

# The Fire Apparatus Industry: An Update (Report V4) April 2021

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

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## The Fire Apparatus Industry: An Update

Submitted by: Sage Policy Group, Inc.

Submitted to:

The Fire Apparatus Manufacturers' Association (FAMA) April 2021



A Sage Industry Analysis

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### **Executive Summary**

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

- a. What can the industry expect in light of economic forecasts, capital budgeting, the state of the fleet, and known demographics?
- b. What are the discernible impacts of COVID-19 on industry performance and prospects?

The market for new fire apparatus achieved its peak in 2006 and then again in 2008 when more than 6,000 new apparatus were booked in North America. As the Great Recession took its toll, municipal and fire department budgets were truncated, forestalling capital expenditures. The impact was gradual and grinding as opposed to sudden. Sales did not attain a cyclical nadir until 2012, three years after the recession ended.

As economic recovery took hold, public finances restored, and confidence climbed, the market predictably improved. Total sales for new fire apparatus in North America (measured in terms of units booked) commenced an ascendance in 2013. That ended in 2016, with units booked declining 11 percent that year, due perhaps in part to the uncertainties accompanying a hotly contested U.S. presidential election. The following year, units booked rebounded, growing 9.0 percent. Units booked expanded modestly in 2018 and 2019.

Then came a global pandemic that shattered a period of growing momentum. In what turned out to be a dreadful year, total units booked in 2020 were down 12.2 percent. To put this into further context, average sales during 2020 were 10 percent below the average observed over the past 16 years. While 2020 was a lousy year, it may be that lost industry momentum was simply attributable to the chaos unleashed by the pandemic and that there is now an abundance of pent-up demand for apparatus that will soon become apparent.



Indeed, the industry's outlook has been rapidly brightening in recent months for three reasons. First, the economy has recovered faster than many anticipated. Second, many state governments did not suffer as much revenue loss in 2020 as expected. Third, massive federal stimulus, including an expected infrastructure package, should result in rapid recovery in units sold.

This is reflected in stakeholder predictions. The latest industry survey data indicate that more than 80 percent of responding member companies expect their employment levels to increase and 75 percent expect capital investment to rise over the next three years. Even in the short-term, more FAMA members expect orders and sales to increase in the next six months than expect them to decrease (44% expect orders/sales to increase; 27-28% expect orders/sales to decrease).

There are other factors at work. The postponed purchases of 2020 have likely generated pent-up demand. There has also been a surge in homebuilding, creating new subdivisions and demand for fire protection in the process. There has also been renewed awareness among policymakers of the importance of sufficient emergency response capacity, whether to respond to emergencies suffered by those experiencing flu-like symptoms or to combat wildfires. All of these considerations help explain why Congress recently passed a stimulus package that includes \$350 billion in assistance to state and local governments and is contemplating another package focused on infrastructure.

Ultimately, the issue is not one of need or desire, but the ability of local and state governments to finance apparatus purchases in the context of the challenges and shifted priorities the pandemic will leave in its wake. Some communities, many of them suburban, will escape the pandemic with reasonably solid finances and growth prospects. Other communities, particularly densely-populated, pricey large American and Canadian cities, are likely to be less well positioned given the diminished importance of proximity to brick-andmortar commercial centers. There has been a rush to the suburbs in both Canada and the United States during the pandemic, resulting in rapidly declining rents in parts of Toronto, Montreal, Vancouver, San Francisco, Seattle, Manhattan and in other major North American cities.

#### Looking Ahead

In sum, industry prospects are brightening. While government finances may take years to recover in certain communities, particularly urban ones, other communities will exit the crisis with *more* money available to spend on apparatus. Industry participants are accordingly upbeat, and there are plenty of reasons for their collective optimism.



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### Introduction

The Fire Apparatus Manufacturers' Association (FAMA) tasked Sage Policy Group (Sage) with analyzing FAMA and other industry-relevant data to generate insights regarding industry trends and likely future performance. The report is organized as follows:

- 1. Discussion of the performance of FAMA members relative to historic norms along key dimensions like orders/sales;
- 2. Discussion of FAMA's 2020/2021 Member Outlook and Industry Outlook surveys;
- 3. Analysis of the condition of the U.S. firefighting fleet;
- 4. Identification of key economic, demographic, and policy factors shaping performance;
- 5. Industry outlook.

#### Two Primary Research Questions Addressed

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

- a. What can the industry expect in light of economic forecasts, capital budgeting, the state of the fleet, and known demographics?
- b. What are the discernible impacts of COVID-19 on industry performance and prospects?

Even prior to the intrusion of COVID-19 into people's lives, the fire equipment industry had been puzzling over an unduly soft recovery in the aftermath of the Great Recession (2007-09). There have been a number of candidate explanations, including the slow and erratic pace of economic recovery during the years after the global financial crisis and the diminished pace of depreciation that characterizes contemporary equipment, including fire trucks.

But these explanations failed to pass muster. Even after the North American economy began to experience accelerating growth during the latter years of the previous decade, units ordered and other industry metrics exhibited subdued tendencies. By this point, state, local, and provincial government finances had been much improved. Borrowing costs remained low. Aggregate social wealth climbed. Despite all of this, industry performance could be characterized as lackluster.

As if this were not enough, COVID-19 caused economic momentum to slam to a halt. Government finances have been compromised in many instances by rapid growth in emergency spending coupled with diminished revenues. While the North American economy is expected to recover rapidly during the second half of 2021, the question remains, will that be enough to counter the negative shock to government finances that accompanied the global pandemic?



### I. FAMA Industry Performance

#### Current & Historic Performance

Demand for new fire apparatus peaked in 2006 and then again in 2008 when more than 6,000 new apparatus were 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.<sup>1</sup>

The impact was gradual and grinding as opposed to sudden. Sales did not reach a cyclical nadir until 2012, three years after recession's end. By that point, bookings were down 35 percent from their pre-established peak. This is consistent with the notion that the condition of public finances tends to lag the performance of the overall economy. This is of course an important consideration given the dislocations produced by Covid.

Exhibit 1. Privin Members Offits Dooked. Recent Flistone Flights & Lows				
	Time Period	Units Booke		
Low	2012 Quarterly Average	98		
TT: 1	2006 Quarterly Average	1,52		
Highs	2008 Quarterly Average	1,50		

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

As economic recovery took hold, public finances were restored, and confidence climbed, the market predictably improved. Total sales for new fire apparatus in North America (measured in terms of units booked) commenced an ascendance in 2013. That ended in 2016, with units booked declining 11 percent that year, due perhaps in part to the uncertainties accompanying a hotly contested U.S. presidential election. The following year, units booked rebounded, growing 9.0 percent. Units booked grew modestly in 2018 and 2019. Then came a global pandemic.

The pandemic shattered a period of building momentum. During 2020's initial half, units book declined significantly, first by a bit more than 3 percent during the first quarter and then by a cataclysmic 38 percent during the second.

After spring shutdowns, the North American economy reopened in fits and starts. That set the stage for partial recovery during 2020's latter half. Units booked rebounded 25 percent during the third quarter and 29 percent during the fourth. Given the laws of mathematics, those percentages were not enough to fully countervail the declines registered during 2020's initial half. In what turned out to be a dreadful year, total units booked were down 12.2

<sup>&</sup>lt;sup>1</sup> FAMA. "Big Data in The Fire Service" <u>https://www.fama.org/forum\_articles/big-data-fire-service/</u>.



percent compared to 2019. To put this into further context, average sales during 2020 were 10 percent below the average observed over the past 16 years.

As noted earlier, the previous cyclical nadir in industry sales activity didn't transpire until three years after the Great Recession's end. If this time is similar, the fiscal dislocations of 2020/21 could reverberate for years to come, resulting in stagnant industry sales or worse.

There are some offsetting considerations, however. It is conceivable that policymakers in Washington, Ottawa, in provincial capitals, state capitals and elsewhere will invest more aggressively in infrastructure in order to accelerate the economic rebound from Covid. The Biden administration has been emphasizing the need for stepped up infrastructure outlays, and that could offset at least some of the damage done to public finances in recent guarters.

Moreover, 2020 was associated with more than pandemic. Forest fires once again raged across much of the western United States, which presumably will induce certain communities to continue to step up investment in firefighting and fire prevention equipment.

Ongoing community aging, the concomitant need to rapidly respond to more emergencies, and depreciation also serve as factors shaping the outlook. Both of these influences would tend to raise demand for equipment.



Exhibit 2. Total Units Booked by Quarter, 2003Q1-2020Q4



#### Vehicle Class

Pumpers represent the majority of sales - around 57 percent of all units booked historically. There has been an overall declining sales trend for pumpers, with sales down 3.0 percent annually on average from 2008-2020 (compound annual growth rate). Over the last 5 years (between 2015 and 2020), pumper sales declined at an average annual rate of 2.2 percent. Pumper sales declined by more than 12 percent in 2020, the same magnitude of decline seen across all types of units booked.



Source: FAMA; Sage

Aerial apparatus and rectangular and elliptical tankers represent the next largest source of sales. Sales in these categories have been relatively steady in recent years, rising and falling only slightly from year to year. Overall, however, sales in both categories declined over the past five years. From 2015 to 2020, aerial apparatus sales declined at an average annual rate of 1.5 percent while rectangular and elliptical tanker sales declined at a 0.4 percent annual rate (CAGR).

