
Health & Hospitals	1.9%	3.5%	0.4%
Highways	2.1%	3.0%	1.4%
Housing & Community Dev.	-1.2%	3.3%	-4.5%
Libraries	5.1%	5.7%	-3.5%
Natural Resources	-0.4%	3.9%	0.2%
Parks & Recreation	3.1%	4.2%	-1.4%
Utilities	-1.8%	4.0%	1.8%
Sanitation	-0.6%	2.8%	1.3%
Other	3.3%	6.1%	-1.0%

Source: 1. Sage. 2. Urban Institute-Brookings Institution Tax Policy Center. *State & Local Government Finance Data Query System*. Data from U.S. Census Bureau, Annual Survey of State and Local Government Finances. Notes: CAGRs are based on figures in 2016 dollars (inflation adjusted).

Conclusion

- Soft Growth in Units Booked despite Stronger North American Economy

Recent data indicate units booked were down 16.7 percent from a year ago during 2018's final quarter and sales remain low by historic standards. Average sales during Q1:2018-Q4:2018 were 2.6 percent below the quarterly average observed over the past 15 years.

This seems remarkable given not only the improved performance of the economy and state/provincial/local budgets, but also given the significant attention given to wildfires in California and elsewhere in recent years. Moreover, with more North Americans aging, the demand for emergency response of various types is on the rise. One might think that that by itself would have triggered more aggressive recovery in units booked by FAMA members.

This report supplies both summary detail regarding industry performance over time as well as an analysis of explanatory factors. We conclude that there are four factors that explain sluggish recovery in units booked since the end of the financial crisis.

1. State and local governments are collectively taking on less debt to finance capital expenditures in part because of rising Medicaid expenditures and still underfunded pensions. Accordingly, between 2006-2016, total fire protection capital outlays fell by 0.3 percent annually after rising at a 4.4 percent annual rate during the prior decade;
2. Federal Assistance to Firefighters Grants (AFG) program funding has shrunk dramatically since FY2009. That year, grants totaled more than \$500 million. By FY2017, grant funding was a bit more than \$310 million;
3. There have been sharp declines in units booked per 100,000 housing units in many parts of the American Midwest and South as many shrinking communities have lost the financial capacity to re-invest in fire safety and emergency response;
4. Many communities lack a fire safety equipment replenishment plan. In lieu of defined strategies, many communities simply apply for federal grants. Waiting for federal monies can produce years of under-investment in firefighting technology and massive deterioration in responsiveness, reliability, and capacity.

Looking Ahead

A combination of economic and demographic forces suggest that units booked should climb going forward. Both the U.S. and Canadian economies have been improving recently, with financial markets flourishing, unemployment falling, and job creation remaining steady. Moreover, both the Canadian and U.S. populations continue to age, which is consistent with significant growth in the number of service calls.

Despite that, the most likely outcome is for units booked to stay relatively flat with occasional strong quarters followed by weak ones. This is because state and local government budgets appear to have heavily tilted toward other priorities and that is unlikely to change. Many state and municipal pensions remain underfunded. Healthcare costs will continue to rise, at least in the United States.

Moreover, in the current political environment, few policymakers are willing to raise taxes in non-emergency situations (e.g. Illinois recently passed tax increases in a desperate attempt to pass a balanced budget) and there is a relative lack of appetite for debt accumulation in support of capital expenditures despite extraordinarily low interest rates. The U.S. government is wrestling with a \$22 trillion debt and recently cut federal taxes, which may stimulate faster economic growth but also appears to have expanded annual budget deficits.

As a final point, there will also likely be increased expenditure on professional firefighters as the number of available volunteers continues to decline due to a host of factors, including the growing need for two incomes to support a given household. This will further dissipate resources available for apparatus. The future, therefore, may be associated with a growing number of professional firefighters working with inadequate physical capital.⁴⁵

⁴⁵ The Pew Charitable Trusts. "State Tax Revenue Makes Biggest Gains in Seven Years". *Fiscal 50: State Trends and Analysis*. January 22, 2019.