Within the rectangular and elliptical tanker category, rectangular tankers have far outpaced elliptical tankers. Elliptical tankers declined from approximately 46 percent of tanker sales in 2003 to just 8.4 percent of tanker sales by 2020, while rectangular tankers have grown from a



market share of approximately 54 percent to more than 90 percent of tanker sales. This may be because rectangular tankers can provide greater capacity.<sup>2</sup>

Non-walk in rescue had been recovering nicely after 2009, largely in response to 1) the shift toward firefighters responding to more medical emergencies and 2) improving economic/fiscal performance.<sup>3</sup> However, sales of non-walk in rescue units declined significantly in more recent years, almost completely reversing previously established trends. After expanding at an average annual rate of 12.5 percent from 2009 to 2014, sales of nonwalk in rescue units declined at almost the same pace over the next five years.

Brush trucks is the only category to experience significant sales growth in recent years, with units booked expanding 7.3 percent annually on average from 2015-2020. Brush trucks, however, represent a small share of total units booked. Airport rescue and firefighting apparatus sales (ARFF) expanded at a 2.7 percent annual growth rate over the same span.

Interpreting these data is more challenging than usual. The pandemic's impact on 2020 outcomes has significantly altered sales trajectories, which is observable in a number of key categories represented in Exhibit 4.



Exhibit 4. Units Booked by Vehicle Class Group (Excluding Pumpers), 2003-2020

<sup>&</sup>lt;sup>2</sup> FAMA. "Changes in Fire Apparatus Now and in the future". https://fama.org/wpcontent/uploads/2015/09/1441730972 55ef119c7b1f3.pdf.

<sup>&</sup>lt;sup>3</sup> Ibid.



Vahiala Class	CAGR			
venicie Class	2009-2014	2015-2020		
Pumpers	2.1%	-2.2%		
Walk-In Rescue	4.7%	-5.4%		
Non-Walk In Rescue	12.5%	-12.0%		
Rectangular and Elliptical Tanker Sales	1.2%	-0.4%		
Aerial	3.1%	-1.5%		
Airport Rescue and Fire Fighting (ARFF)	7.3%	2.7%		
Major Refurbishment	-14.0%	-7.3%		
Brush Trucks	-3.5%	7.3%		
Total Units Booked	2.6%	-2,0%		
Source: FAMA: Sage				

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

Source: FAMA; Sage

As noted, the most recent full year of data indicates an overall decline in units booked of 12.2 percent across all vehicle classes. Brush trucks was the only category that did not experience an orders' decline in 2020. Brush trucks also experienced the fastest rate of growth in booking over the past five years among all types of apparatus. Undoubtedly, this is at least partially in response to devastating wildfires, particularly 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 translated into 450 fatalities.

While history doesn't necessarily repeat itself, it has a tendency to rhyme (paraphrasing Mark Twain). 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, with climate change often cited as an important explanatory factor.

Vahiala Class /Units Booked	2010	2020	2019 v. 2020	
Venicie Class/ Units Dooked	2019	2020	Net	%
Pumpers	2,798	2,456	-342	-12.2%
Walk-In Rescue	88	65	-23	-26.1%
Non-Walk In Rescue	228	179	-49	-21.5%
Rectangular and Elliptical Tanker Sales	551	499	-52	-9.4%
Aerial	662	604	-58	-8.8%
Airport Rescue and Fire Fighting (ARFF)	196	150	-46	-23.5%
Major Refurbishment	84	54	-30	-35.7%
Brush Trucks	278	280	2	0.7%
Total Units Booked	4,885	4,287	-598	-12.2%

Exhibit 6. Units Booked by Vehicle Class, 2019 v. 2020

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. U.S. sales had been relatively steady from 2017-2019. In 2020, sales declined by a bit more than 9 percent.

After strong sales growth in 2018 and 2019, Canadian sales fell by more than 28 percent in 2020. Canadian sales were at their lowest observed level since 2005. In general, the U.S. economy held up better than Canada's in 2020. While the U.S. economy shrank an estimated 3.5 percent in 2020, the Canadian economy was diminished by more than 5 percent.







*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. These three provinces, Ontario, Alberta, and British Columbia, represented almost all of 2020's decline in units booked. Units booked in Ontario declined 44 percent in 2020, while declines in Alberta and British Columbia approach 40 percent. Please see Exhibit 9 for relevant statistical detail.



Exhibit 8. Units Booked by Canadian Province, 2020

Source: FAMA; Sage.

Exhibit 9. Units Booked by Canadian Province, 2019 v. 2020

State	2010	2020	2019 v. 2020	
State	2017	2020	Net	%
Alberta	56	35	-21	-37.5%
British Columbia	62	38	-24	-38.7%
Manitoba	29	32	3	10.3%
New Brunswick	14	11	-3	-21.4%
Newfoundland and Labrador	11	3	-8	-72.7%
Nova Scotia	13	15	2	15.4%
Northwest Territories	2	3	1	50.0%
Nunavut	2	2	0	0.0%
Ontario	132	74	-58	-43.9%
Prince Edward Island	3	3	0	0.0%
Quebec	37	40	3	8.1%
Saskatchewan	7	4	-3	-42.9%
Yukon	0	2	2	_
Total Canada	368	262	-106	-28.8%

Source: FAMA; Sage.



*United States.* Within the U.S., large states like California, Texas, New York, Florida, and Pennsylvania unsurprisingly represent large shares of total sales. Fewer than half of the states experienced an increase in units booked in 2020, and none registered significant increases. New York and New Jersey experienced the largest net decreases in units booked in 2020.



Exhibit 10. Units Booked by U.S. State, 2020

Exhibit 11.	Units	Booked	by U.S.	State,	2019	v. 2020

Rank	State	Chg. in Units Booked	Rank	State	Chg. in Units Booked	Rank	State	Chg. in Units Booked
1	Nevada	28	18	Michigan	0	35	Illinois	-13
2	Alaska	22	18	North Dakota	0	35	Kentucky	-13
3	Maryland	16	18	Wyoming	0	35	Texas	-13
4	New Hampshire	10	21	District of Columbia	-1	38	Louisiana	-14
4	West Virginia	10	21	Idaho	-1	39	California	-18
6	Minnesota	9	21	Maine	-1	40	Indiana	-19
6	Tennessee	9	21	South Dakota	-1	40	Massachusetts	-19
8	Alabama	8	25	Oregon	-2	42	Missouri	-20
8	North Carolina	8	25	Vermont	-2	43	Mississippi	-23
8	Ohio	8	27	Pennsylvania	-3	44	Florida	-25
8	Utah	8	28	Colorado	-5	45	Washington	-28
12	Kansas	6	28	Delaware	-5	46	Oklahoma	-34
13	Rhode Island	3	30	Connecticut	-7	47	Arizona	-36
13	Wisconsin	3	31	Georgia	-9	47	South Carolina	-36
15	New Mexico	2	31	Nebraska	-9	49	Virginia	-38
16	Arkansas	1	33	Montana	-10	50	New Jersey	-46
16	Iowa	1	33	Hawaii	-10	51	New York	-79
							Total U.S.	-388

Source: FAMA; Sage. Notes: 1. There were 0 units booked in 2020 for the following areas: American Samoa, Guam, Northern Marianas, and Virgin Islands. There were 15 units booked in Puerto Rico in 2020. 2. See Appendix for full data regarding units booked in U.S. states and territories in 2019-20.



#### 2020/2021 FAMA Member Outlook Survey

In late 2020/early 2021, FAMA surveyed its member companies regarding an array of issues ranging from factory utilization to marketing strategies. Among other things, member companies were asked about their most pressing issues and about their expectations for the future.

• Apparatus is Global

Most FAMA members surveyed have at least one manufacturing location in the U.S. (89.6% of responding member companies) and nearly 20 percent have at least one manufacturing location in Canada. A bit more than 10 percent of responding companies have at least one manufacturing location in Europe and almost 8 percent have at least one location in Asia. Fewer than 4 percent of responding member companies have manufacturing locations in Central or South America.

Most FAMA members' sales are in the U.S. and Canada. Almost half of responding member companies (46%) do not have primary business sales outside of the U.S. and Canada. More than 2 in 5 responding companies have some primary business sales in 1-10 locations outside the U.S. and Canada and 13 percent have some primary business sales in more than 10 locations outside the U.S. and Canada.

Despite a significant global industry footprint, exports represent a small share of sales for most responding FAMA members (22% indicate that they have no export sales and another 36% said exports represent less than 5% of sales). Nearly a third of members indicate that exports represent between 5-25 percent of sales. Not quite 1 in 10 members indicate that exports account for more than 25 percent of sales.

Principal Member Concerns

FAMA member companies were asked to rate how concerned they were about specific issues on a scale of 1 to 5, where 1 indicates the issue did not fundamentally impact their business and 5 indicates the issue keeps them up at night, perhaps literally. Unsurprisingly, respondents ranked funding availability as their highest level of concern (71.4% of companies ranked it 4 or 5), followed by 'overall economic conditions/general sales declines' (62.3% of companies ranked that as a 4 or 5).

FAMA member companies were asked which strategies they think are or will prove the most successful during challenging economic times. Almost half (49.4%) of responding companies identified greater diversification through entry into new markets and focusing on several markets as their most successful strategy. Focusing on higher margins was identified as the most successful strategy by 14 percent of responding companies and becoming more specialized by focusing on niche markets was identified as the most successful strategy by 13



percent of responding companies. In other words, while some firms seek to diversify across segments, some seek greater specialization within defined segments. It will be interesting to see which strategy proves to be closely aligned with growth and enhanced profitability.