Appendix

FAMA Members: Units Booked

Exhibit A1. FAMA Members-Total Units Booked by U.S. State, 2017 v. 2018

State	2017	2018	2017 v. 2018	
			Net	%
Alaska	16	11	-5	-31.3%
Alabama	50	57	7	14.0%
Arkansas	38	34	-4	-10.5%
Arizona	46	59	13	28.3%
California	390	424	34	8.7%
Colorado	62	85	23	37.1%
Connecticut	58	51	-7	-12.1%
District of Columbia	18	5	-13	-72.2%
Delaware	11	34	23	209.1%
Florida	239	216	-23	-9.6%
Georgia	113	130	17	15.0%
Iowa	35	36	1	2.9%
Idaho	34	17	-17	-50.0%
Illinois	109	126	17	15.6%
Indiana	94	95	1	1.1%
Kansas	48	43	-5	-10.4%
Kentucky	37	41	4	10.8%
Louisiana	116	91	-25	-21.6%
Massachusetts	103	87	-16	-15.5%
Maryland	97	48	-49	-50.5%
Maine	33	20	-13	-39.4%
Michigan	128	115	-13	-10.2%
Minnesota	84	75	-9	-10.7%
Missouri	72	52	-20	-27.8%
Mississippi	37	53	16	43.2%
Montana	5	16	11	220.0%
North Carolina	198	160	-38	-19.2%
North Dakota	12	23	11	91.7%
Nebraska	33	34	1	3.0%
New Hampshire	16	27	11	68.8%
New Jersey	137	109	-28	-20.4%
New Mexico	41	34	-7	-17.1%
Nevada	18	33	15	83.3%
New York	250	264	14	5.6%
Ohio	129	127	-2	-1.6%

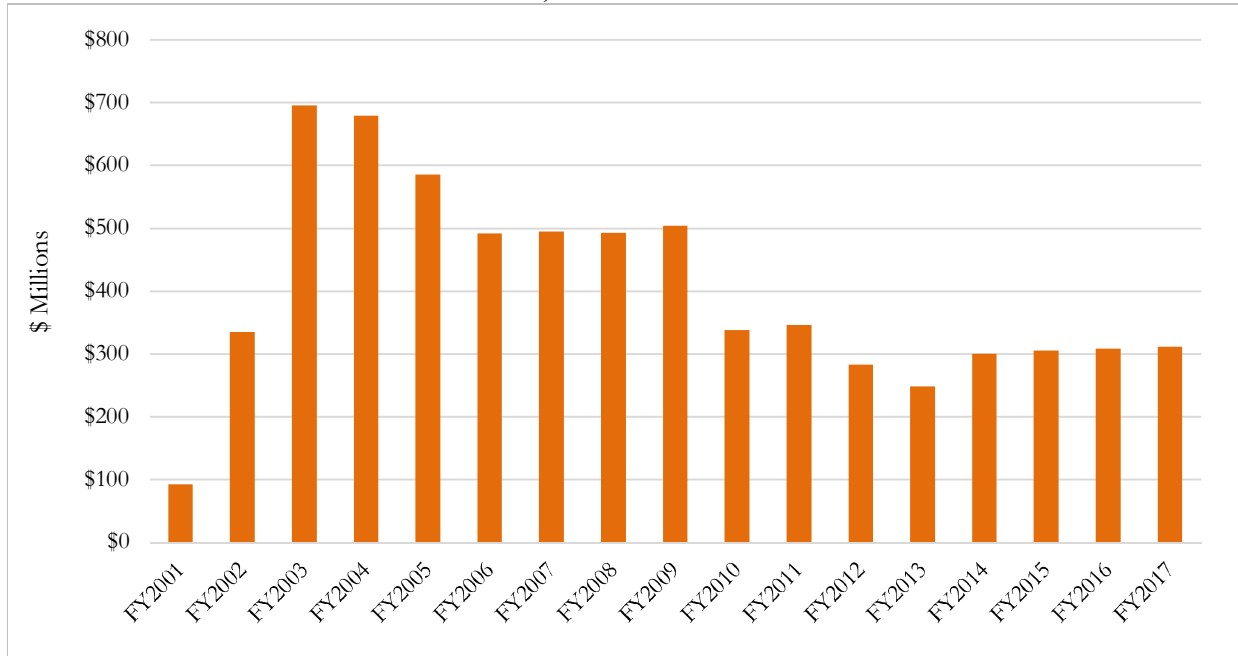
State	2017	2018	2017 v. 2018	
			Net	%
Oklahoma	33	43	10	30.3%
Oregon	42	26	-16	-38.1%
Pennsylvania	183	170	-13	-7.1%
Rhode Island	12	6	-6	-50.0%
South Carolina	70	94	24	34.3%
South Dakota	20	18	-2	-10.0%
Tennessee	64	60	-4	-6.3%
Texas	265	283	18	6.8%
Utah	24	34	10	41.7%
Virginia	111	121	10	9.0%
Vermont	22	13	-9	-40.9%
Washington	62	97	35	56.5%
Wisconsin	91	74	-17	-18.7%
West Virginia	31	25	-6	-19.4%
Wyoming	10	11	1	10.0%
American Samoa	0	0	0	-
Guam	0	0	0	-
Hawaii	5	19	14	280.0%
Northern Mariana Islands	1	0	-1	-
Puerto Rico	0	0	0	-
Virgin Islands	0	0	0	-
Total U.S.	3,953	3,926	-27	-0.7%