Tanna	1: This doesn't impact our business   5: Keeps me up at night					
Issue	Rated 1-2	Rated 3	Rated 4-5	Total		
State/local taxes	46.8%	16.9%	36.4%	100%		
Federal regulation	33.8%	31.2%	35.1%	100%		
Energy costs	42.9%	41.6%	15.6%	100%		
Funding/budgets	10.4%	18.2%	71.4%	100%		
Overall economic conditions/general sales declines	9.1%	28.6%	62.3%	100%		
Cost of raw materials	14.3%	36.4%	49.4%	100%		
Product liability and litigation	45.5%	35.1%	19.5%	100%		
Health care costs	31.2%	23.4%	45.5%	100%		
Housing market	46.8%	36.4%	16.9%	100%		

Exhibit 12	FAMA	Member	Survey:	Issues	of Conce	ern
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Source: FAMA; Sage.

• Three-Year Outlook

FAMA member companies were asked about their expectations for coming years regarding a range of issues including employment, capital investment, factory utilization, exports, and industry consolidation. Here are their responses.

*Employment.* Member companies were asked about expectations for company employment levels in 2021 and over the ensuing three years. More than half of responding member companies expect their full-time employment to increase in 2021 (most of those expect an increase ranging between 1-10%). Almost 38 percent of responding companies expect their full-time employment to be the same in 2021. Just 6.5 percent of member companies expect full-time employment to decline in 2021.

Over the longer-term (next 3 years), more than 80 percent of responding member companies expect their employment levels to increase (58% think it will increase by 1-10%; 23% think it will increase by more than 10%). Thirteen percent of responding member companies think employment levels won't change and 5 percent think employment will decline in the next three years.

Parenthetically, FAMA member companies were also asked how many employees at their company were involved in fire apparatus or equipment manufacturing. Forty-three percent of responding companies said they had fewer than 50 employees involved in fire apparatus or equipment manufacturing and 40 percent of responding companies had between 50-200 employees involved. Approximately 14 percent of companies said they had between 200-500 employees involved in fire apparatus or equipment manufacturing.



*Capital Investment.* Over the next three years, very few responding FAMA members indicated that capital investment is expected to decline (only 1.3% of responding companies). Approximately a quarter of responding member companies expect capital investment to be unchanged over the next three years. That means that nearly 75 percent of respondents expect capital investment to increase over the three-year forecast horizon. Just over 44 percent of responding companies expect capital investment to increase modestly (by 1-10%), 21 percent of responding companies expect it to increase even more (by 11-20%), and 9 percent expect capital investment will increase substantially (by more than 20%) during the next three years.

*Exports.* Asked whether company exports (in terms of sales volume) would increase or decrease over the next 3 years, almost precisely half (49%) of responding member companies indicated that export levels were not expected to change. A bit more than 35 percent expect exports to increase modestly (between 1-10%) and nearly 12 percent expect exports to increase more substantially (more than 11%) in the next 3 years. A small share of member companies (3.9%) expect exports to decline.

*Product lead times.* Just over a third of responding member companies believe product lead times will improve over the next 3 years, but nearly 43 percent think lead times will stay the same and 23 percent think project lead times might decline.

*Industry consolidation.* The majority of responding FAMA member companies (more than 62%) are of the opinion that industry consolidation will increase over the next three years and nearly 38 percent think industry consolidation will stay about the same. No responding companies indicate a belief that the pace of industry consolidation will slow over the next three years.

*Factory utilization.* Nearly a quarter (24.7%) of responding FAMA member companies indicate that factory utilization is at its upward bound. Almost half of respondents (49.4%) indicate that current factory utilization is between 75-99 percent and more than 23 percent (23.4%) indicate factory utilization between 50-74 percent. Four in ten responding member companies expect factory utilization to reach its limit in three years or less. More than half expect utilization to stand between 75-99 percent at that time. Very few companies expect utilization to be below 75 percent in 3 years.



Short-Term Outlook (Next 6-months)

Based on questions posed to FAMA members about their expectations regarding orders, sales, and sale prices, Sage economists computed the new FAMA Confidence Index (FCI), which measures member companies' outlook for the next six months. The first FCI reads 54.9 for orders, indicating an expectation that orders will increase over the next 6 months (any reading below 50 indicates an expectation of shrinking orders, while any reading above 50 indicates expected expansion). The FCI sales reading was 55, while the reading for sales prices was 66.2, indicating a widely held expectation of price increases over the next two quarters. This may have something to do with a recent increase in metals prices, with the notion being that at least some of those input price increases will be passed along to customers.

Exhibit 15. 17 IVIA Member Co			
	Orders	Sales	Sales Prices
	54.9	55.2	66.2
	Expectation	ns	
Increase Significantly	7.8%	6.5%	7.8%
Increase Slightly	36.4%	37.7%	55.8%
No Change	27.3%	28.6%	31.2%
Decrease Slightly	24.7%	24.7%	3.9%
Decrease Significantly	3.9%	2.6%	1.3%
Source: Sage: EAMA			

Exhibit 13 EAMA Member Confidence Index

Despite concerns regarding funding and general sales declines, more FAMA members expect orders to increase than decrease (by a ratio of roughly 5 to 4), anticipate rising sales as opposed to declining ones (by a ratio of approximately 5 to 3), and also expect to be able to sustain some upward pressure on prices charged (by a ratio exceeding 12 to 1).



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. More than 1,100 fire departments responded to FAMA's 2020 Industry Outlook survey.

The majority of respondents' organizations are volunteer/paid on-call departments (55.6%) or combination career/volunteer departments (19.7%). 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 in the U.S. are predominately volunteer (70.4%) or mostly volunteer (15.8%).<sup>4</sup> A somewhat larger share of FAMA survey respondents are from career fire departments compared to the national average (22.4% v. 9.1% nationally).

Among other things, researchers asked departments about the average age of their department's front-line apparatus. More than 60 percent of respondents report having apparatus that is at least 10 years old, and 23 percent report that their department's apparatus is at least 16 years old. As far back as 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.<sup>5</sup> Based on sales data, a meaningful share of this equipment has yet to be replaced.





Source: FAMA; Sage. Note: Average age unknown for 0.3% of respondents.

<sup>&</sup>lt;sup>4</sup> U.S. Fire Administration (USFA). "National Fire Department Registry quick facts".

<sup>&</sup>lt;sup>5</sup> NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016.



#### Apparatus Replacement Plans

The survey also asked departments about their apparatus replacement plans and processes. Asked whether their fire department maintains a formal or written apparatus replacement plan or process, only 43.1 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).<sup>6</sup>

Indeed, FAMA survey results indicate that fewer departments had apparatus replacement plans compared to previous survey years. However, the phrasing of the 2018-2020 survey question may have contributed to the decline in respondents answering "yes" to this question.

Survey questions were phrased thusly:

Survey years 2015-2017: "Does your fire department have an apparatus replacement plan or process?" Survey year 2018-2020: "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 manner. Exhibit 15 summarizes.



Exhibit 15. Responding Departments: Apparatus Replacement Plans

Source: FAMA; Sage

<sup>6</sup> NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. 127.



Respondents were also asked how their department determines that an apparatus is ready for replacement. Among responding departments (14.5 percent of respondents left this question blank), age of apparatus is the primary determinant (52.7% of respondents) followed by cost of maintenance (31.0%).

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.<sup>7</sup> Furthermore, age and cost of maintenance are likely closely related since the cost of maintenance presumably increases with the number of years apparatus has been in service all things being equal.

#### Choosing Equipment & Apparatus

Departments were asked to rank certain factors—including sources of information, brand loyalty, and service/manufacturer attributes—regarding their relative importance in selecting new pieces of equipment or apparatus.

*Sources of Information.* When seeking information regarding apparatus and equipment, personto-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 nearly a third (29.9%) ranked manufacturer/dealer salespersons as the number one most important source. More than 50 percent of respondents ranked manufacturer/dealer salespersons as 1<sup>st</sup> or 2<sup>nd</sup>. The second most important source of information was word of mouth/networking with colleagues, with more than 24 percent of respondents ranking this source of information as the most important and nearly 39 percent ranking it as 1<sup>st</sup> or 2<sup>nd</sup>.

	% of Respondents				
Source	Ranked 1 or 2	Ranked 3-5	Ranked 6-7	Total	
Trade publications	22.1%	48.8%	29.1%	100%	
Trade website articles	14.0%	58.1%	27.9%	100%	
Trade shows	27.6%	50.3%	22.1%	100%	
Networking with industry colleagues	38.7%	45.4%	15.9%	100%	
Manufacturer / Dealer websites	32.2%	51.0%	16.8%	100%	
Manufacturer / Dealer salespersons	50.6%	27.9%	21.5%	100%	
Social media (Facebook/Twitter, etc.)	14.8%	18.5%	66.7%	100%	

Exhibit 16. Most Important Sources of Information on Apparatus & Equipment

Source: FAMA; Sage.

<sup>&</sup>lt;sup>7</sup> NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. 124.



Trade publications and manufacturer/dealer websites continue to be less important than word of mouth information. Social media appears to be the single least important source of information for departments considering new equipment or apparatus. More than half of respondents (56%) ranked social media as the least important source of information (7<sup>th</sup>) and almost 67 percent ranked it 6<sup>th</sup> or 7<sup>th</sup>. Exhibit 16 summarizes survey findings.

*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 characteristic followed by service and then price.

More than 66 percent of respondents ranked quality as 1<sup>st</sup> or 2<sup>nd</sup> when explaining their loyalty to brands. Other popular responses were service (54% indicated this as a 1<sup>st</sup> or 2<sup>nd</sup> factor) and price (40%). Delivery timeframes and availability of customized options appear to play the smallest roles in shaping brand loyalty in the context of new equipment purchases.

		% of Respondents				
Aspect	Ranked	Ranked 3	Ranked 4-5	Total		
Service	54.2%	24.4%	21.4%	100%		
Price	39.6%	35.6%	24.8%	100%		
Quality	66.4%	15.9%	17.7%	100%		
Availability of customized options	20.1%	17.5%	62.5%	100%		
Delivery time frame	19.7%	6.7%	73.6%	100%		

Exhibit 17. Most Important Aspects Related to Brand Loyalty When Purchasing New Equipment

Source: FAMA; Sage.

*Service/Manufacturer Attributes-Apparatus.* Researchers asked respondents 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. More than a third of respondents (34%) ranked this attribute as the most important and 54 percent ranked it as 1<sup>st</sup> or 2<sup>nd</sup>. Approximately 20 percent of survey participants ranked brand 1<sup>st</sup> and another 20 percent ranked customer service 1<sup>st</sup>. Relationships with sales persons appears to be the least important factor in choosing new apparatus.

Exhibit 18. Most Important Service/Manufacturer Attributes in the Purchase of New Apparatus

Sorvice / Mapufacturer	% of Respondents				
Attribute	Ranked 1 or 2	Ranked 3	Ranked 4-5	Total	
Local dealer	35.6%	21.8%	42.6%	100%	
Brand	33.2%	16.6%	50.2%	100%	
Relationship with sales person	27.0%	30.9%	42.2%	100%	
Customer service experience	49.8%	18.3%	31.9%	100%	
After-sales service and parts	54.4%	12.5%	33.1%	100%	

Source: FAMA; Sage.



#### Industry Outlook

FAMA asked respondents about their departments' experiences over the last two years (2019 and 2020) with respect to budgets, staffing, and apparatus purchases. The majority of respondents indicated that their budgets had not changed over the previous two years, with 61 percent saying their equipment budget (exclusive of capital purchases like apparatus) had stayed the same and 60 percent saying their apparatus budget had stayed the same.

Approximately 20-22 percent of surveyed departments indicated that their budgets had increased, and 17-19 percent indicated their budgets had decreased over the previous two years. Importantly, only 20 percent of departments increased their staffing levels during 2019-2020, while nearly 27 percent reduced staff. Whether this was due to budgetary pressures, retirements, difficulty recruiting, or human-displacing technologies is unclear.

Respondents were asked whether their department had made apparatus purchases in the past two years. More than a third of respondents (37.3%) indicated their department hadn't purchased any apparatus in the last two years, while nearly 63 percent indicated that their department had purchased apparatus, whether new or used. Among the departments that had purchased apparatus in the previous two years, more than 75 percent of purchases were of new apparatus, almost 16 percent were of used apparatus, and almost 9 percent were purchases of both new and used apparatus.



Exhibit 19. Apparatus Purchases in the Previous Two Years Among Departments Surveyed

Source: FAMA; Sage



Respondents were also asked about anticipated apparatus purchases during the next fiscal year. The question was phrased: "if purchasing apparatus in the next fiscal year, which type do you anticipate purchasing?" Almost a quarter (22.6%) of respondents skipped this question. Among respondents who answered, nearly 47 percent indicated an intention to purchase pumpers in the coming year. 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 during the next year. Aerial apparatus, rescue apparatus, and tankers were also high on the list of types of apparatus departments intend to purchase in the next year.

Exhibit 20. Apparatus Purchase Plans Among Fire Departments Surveyed		
Which of the following apparatus do you	% of Depts Intending	
anticipate purchasing in the next fiscal year?	to Purchase	
Pumper	46.7%	
Aerial	19.7%	
Rescue	17.6%	
Tanker	17.4%	
Wildland / Brush Truck	13.6%	
Command Vehicle	12.1%	
Pre-Owned / Used	9.5%	
Other (please specify)	9.3%	
Refurbished Vehicle	5.0%	
UTV	4.5%	
ARFF (Airport Rescue Firefighting)	1.7%	

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

Intention does not necessarily translate into purchases, however. For example, more than a quarter of total departments responding in 2017 planned to buy pumpers in the next fiscal year (2018) compared to fewer than 23 percent indicating such an intention the prior year. However, in 2018 itself, pumper units booked actually declined. This loose fit between intentionality and actual bookings has been apparent in many previous years as well. There are many likely reasons for this, but one may relate to the uncertain nature of public budgets, which are after all forged out of unpredictable political processes.

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%).



Finally, fire departments were asked about their expectations for staffing and funding levels in the next year (2021). Seventy percent of those who responded expect staffing levels to remain the same next year. Approximately 20 percent expect staffing levels to increase, and 10 percent expect to see the size of their staff shrink.

Similar to expectations regarding staffing, an easy majority of respondents expect budgets for apparatus to stay the same next year (62%). Just over 21 percent expect apparatus budgets to increase and almost 17 percent expect apparatus budgets to decline in 2021. Expectations for overall equipment budgets (excluding capital purchases like apparatus) are generally the same as expectations for apparatus budgets.



Exhibit 21. Expectations for Changes to Staffing Levels/Apparatus Budgets in 2021

Expectations often go unrealized, however. In 2019, when asked if they anticipated their apparatus budgets to increase, decrease, or stay the same over the next two years, only 7 percent of departments indicated that their apparatus budgets would decline. At that time, no one would have built a global pandemic into their baseline expectations.

When asked in late 2020 if their apparatus budget had increased, decreased, or stayed the same in 2019 and 2020, nearly 20 percent of respondents said their departments' budget had declined. That fits neatly with the 12 percent decline in units book observed in 2020.

This year, a majority of respondents indicated an expectation that staffing levels and apparatus budgets would stay the same in the coming year. Approximately 20 percent expect staffing levels to increase and a bit more than 21 percent expect apparatus budgets to increase. If the past is prologue, some of those who expect rising staffing levels will be disappointed.



### II. Industry Performance in Context

To put FAMA member performance into 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 that shape industry performance.

#### The U.S. Fire Fleet

Much of the data referenced in this section of the report describing the U.S. fire fleet emerges from two publications by The National Fire Protection Association (NFPA): "U.S. Fire Department Profile-2018" (February 2020) and "Fourth Needs Assessment of the U.S. Fire Service" (November 2016).

*Fire Stations*. According to the National Fire Protection Association (NFPA) Fire Service Inventory as well as surveys of fire departments, there were 29,705 fire departments in the U.S. as of 2018 (see Exhibit 22 below). As of January 2021, 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 encompass 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 15 percent have three or more stations.<sup>8</sup>



Exhibit 22. Number of Fire Departments in the U.S., 1990-2018

Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020. 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.

<sup>8</sup> 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, transportation authority or airport fire departments.<sup>9</sup> Fire departments are predominately volunteer (70.4%) or mostly volunteer (15.8%). The propensity to operate primarily volunteer fire departments varies greatly by state as reflected in Exhibit 24.





	Volunteer & Mostly Volunteer	,	Career & Mostly Career		
Rank	State	%	Rank	State	%
1	Delaware	98.3%	1	District of Columbia	100.0%
2	Minnesota	97.2%	2	Hawaii	91.7%
3	Pennsylvania	96.8%	3	Florida	53.5%
4	North Dakota	96.6%	4	Arizona	45.1%
4	South Dakota	96.6%	5	Massachusetts	45.0%
6	Nebraska	96.1%	6	California	43.6%
7	Iowa	95.8%	7	Rhode Island	38.2%
8	Vermont	95.6%	8	Georgia	27.5%
9	West Virginia	95.5%	9	Colorado	25.7%
10	Maine	94.4%	10	South Carolina	22.2%
11	New York	94.3%	11	Washington	22.2%
12	Montana	93.2%	12	Nevada	19.7%
13	Arkansas	93.1%	13	Illinois	19.5%
14	Wisconsin	92.5%	14	Ohio	18.1%
15	Oklahoma	91.6%	14	Texas	18.1%
16	North Carolina	91.1%	16	Connecticut	16.5%
17	Kentucky	90.6%	17	Missouri	15.3%
18	Oregon	90.2%	18	Louisiana	14.8%
19	Kansas	89.9%	19	New Hampshire	14.1%
20	Wyoming	89.4%	20	Utah	13.6%

Volunteer & Mostly Volunteer	Career & Mostly Career
Exhibit 24. Percentage of Registered Depts by Volunte	eer/Career Status, Top 20 States by Rank (Jan. 2021)

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

<sup>&</sup>lt;sup>9</sup> U.S. Fire Administration (USFA). "National Fire Department Registry quick facts".



Exhibit 25 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 77 percent of registered fire departments.



Exhibit 25. Specialized Services Provided by U.S. Fire Departments, January 2021

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, 19.1 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 2018 National Fire Experience Survey data, the number of firefighters in the U.S. increased 5.6 percent in 2018 to 1,115,200.

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 (27.2%). Approximately 23 percent of firefighters fall in the 40-49 age group and approximately 21 percent fall in the 20-29 age group.



According to NFPA, approximately 67 percent of firefighters are volunteers with the balance being career firefighters as of 2018. The number of career firefighters in the U.S. has tended to increase steadily and hit an all-time high in 2017 at 373,600. 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.

From 2012-2015 the number of volunteer firefighters began to expand again, increasing 4.0 percent over that span. Since then, the number of volunteer firefighters has been declining and in 2017 the count fell to 682,000, the lowest estimate since NFPA began reporting this statistic in 1986. In 2018 the number of volunteer firefighters rebounded sharply, but still remained at the slightly depressed level of 745,000, almost precisely 10 percent below the 2008 peak.



Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020. Note: The NFPA's "U.S. Fire Department Profile" is based on two data sources the annual NFPA Survey of Fire Departments for US Fire Experience During 2018 and the NFPA Fire Service Survey, 2016–2018. 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 5,000 are included in the sample.