Exhibit A2. FAMA Members-Total Units Booked by Canadian Province, 2017 v. 2018

Province	2017	2018	2017 v. 2018	
			Net	%
Alberta	50	53	3	6.0%
British Columbia	59	59	0	0.0%
Manitoba	22	32	10	45.5%
New Brunswick	21	18	-3	-14.3%
Newfoundland and Labrador	3	2	-1	-33.3%
Nova Scotia	14	19	5	35.7%
Northwest Territories	0	2	2	-
Nunavut	1	3	2	200.0%
Ontario	116	145	29	25.0%
Prince Edward Island	2	1	-1	-50.0%
Quebec	27	29	2	7.4%
Saskatchewan	10	14	4	40.0%
Yukon	5	4	-1	-20.0%
Total Canada	330	381	51	15.5%

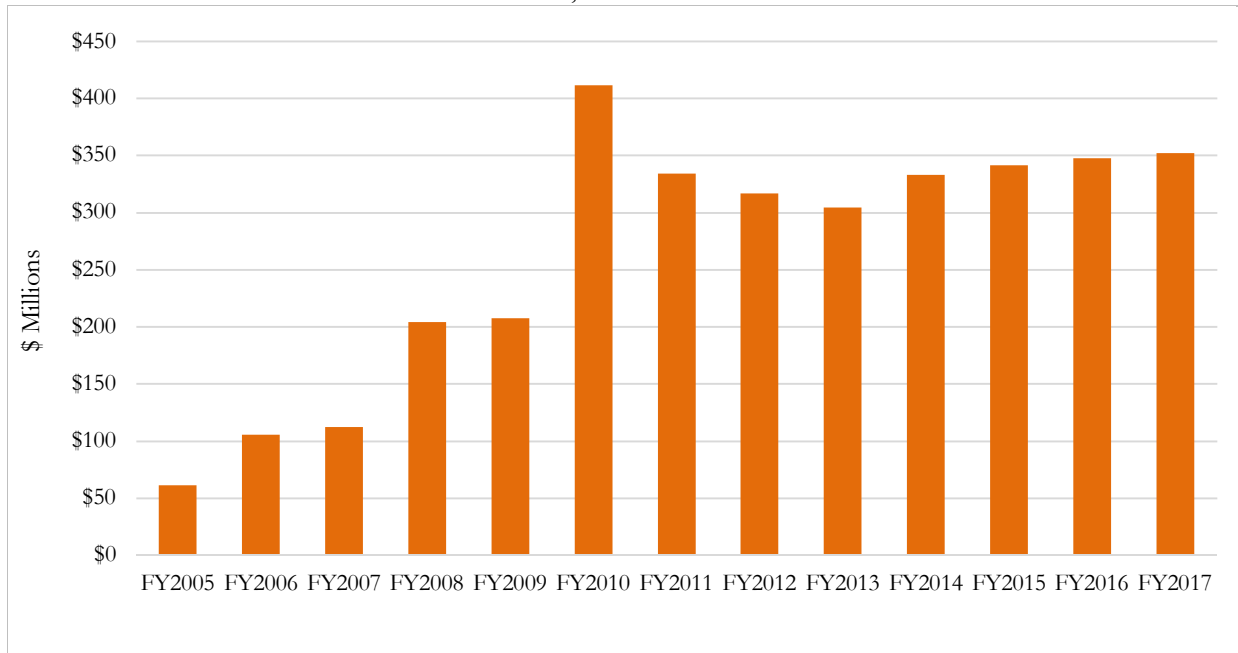
FEMA Grants

Exhibit A3. FEMA AFG Grants Distributed, FY2001-FY2017



Source: Sage; Congressional Research Service, “Assistance to Firefighters Program: Distribution of Fire Grant Funding”. Author: Lennard G. Kruger, Specialist in Science and Technology Policy. Notes: AFG: Assistance to Firefighters Grants; Fema.gov.

Exhibit A4. FEMA SAFER Grants Distributed, FY2005-FY2017



Source: Sage; Congressional Research Service, “Assistance to Firefighters Program: Distribution of Fire Grant Funding”. Author: Lennard G. Kruger, Specialist in Science and Technology Policy. Notes: AFG: Assistance to Firefighters Grants; Fema.gov.