According to data reported to the NFPA, as of 2018 the median number of career firefighters per 1,000 population in the U.S. was 1.8, while the median number of volunteer firefighters per 1,000 population was 6.1. 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.<sup>10</sup>



Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020.

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."<sup>11</sup> Exhibit 28 shows the range of rates for career firefighters per 1,000 people in departments protecting at least 25,000 people and for volunteer firefighters in departments protecting populations less than 25,000.

<sup>&</sup>lt;sup>10</sup> National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020.

<sup>&</sup>lt;sup>11</sup> National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2017". March 2019. p. 7.







Fire departments protecting communities of 25,000 people or more are associated with median rates of career firefighters per 1,000 people between 0.87 (1,000,000 or more) and 1.32 (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 just under 1.0 to nearly 19.0. 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.<sup>12</sup>

Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020.

<sup>&</sup>lt;sup>12</sup> National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020. p. 3.



*Fire Apparatus.* NFPA estimates indicate that the number of fire apparatus in the United States included 72,100 pumpers, 7,400 aerial apparatus, and 80,900 other suppression vehicles as of 2016-2018. While the number of pumpers declined during the 2015-2017 survey period, it rebounded in 2016-2018, rising 8.6 percent above the prior survey period's level. The number of other suppression vehicles, which includes apparatus with pumps less than 1,000 gpm, hose wagons, brush fire vehicles, and tankers, grew 12.5 percent over the previous survey period as reflected in Exhibit 29.



Exhibit 29. Number of Pumpers & Other Suppression Vehicles in the U.S., 2005-2018

Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020. 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.<sup>13</sup> 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 30. 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	
Comment 1 Comment 2 Nictional Eins Destantions Associations (NIEDA) ((Economic Associations) + 64h - 11 C. Eins Commission)					

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.

<sup>&</sup>lt;sup>13</sup> 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 extrapolation allows for the calculation of an overall percent, which is based on the sum of the number of projected departments is 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. xxxiy).


Average apparatus and station rates differ significantly by community size. Exhibit 31 presents the average number of apparatus per 1,000 people by the size of protected population. Numbers 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 31. Average Station & Apparatus Rates per 1,000 Population by Community Size, 2016-2018

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. There are more than 5,600 engines in service that are at least 30 years old.

As stated earlier in this report, 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.<sup>14</sup> Based on this piece of data and others, there is clearly a potential need for replacement.

Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020.

<sup>&</sup>lt;sup>14</sup> NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. 124.





Exhibit 32. 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 33 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. This share falls steadily the larger the community on average.



Exhibit 33. 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, at least at first blush. 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%."<sup>15</sup>

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.<sup>16</sup> 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 34. Percent of Engines and Pumpers in Service 15+ Years Old by Select Community Sizes over Four Survey Periods

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

<sup>&</sup>lt;sup>15</sup> NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. 126.

<sup>&</sup>lt;sup>16</sup> Federal Emergency Management Agency (FEMA). "Assistance to Firefighters Grant Program Performance Assessment System". Fiscal Year 2015 Annual Report to Congress. October 19, 2015.



Exhibit 35 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. Accordingly, department personnel, particularly department leadership, are better positioned to make equipment purchase requests to policymakers in the interests of public safety.

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 fewer than 37 percent for communities with populations under 10,000.

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.<sup>17</sup> That said, there are nearly 15,000 departments lacking 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.<sup>18</sup>



Exhibit 35. 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.

<sup>17</sup> NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. 127.

<sup>&</sup>lt;sup>18</sup> Ibid. p. xii.



### Trends in Community Fire Protection Spending

• 2020 was a Good Year . . . For Government Spending on Public Safety

The lengthiest economic expansion commenced during the summer of 2008. During the quarters and years that followed, America managed to expand employment for 113 consecutive months (through February 2020, a durability record), drive national unemployment to a 50-year low of 3.5 percent, and experienced a surge in state and local fiscal health in the context of higher income tax receipts, capital gains, retail sales tax collections, parking revenues, permitting fees, recordation taxes, and hotel tax collections.

Despite that, as late as 2019, state and local public safety construction spending on fire and rescue had failed to recover to its 2009 level of \$2.47 billion. In 2019, total construction spending in this category totaled \$2.36 billion. When one considers inflation, the lack of recovery in real terms becomes all the more dramatic. For various reasons, state and local governments had collectively decided to invest less in fire and rescue service delivery capacity, at least in terms of physical capital. That said, it is true that a recovery in construction spending in these categories commenced after 2013, but it wasn't until last year that America experienced investment surpassing the 2009 peak.

It took a pandemic to alter the equilibrium. In 2020, construction spending on fire/rescue surged as governments began to take response times and capacity to respond more seriously. State and local construction spending in the fire/rescue category totaled \$2.65 billion in 2020. This was the highest level in the history of the data series and 7 percent higher than the previous peak level of spending recorded in 2009, when state/local construction spending in this category approached \$2.5 billion. Since hitting a cyclical nadir in 2013, spending in this category has grown 89 percent. Exhibit 36 supplies relevant statistical detail.

While state/local governments had been spending less on physical capital until recently, overall outlays for fire protection have been on the rise. This hints at a shift in spending from physical capital to human capital. In short, people have become more expensive.







Source: Sage; U.S. Census Bureau

Exhibit 37 supplies data characterizing inflation-adjusted local government expenditures on current operations and capital outlays for fire protection in the U.S. from 1980 to 2017. In late-2020 the U.S. Census Bureau released preliminary data regarding local government expenditures in 2018. Unfortunately, those data are not as useful since they do not disaggregate current operations versus capital outlays. Nonetheless, these preliminary 2018 data indicate that total local government expenditures on fire protection increased 0.7 percent in 2018 or by \$354 million (adjusted for inflation). From 1980 to 2018, total expenditures grew at a 2.9 percent compound annual growth rate in real terms.



Exhibit 37. Local Government Direct Expenditures on Fire Protection in the U.S., 1980-2017

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. 3. U.S. Bureau of Labor Statistics Notes: Figures are in 2017 dollars (inflation adjusted).



Here is the issue. While there has been a recovery in construction spending on fire and rescue since 2013 and while there was a surge in such investment last year, this may not be indicative of patterns in investment spending to come. The increased investment transpired during a period of steadily improving state and local government finances. While the pandemic induced more governments to invest more in response capability, it also damaged the underpinnings of fiscal health. All things being equal, that could translate into diminished expenditures going forward.

There's more to consider. Given the massive uptick in public safety-related construction expenditures since the pandemic began to intrude on our lives, there may be a feeling among certain policymakers that additional investment in the post-pandemic world is less important. Many governments will be scrambling to reduce outlays in any case, though the decision to infuse federal monies to support state and local government general funds and capital budgets will help alleviate these dynamics.



Exhibit 38. U.S. Public Safety Construction Spending, 2002-2020

Source: Sage; U.S. Census Bureau

Much of the growth in public safety construction spending in 2020 took the form of creating temporary hospitals as the nation was overwhelmed by patients needing ICU beds, ventilators, and other forms of support. Much of that money was borrowed, which further jeopardizes the growth trajectory of capital spending in the fire and rescue segments going forward.



Interestingly, though virtually all direct spending on fire protection originates at state and local government levels, FAMA member performance in terms of units booked seems to closely mimic changes in *federal* public safety construction spending. This a likely reflection of the ongoing importance of federal grant funding as a source of revenue for state/local governments.

This relationship was generally apparent in previous years, but the alignment disappeared in 2020 when units booked declined while federal public safety construction spending surged (Exhibit 39). Again, this is likely a reflection that much of the federal public safety construction spending that transpired in 2020 went towards bulking up healthcare capacity as opposed to segments like fire/rescue.



Exhibit 39. Annual Growth: U.S. Federal Public Safety Construction Spending & FAMA Units Booked, 2004-20

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



# Looking for Explanations: Demographic Factors, Economic Conditions, & Fiscal Health

While the U.S. economy had gained steam in recent pre-pandemic years (e.g., 2015, when U.S. output rose 3.1% and 2018 when it grew 3.0%), the FAMA units booked variable had failed to respond commensurately. This is 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 regarding a double-dip recession, these rationales became far less compelling after more than 10 years of economic expansion that ended in early-2020.

Preliminary Commerce Department data indicate that the U.S. economy contracted 3.5 percent in 2020. U.S. employment dipped by nearly 6 percent. Unfortunately, in this instance, units booked in the U.S. moved in the same direction, declining 9.2 percent last year in the context of large-scale public sector outlays to address conditions resulting from Covid.



Exhibit 40. FAMA Units Booked vs. U.S. Nonfarm Employment, 2003-2020

The previous economic expansion had been associated with surging construction of new hotels, office buildings, apartments, casinos, fulfillment and data centers (fulfillment and data center construction remains active as the e-commerce boom persists amid the crisis). As construction activity expands, fire departments have a larger stock of buildings to protect, which strongly implies growing demand for both firefighters and apparatus.

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



Indeed, historically, FAMA sales have closely tracked construction activity. But since roughly 2013, there has been misalignment between construction spending trends and units ordered. That pattern did not change in 2020. In fact, in 2020, units booked declined to its lowest level since 2016.





Exhibit 41 reflects the fact that the world of fire apparatus purchasing changed during the Great Recession. Prior to the collapse of the U.S. housing market (begins in 2006) and the global financial crisis (begins in 2008), there was a period of dramatic growth in apparatus purchasing. This was attributable to many factors, but the most important was likely the rapid development of new residential subdivisions around the country and the associated impacts on state/local government finances.