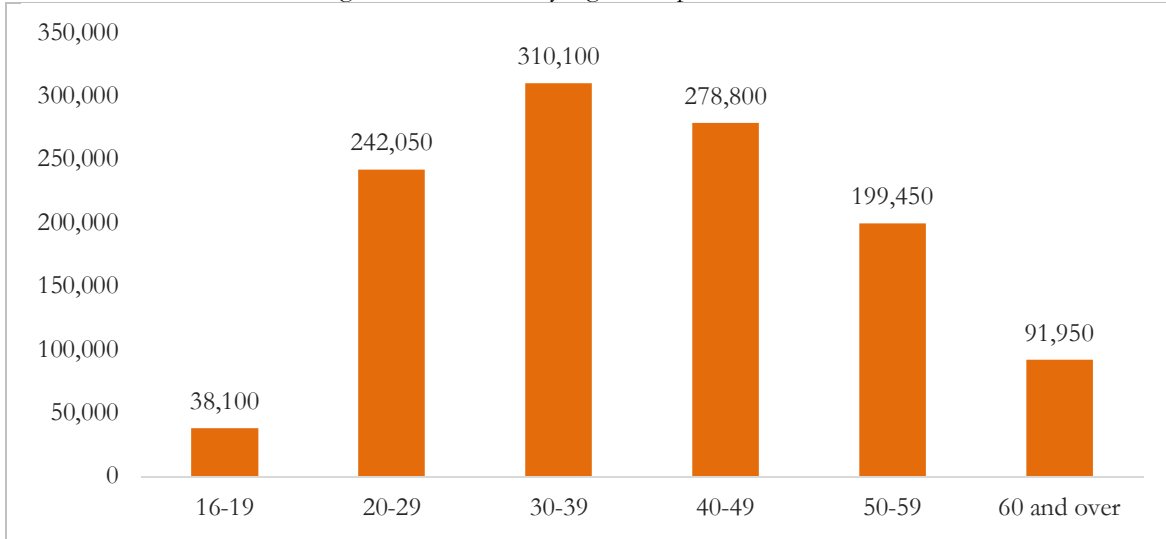
Exhibit A5. Assistance to Firefighters Grants (AFG) Awarded by State, FY2002-FY2017

State	AFG Grants (\$ Millions)			
	FY2002-2009	FY2010-2017	Net Chg.	% Chg.
Alaska	\$18.65	\$6.03	-\$12.62	-67.7%
Alabama	\$166.99	\$119.49	-\$47.50	-28.4%
Arkansas	\$70.17	\$26.08	-\$44.09	-62.8%
Arizona	\$47.93	\$35.22	-\$12.72	-26.5%
California	\$190.89	\$166.34	-\$24.55	-12.9%
Colorado	\$38.35	\$24.41	-\$13.94	-36.4%
Connecticut	\$57.06	\$31.52	-\$25.54	-44.8%
District of Columbia	\$2.22	\$2.83	\$0.61	27.6%
Delaware	\$7.49	\$7.37	-\$0.12	-1.6%
Florida	\$94.79	\$80.68	-\$14.11	-14.9%
Georgia	\$76.79	\$42.16	-\$34.63	-45.1%
Iowa	\$91.85	\$35.15	-\$56.71	-61.7%
Idaho	\$30.84	\$14.11	-\$16.72	-54.2%
Illinois	\$184.49	\$94.30	-\$90.18	-48.9%
Indiana	\$120.17	\$48.85	-\$71.32	-59.3%
Kansas	\$54.44	\$21.23	-\$33.21	-61.0%
Kentucky	\$114.74	\$51.03	-\$63.72	-55.5%
Louisiana	\$72.58	\$35.62	-\$36.95	-50.9%
Massachusetts	\$93.68	\$84.92	-\$8.76	-9.4%
Maryland	\$60.06	\$43.53	-\$16.52	-27.5%
Maine	\$51.35	\$17.10	-\$34.25	-66.7%
Michigan	\$126.01	\$94.57	-\$31.44	-25.0%
Minnesota	\$120.82	\$66.34	-\$54.48	-45.1%
Missouri	\$110.24	\$55.54	-\$54.70	-49.6%
Mississippi	\$75.75	\$29.02	-\$46.74	-61.7%
Montana	\$49.03	\$12.43	-\$36.60	-74.6%
North Carolina	\$152.46	\$89.45	-\$63.01	-41.3%
North Dakota	\$25.17	\$6.17	-\$19.00	-75.5%
Nebraska	\$39.41	\$11.61	-\$27.80	-70.5%
New Hampshire	\$28.81	\$17.43	-\$11.39	-39.5%
New Jersey	\$111.86	\$67.92	-\$43.93	-39.3%
New Mexico	\$19.96	\$9.99	-\$9.96	-49.9%
Nevada	\$12.04	\$7.85	-\$4.19	-34.8%
New York	\$229.99	\$118.77	-\$111.22	-48.4%
Ohio	\$209.11	\$167.64	-\$41.46	-19.8%
Oklahoma	\$66.82	\$18.60	-\$48.22	-72.2%
Oregon	\$64.58	\$37.21	-\$27.37	-42.4%
Pennsylvania	\$312.42	\$207.89	-\$104.53	-33.5%
Rhode Island	\$14.62	\$24.84	\$10.22	69.9%
South Carolina	\$82.55	\$50.28	-\$32.27	-39.1%
South Dakota	\$27.07	\$7.64	-\$19.43	-71.8%
Tennessee	\$118.10	\$60.08	-\$58.01	-49.1%
Texas	\$174.16	\$59.45	-\$114.71	-65.9%
Utah	\$22.27	\$20.69	-\$1.58	-7.1%
Virginia	\$89.13	\$44.04	-\$45.08	-50.6%
Vermont	\$20.25	\$7.82	-\$12.43	-61.4%
Washington	\$113.90	\$68.55	-\$45.35	-39.8%
Wisconsin	\$126.92	\$49.94	-\$76.98	-60.7%
West Virginia	\$58.76	\$34.43	-\$24.32	-41.4%
Wyoming	\$14.25	\$2.24	-\$12.02	-84.3%