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



The pre-global financial crisis period skews discussions of longer-term trends. For instance, in the West, Midwest, and Northeast regions, the ratio of units booked per 100,000 housing units was up by 0.11-0.13 in 2019 compared to 2003 (Exhibit 42). In the South that ratio expanded by 0.30 over the same span. But these data are heavily influenced by what occurred immediately after 2003 as opposed to what has been transpiring in more recent years.

Region/Division	Units Booked		Housing Uni	Units Booked Per 100,000 Housing Units			
	2003	2019	2003	2019	2003	2019	2003 v. 2019
NORTHEAST	763	853	22,703,915	24,435,406	3.36	3.49	0.13
Division I: New England	191	219	6,106,864	6,656,585	3.13	3.29	0.16
Division 2: Middle Atlantic	572	634	16,597,051	17,778,821	3.45	3.57	0.12
MIDWEST	771	874	28,013,805	30,534,299	2.75	2.86	0.11
Division 3: East North Central	461	564	19,459,396	20,896,874	2.37	2.70	0.33
Division 4: West North Central	310	310	8,554,409	9,637,425	3.62	3.22	-0.41
SOUTH	1,187	1,586	44,996,117	54,015,453	2.64	2.94	0.30
Division 5: South Atlantic	649	871	23,951,411	28,845,291	2.71	3.02	0.31
Division 6: East South Central	225	232	7,627,908	8,658,439	2.95	2.68	-0.27
Division 7: West South Central	313	483	13,416,798	16,511,723	2.33	2.93	0.59
WEST	634	789	25,811,623	30,699,086	2.46	2.57	0.11
Division 8: Mountain	239	317	8,219,835	10,459,154	2.91	3.03	0.12
Division 9: Pacific	395	472	17,591,788	20,239,932	2.25	2.33	0.09

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

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).



Regional figures often mask more localized trends. For example, while the ratio of units booked per 100,000 housing units in the overall Midwest grew over time, the ratio expanded in the East North Central subdivision (e.g., Illinois, Wisconsin, Michigan) while declining in the West North Central subdivision (e.g., Minnesota, Iowa, North Dakota). In the South, the ratio was up on a region-wide basis, but down in the East South Central subdivision (Alabama, Kentucky, Mississippi, Tennessee).



Exhibit 43. Annual Growth: U.S. Building Permits/Housing Units Completed & FAMA Units Booked, 2004-20

Source: Sage; FAMA; U.S. Census Bureau. Note: \*Housing Units Authorized in Permit-Issuing Places

If the past is prologue, based on past patterns, the downward move of units booked relative to residential building permits and housing units observed in 2020 should translate into a sharp bounce-back in the near-term. This is the market for apparatus' version of reversion to the mean.



• 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.<sup>19</sup>

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.<sup>20</sup> FP&S grants are dedicated to projects that enhance the safety of firefighters and the broader public from fire and related hazards.<sup>21</sup>

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."<sup>22</sup> 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).<sup>23</sup>

Note that the amount of AFG grants distributed has shrunk dramatically since FY2009. That year, grants totaled more than \$500 million. By FY2018, grant funding stood at around \$316 million. Even prior to FY2009, there had been declines in funding. In FY2003, which came shortly on the heels of 9/11, AFG grant funding approached \$700 million.

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

<sup>&</sup>lt;sup>19</sup> 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.

<sup>&</sup>lt;sup>21</sup> Federal Emergency Management Agency (FEMA). *Fire Prevention & Safety Grants*. <u>https://www.fema.gov/fire-prevention-safety-grants</u>.

<sup>&</sup>lt;sup>22</sup> Federal Emergency Management Agency (FEMA). *Assistance to Firefighters Grant Program*. <u>https://www.fema.gov/welcome-assistance-firefighters-grant-program</u>.

<sup>&</sup>lt;sup>23</sup> U.S. Government Accountability Office (GAO). "FIRE GRANTS: FEMA Could Enhance Program Administration and Performance Assessment", GAO-16-744. September 2016.



During the FY2019 AFG program year, authorized funding was \$415 million. However, \$100 million of that tally took the form of additional, emergency AFG grants authorized under the CARES Act, which the previous President signed on March 27, 2020 in response to the public health effects of the COVID-19 pandemic. Policymakers prescribed these additional funds for the purchase of personal protective equipment (PPE) and related supplies.<sup>24</sup>

For the FY2020 AFG program year, funding has been authorized at \$319.5 million, which is akin to authorizations transpiring during fiscal years 2015-2018. The expected funding selection date is April 30<sup>th</sup>, 2021.<sup>25</sup>



Exhibit 44. Firefighter Assistance: FEMA AFG Grants, FY2001-FY2019

Source: Sage; Fema.gov; Congressional Research Service, "Assistance to Firefighters Program: Distribution of Fire Grant Funding". Author: Lennard G. Kruger, Specialist in Science and Technology Policy; Congressional Research Service (CRS), "Funding for Firefighters for COVID-19 Response", 4/15/2020. Notes: AFG: Assistance to Firefighters Grants. \*FY2019 figures are preliminary.

<sup>&</sup>lt;sup>24</sup> Congressional Research Service (CRS), "Funding for Firefighters for COVID-19 Response", 4/15/2020. <u>https://crsreports.congress.gov/product/pdf/IF/IF11507</u>. Note: Grant awards made in calendar year 2020 referred back to the FY2019 grant program.

<sup>&</sup>lt;sup>25</sup> The Department of Homeland Security (DHS). "Notice of Funding Opportunity (NOFO). Fiscal Year 2020 Assistance to Firefighters Grant (AFG) Program". <u>https://www.fema.gov/sites/default/files/documents/fema\_fy-2020\_afg\_notice-of-funding-opportunity.pdf</u>. Note: This date actually occurs during FY2021, but the authorizations will refer back to the FY2020 grant program.



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 replaced during FY2008-FY2013 were at least 15 years old, and nearly 89 percent were 25 years old or older. Approximately 90 percent of grant recipients indicated that the vehicle had been permanently removed from service.<sup>26,27</sup>





Source: Sage; Fema.gov; 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.

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%).<sup>28</sup> From FY2014-FY2016, funds for vehicles have represented around 44 percent of total funds requested by applicants.<sup>29</sup> However, no more

<sup>&</sup>lt;sup>26</sup> Federal Emergency Management Agency (FEMA). "Assistance to Firefighters Grant Program Performance Assessment System". Fiscal Year 2017 Annual Report to Congress. March 2018.

 <sup>&</sup>lt;sup>27</sup> 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.)
 <sup>28</sup> U.S. Government Accountability Office (GAO). "FIRE GRANTS: FEMA Could Enhance Program Administration and Performance Assessment", GAO-16-744. September 2016.

<sup>&</sup>lt;sup>29</sup> Mark Price and Brad Cole. "Assistance to Firefighters Grant" Presentation. May 19, 2017.

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



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.<sup>30</sup>

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."<sup>31</sup> In FY2019, AFG grants for vehicle acquisition totaled \$51.8 million and represented 14 percent of all AFG grants awarded (see Exhibit 45).

*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 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.<sup>32</sup>

Budget appropriations for AFG and SAFER remain a congressional issue. As is the case with many federal programs, concerns regarding the federal budget deficit and accumulated national debt will likely impact AFG and SAFER budget levels, at least eventually. At the same time, firefighter assistance budgets will likely receive increased scrutiny in the context of the local budgetary shortfalls.<sup>33</sup>

4/25/2019. Author: Lennard G. Kruger, Specialist in Science and Technology Policy.

<sup>&</sup>lt;sup>30</sup> The Department of Homeland Security (DHS). "Notice of Funding Opportunity (NOFO). Fiscal Year 2020 Assistance to Firefighters Grant (AFG) Program". <u>https://www.fema.gov/sites/default/files/documents/fema\_fy-2020\_afg\_notice-of-funding-opportunity.pdf</u>.

<sup>&</sup>lt;sup>31</sup> NFPA. "Fourth Needs Assessment of the U.S. Fire Service". November 2016. p. xi.

<sup>&</sup>lt;sup>32</sup> Congressional Research Service, "Assistance to Firefighters Program: Distribution of Fire Grant Funding".

<sup>&</sup>lt;sup>33</sup> Ibid.



*State & Local Finances.* Funding and overseeing firefighting activities is frequently the responsibility local authorities.<sup>34</sup> Over the past quarter century, overall local government expenditures have generally trended higher in America, including during recent years as the economy has expanded along with tax bases.

All things being equal, this ongoing growth in public sector financing capacity 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 while other categories, whether education or public health, have gobbled up growing budget shares. In order to determine whether this state of affairs will persist, it is important to identify which categories have been securing greater local government expenditure share.





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. 3. U.S. Bureau of Labor Statistics. Notes: Figures are in 2018 dollars (inflation adjusted).

All or mostly-volunteer fire departments (which comprise 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 through the administration of a special fire district tax or some other tax. Apparatus constitutes the principal cost for volunteer departments, so one would intuitively expect fire apparatus sales to neatly and predictably correlate with local tax revenues.

<sup>&</sup>lt;sup>34</sup> Congressional Research Service, "Assistance to Firefighters Program: Distribution of Fire Grant Funding". April 25, 2019. 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 (2007-09). 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.<sup>35</sup>

Since the 2007-09 recession, state tax revenues have been slower to rebound than after any of the three previous downturns, with trends varying 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 mid-year budget gaps in fiscal year 2017.<sup>36</sup>

Circumstances had begun to improve and by mid-2019, precisely a decade after the Great Recession's end, tax revenue was lower in only five states relative to its pre-recession peak.<sup>37</sup> Still, the speed of recovery was uneven across states due to differences in economic conditions, population shifts, and tax policies.

<sup>&</sup>lt;sup>35</sup> Boyd and Dadayan. 2016. "State and Local Governments Reshape Their Finances". July 1, 2016. <u>http://knowledgecenter.csg.org/kc/content/state-and-local-governments-reshape-their-finances</u>.

<sup>&</sup>lt;sup>36</sup> The Pew Charitable Trusts. "Weak Growth in State Tax Revenue Persists in 2017". *Fiscal 50: State Trends and Analysis*. October 17, 2017. <u>http://pew.org/2il0kwl</u>.

<sup>&</sup>lt;sup>37</sup> The Pew Charitable Trusts. *Fiscal 50: State Trends and Analysis*. <u>https://www.pewtrusts.org/en/research-and-analysis/articles/2014/05/19/fiscal-50-state-trends-and-analysis</u>.



Some state governments also faced fiscal constraints due to inherited shortfalls in funding for public employees' pension and retiree health care benefits. There are many indicators hinting at lurking fiscal stress. For instance, in 2017, total state and local government expenditures were 4.6 percent higher than 2010 levels, but employee retirement expenditures were 31.4 percent higher.<sup>38</sup>

Indebtedness represents another concern. Buoyed by stronger economic and fiscal performances, many state policymakers have decided to bulk up debt, including to fund school construction and other public needs. Low interest rates have served as another motivational factor.

Exhibit 48 reflects the decline in long-term debt issuance that prevailed from 2007 to 2014 (2010 was an exception, largely attributable to the passage of a federal stimulus package in February 2009). However, during the three-year period immediately thereafter, debt issuance surged, before dipping slightly in 2018, the most recent year for which these data are available. In the short-term, the willingness of governments to borrow and spend strengthens economic performance. In the long-run, however, this indebtedness can become a source of risk, particularly during rocky economic times when meeting debt services becomes more challenging.



Exhibit 48. U.S. State & Local Governments' Total Long-Term Debt Issued (\$ Billions), 2007-2018

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. 3. U.S. Bureau of Labor Statistics. Notes: 1. Figures are in 2018 dollars (inflation adjusted).

<sup>&</sup>lt;sup>38</sup> 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.



With a few exceptions (e.g. state gas taxes), state and local governments have responded to sharply constrained resources not by raising taxes, but by slashing capital spending and other areas of their respective budgets.<sup>39</sup> 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 32 states in 2017 compared to 2009 levels. However preliminary data indicate that state and local government capital outlays increased by 1.3 percent in 2018 (by 0.9% on a per capita basis). Exhibit 49 supplies relevant statistical and visual detail.



Exhibit 49. U.S. State & Local Government Capital Outlays, 1980-2018

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. 3. U.S. Bureau of Labor Statistics. Notes: 1. Figures are in 2018 dollars (inflation adjusted).

This pattern becomes even more apparent in Exhibit 50. Between 1987 and 1997, total capital outlays in the fire protection category rose 4.0 percent annually. During the ensuing decade, fire protection-related capital outlays expanded at an annual rate of 4.1 percent. But between 2007 and 2017, they fell 1.0 percent/annum. The Census Bureau released preliminary data for 2018 in late-2020. Unfortunately, these preliminary data do not supply the level of detail required for inclusion in Exhibit 50.

<sup>&</sup>lt;sup>39</sup> Boyd and Dadayan. 2016. "State and Local Governments Reshape Their Finances". July 1, 2016.



	CAGR (%)						
Period	1987-1997	1997-2007	2007-2017				
Total Capital Outlays	2.5%	4.1%	-0.9%				
Construction	2.5%	4.3%	-0.8%				
Other Capital Outlays	2.6%	3.3%	-1.2%				
By Function							
Education	7.1%	4.7%	-1.7%				
Fire Protection	4.0%	4.1%	-1.0%				
Police Protection	3.8%	1.7%	-0.6%				
Corrections	-5.6%	2.6%	-5.8%				
Financial Admin. & Gen Control	5.8%	2.9%	-1.3%				
General Public Buildings	0.7%	3.1%	-3.0%				
Health & Hospitals	1.1%	4.8%	-0.5%				
Highways	1.7%	3.4%	0.4%				
Housing & Community Dev.	1.1%	1.0%	-3.3%				
Libraries	4.1%	2.6%	-2.4%				
Natural Resources	-2.5%	9.0%	-2.6%				
Parks & Recreation	3.4%	4.0%	-1.1%				
Utilities	-0.7%	4.1%	1.1%				
Sanitation	-1.1%	3.4%	-0.5%				
Other	4.5%	4.7%	-1.6%				

Exhibit 50. Growth in U.S. Local Government Capital Outlays by Function, 1987-2017

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 2017 dollars (inflation adjusted).

In April 2020, Moody's Analytics evaluated state finances in the context of COVID-19, yet another factor that will shape the trajectory of firefighting apparatus sales. According to their analysis, only five states possessed the reserves necessary to fully absorb the near-term fiscal stress produced by the pandemic. Thirty-three states would need to address budget gaps of 5 percent or more assuming a recession on par with Moody's then-existing forecast and 21 of those states would need to contend with gaps of 10 percent or more.<sup>40</sup>

According to data compiled by the Urban Institute, state government revenue from April-December 2020 was down in 28 states compared to the same period a year prior. Some of these losses resulted from government actions that deferred revenue collections to a later period, while other financial losses are likely permanent and unrecoverable.<sup>41</sup>

<sup>&</sup>lt;sup>40</sup> Moody's Analytics. "Stress-Testing States: COVID-19". By Dan White, Sarah Crane, and Colin Seitz. April 2020.
<sup>41</sup> Urban Institute, State and Local Finance Initiative. "State Tax and Economic Review, 2020 Quarter 2" by Lucy Dadayan. December 2020. <u>https://www.urban.org/sites/default/files/publication/103423/state-tax-and-economic-review-2020-quarter-2\_0.pdf.</u>



Change in State Tax Revenue: April-December 2019 v. April-December 2020							
State	% Chg.	State	% Chg.	State	% Chg.		
Alaska	-42.5%	Missouri	-2.7%	California	1.2%		
Hawaii	-17.0%	Minnesota	-2.5%	Virginia	1.2%		
North Dakota	-14.8%	Connecticut	-2.5%	Kentucky	1.5%		
Nevada	-11.8%	Indiana	-2.4%	South Carolina	1.7%		
Florida	-11.3%	New Jersey	-2.4%	Georgia	1.9%		
Oregon	-10.5%	New Hampshire	-2.0%	North Carolina	2.1%		
Texas	-10.4%	Illinois	-2.0%	Maine	2.2%		
Wyoming	-8.5%	Iowa	-2.0%	Vermont	2.2%		
Louisiana	-7.5%	Tennessee	-1.3%	Arizona	2.4%		
Delaware	-7.3%	Ohio	-0.9%	Washington	2.5%		
Montana	-5.6%	Arkansas	-0.2%	Alabama	3.7%		
West Virginia	-4.3%	Maryland	0.1%	New Mexico	4.3%		
New York	-4.1%	Mississippi	0.3%	Colorado	5.7%		
Oklahoma	-4.0%	Michigan	0.3%	South Dakota	6.3%		
Pennsylvania	-3.1%	Wisconsin	0.5%	Utah	8.0%		
Massachusetts	-2.8%	Nebraska	0.7%	Idaho	10.4%		
Kansas	-2.7%	Rhode Island	0.8%	All U.S. States	-1.8%		

#### Exhibit 51. State Tax Revenue During COVID-19: April-December 2019 v. April-December 2020

Source: Urban Institute, State and Local Finance Initiative. Notes: For Nevada data is through November, for New Mexico and Wyoming data is through September.

State and local government tax revenues are both fied to macroeconomic outcomes, but state tax revenues are more cyclically sensitive than local tax revenue. This is primarily because states are relatively more reliant on income and sales tax revenues, while local governments rely more on property tax revenues. Income and sales tax revenues are significantly correlated with macroeconomic activity, while property tax revenues are based on assessed values that tend to be adjusted with multi-year lags. As a result, local government revenues tend to react to recessions with an 18-24 month delay. This means that for many localities, the full financial impacts of COVID-19 on government finances have not yet been experienced. Budgets in 2021 are expected to more fully reflect the fiscal effects of the COVID-19 pandemic, though the effects will obviously vary dramatically across localities.<sup>42</sup>

<sup>&</sup>lt;sup>42</sup> Richmond Fed, "State and Local Governments: Economic Shocks and Fiscal Challenges", by John Mullin and Santiago Pinto, October 20, 2020.

https://www.richmondfed.org/research/regional economy/regional matters/2020/rm 10 20 2020 state and local.



Exhibit 52 reflects both historic and more recent gyrations in state and local government finances. During the second quarter of 2020 when the economic crisis was at its worst, state and local governments received massive grants from the federal government to deal with the early stages of the crisis and deal with the need to bulk up healthcare capacity. Predictably, without the benefit of those grants, state and local governments quickly retreated back into net borrower mode by the third quarter.

The upshot is that state and local government finances were poised to remain unsettled into the distant future. But there is more to the story than simply the ravaging impacts of a pandemic on state, local and provincial finances. On March 11, 2021, President Joe Biden signed a \$1.9 trillion stimulus package. Embodied within that package is \$350 billion in relief for state and local governments.



Exhibit 52. FAMA Units Booked v. State & Local Govt. Net Lending/Borrowing

Source: 1. Sage. 2. FAMA. 3. U.S. Bureau of Economic Analysis, Government Receipts and Expenditures

While conventional wisdom suggests that state government finances were simply hammered by the pandemic, such views lack sufficient nuance. At the crisis' onset, governors and other leaders were wrestling with many issues, including how much damage would be done to state government finances during the pandemic. Remarkably, in many states, the financial damage has not been severe. By some measures, states ended up collecting nearly as much revenue in 2020 as they had in 2019.