Source: Sage; Congressional Research Service, "Assistance to Firefighters Program: Distribution of Fire Grant Funding". Author: Lennard G. Kruger, Specialist in Science and Technology Policy; Fema.gov

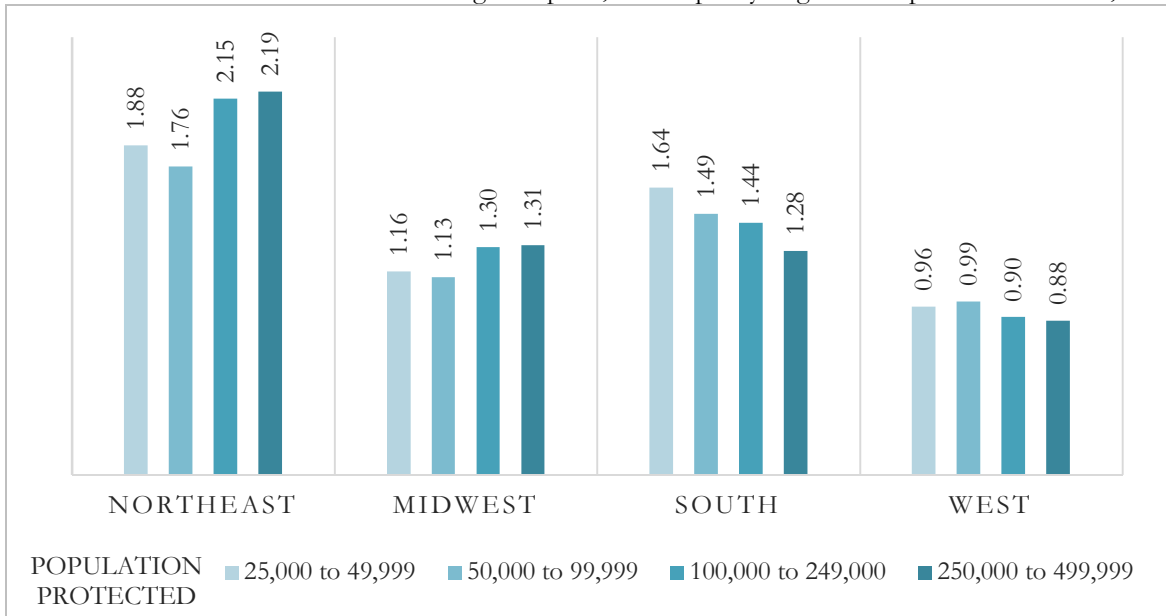
Characteristics of Firefighters in the U.S.

Exhibit A6. Number of Firefighters in the U.S. by Age Group, 2015



Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2015". April 2017

Exhibit A7. Median Rates of Career Firefighters per 1,000 People by Region & Population Protected, 2015



Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2015". April 2017.



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