A J.P. Morgan report called 2020 virtually flat with 2019 based on the financial performance of 47 states that report their tax revenues every month (the only states that don't are Alaska, Oregon, and Wyoming). Research from the Urban-Brookings Tax Policy Center determined that total state revenues from April through December of last year were down just 1.8 percent from the same period in 2019. Using a different method, Moody's analytics found that 31 states currently have enough cash to fully absorb the economic stress emerging from the pandemic without federal assistance.<sup>43</sup>

There are a number of factors at work, including the fact that many white-collar workers, who often pay significant state income taxes, were able to work remotely. Federal stimulus also helped bolster consumer spending, which translated into solid retail sales tax collections.

This is not to suggest that no damage has been done, but merely that the combination of rapid economic recovery in the U.S., the stable performance of tax collections in a number of key categories, and federal stimulus have left state and local government finances in far better shape than anyone could have possibly imagined.

There are certainly challenges facing many governments. For instance, many communities are facing depressed commercial real estate values, under-occupied hotels, increasingly vacant office buildings, shuttered shopping centers, and closed stores. Many urban areas have experienced dramatic declines in apartment rents, the result of rapid out-migration from center cities to the suburbs. Accordingly, the financial health of many of the cities that support the largest firefighting departments may be compromised for quite some time even with stepped-up support from the federal government. This will likely be truer for certain communities (e.g., urban, Illinois, New York, California, Vancouver) than others (e.g., suburban, Georgia, Idaho, Utah, Halifax).



<sup>&</sup>lt;sup>43</sup> The New York Times. "Virus Did Not Bring Financial Rout That Many States Feared", by Mary Williams Walsh, 3/1/2021. <u>https://www.nytimes.com/2021/03/01/business/covid-state-tax-revenue.html</u>.



## III. Economic Outlook

The pandemic of 2020-21 has ushered forth some jarring social shifts. Entry-level and nearentry-level economic segments have been far more impacted than others, with profound job losses registered among restaurants, hotels, retailers, salons, theaters, theme parks, gymnasiums and bowling alleys. Meanwhile, white-collar workers and investors have fared much better, with those able to work remotely more likely to hold onto employment and investors watching as share prices have raged higher along with more exotic investments like Bitcoin.

All of this has had implications for public sector revenues and expenditures, on monies available for fire departments, and on demand for apparatus. This section focuses upon the economic outlook and what that likely portends for expenditures on firefighting apparatus.

• A Black Swan

COVID-19 has impacted firefighters and departments in myriad ways. The National Volunteer Fire Council (NVFC) created a survey to better understand the experiences of volunteer and combination fire, EMS, and rescue departments dealing with the outbreak of COVID-19. In a survey administered during late-March and early-April 2020, running low on Personal Protective Equipment (PPE) was the most frequently cited challenge, with 60 percent of respondents indicating that their department was encountering this challenge. Nearly 50 percent of respondents indicated they were experiencing challenges fundraising, which comes as little surprise given the massive job losses and financial meltdowns occurring during the early spring of 2020.

COVID-19 also produced a range of staffing challenges. For instance, 43 percent of respondents indicated that they were experiencing challenges with staff being unwilling or unable to respond to calls. A significant share of respondents also indicated that their departments were facing challenges training and certifying new personnel due to forestalled EMS education processes. Difficulties acquiring test results for personnel, concerns around the mental health of staff members and low morale also ranked high on the list of early-stage pandemic challenges.<sup>44</sup>

*Health & Safety.* Above all, COVID-19 created health and safety challenges for firefighters. Firefighters who supply emergency medical services (EMS) served as first responders for help from those who were infected during the crisis. This created elevated risk of infection. Not only did this create risks to individual emergency service providers, but to entire teams

<sup>&</sup>lt;sup>44</sup> National Volunteer Fire Council (NVFC), "Weekly Results of NVFC Survey to Document Volunteer Emergency Services' Covid-19 Experiences" 4/3/2020. <u>https://www.nvfc.org/weekly-results-of-nvfc-survey-to-document-volunteer-emergency-services-covid-19-experiences/</u>.



of them. Upon infection, the need to quarantine was lengthy, meaning that emergency response capacity could be truncated when it was most required.<sup>45</sup>

Indeed, as the number of COVID-19 cases in the U.S. grew, so did the number of affected firefighters. The International Association of Fire Chiefs (IAFC) developed a dashboard indicating the number of firefighter personnel exposed, quarantined, and/or diagnosed with COVID-19 in the U.S. When IAFC launched the dashboard in early March 2020, there were 44 departments reporting, 55 personnel exposed to the virus, 46 in quarantine, and 1 diagnosed with the virus. By mid-April 2020, there were almost 2,200 departments reporting, more than 10,500 firefighter personnel exposed, 4,852 in quarantine, and 575 tested and diagnosed with coronavirus.<sup>46</sup>

One of the early challenges among fire departments was the acquisition of sufficient supplies of PPE. The IAFC solicited weekly surveys of fire departments beginning in March 2020 regarding their PPE needs. Most departments (83%) were forced to implement alternative procedures or protocols due to limited PPE supplies. N-95 masks were most often cited as the highest immediate need for PPE; gowns were cited as the second highest priority need and decontamination supplies were third. More than 57 percent of responding departments indicated they had been advised by their state/province's emergency operations center that they were unable to fill the organizations' PPE requests.<sup>47,48</sup>

In late March 2020, the Coronavirus Aid, Relief, and Economic Security (CARES) Act was passed and signed by the former president. That Act appropriated more than \$2 trillion in aid to respond to COVID-19's public health and economic dislocations.

Among other things, the CARES Act allocated funding specifically for firefighters through an additional \$100 million for the Assistance to Firefighter Grants (AFG) program. These monies were intended to provide funding to departments for COVID-19 expenses, including PPE, supplies, and reimbursements related to the response.

Despite that reasonably strong showing of financial support, it is conceivable that much of that aid may not have reached fire departments in a timely manner. First, awarding AFG grants requires lengthy processes. Accordingly, grants may not have been awarded in time to help with immediate needs. Second, because AFG is a competitive grant program, not all applicants receive funding. Under normal conditions there are consistently more applications for AFG grants than FEMA can approve. Finally, AFG program requirements restrict the use of funds for certain purposes. This potentially limits the ability of

<sup>&</sup>lt;sup>45</sup> Congressional Research Service (CRS), "Funding for Firefighters for COVID-19 Response", 4/15/2020. <u>https://crsreports.congress.gov/product/pdf/IF/IF11507</u>.

<sup>&</sup>lt;sup>46</sup> Congressional Research Service (CRS), "Funding for Firefighters for COVID-19 Response", 4/15/2020.

<sup>&</sup>lt;sup>47</sup> International Fire Chiefs Association (IAFC). <u>https://www.iafc.org/topics-and-tools/coronavirus-covid-19</u>.

 $<sup>^{48}</sup>$  465 respondents, weekly survey results through 12/31/2020.



departments that receive funding to put those funds to use in ways that best respond to critical short-term needs.<sup>49</sup>

*Financial Impacts.* The pandemic resulted in greater need for fire and emergency services while limiting fire department funding as North America's economy collapsed during the spring of 2020. There are compelling data indicating that many fire departments suffered financially even as they were asked to respond to a burgeoning crisis.

The International Association of Fire Chiefs (IAFC) surveyed departments regarding lost revenues, furloughed personnel, and other economic implications of COVID-19. Results indicate that 29 percent of departments sustained an increase in COVID-19 related expenses. Simultaneously, the aggregate budget loss among respondents was in excess of \$1.8 billion in 2020. Importantly, anticipated 2021 budget losses among respondents totaled more than \$2.0 billion. Responding departments reported that 19 to 25 percent of their time was spent on logistics or planning for COVID-19 on average.<sup>50,51</sup>

FireRescue1 surveyed their online community regarding anticipated financial impacts of COVID-19. Respondents were asked which purchases they expected their department to delay or cancel. Apparatus was the most frequently selected category (47% of respondents) followed by training (44%).

That apparatus tops the list is not necessarily surprising, though it is deeply problematic for manufacturers. As Executive Editor of FireRescue1 Fire Chief Marc Bashoor noted: "If you are operating with a good rotation of equipment to maintain your apparatus NFPA-age standards, you should generally be able to survive with a one-season break in that supply." He also stresses, however, the imperative for departments not to put off apparatus purchases for too long: "The adverse impacts of delayed apparatus purchase will become exponentially worse year over year, so getting back on track is critical." From the perspective of future purchases of apparatus, such considerations are reasons for longer-term optimism.

During the period of FireRescue1's survey, 43 percent of respondents indicated that they did not expect their department to delay hiring of new paid or volunteer firefighters. However given that personnel costs usually comprise 70 percent of department budgets and because the pandemic persisted for so long, it is likely that many departments have had to or ultimately will revisit staffing decisions.<sup>52</sup>

<sup>&</sup>lt;sup>49</sup> Congressional Research Service (CRS), "Funding for Firefighters for COVID-19 Response", 4/15/2020.

 <sup>&</sup>lt;sup>50</sup> International Fire Chiefs Association (IAFC). <u>https://www.iafc.org/topics-and-tools/coronavirus-covid-19</u>.
 <sup>51</sup> 903 respondents, weekly survey results through 12/31/2020.

<sup>&</sup>lt;sup>52</sup> FireRescue1, "Survey results: COVID-19's financial impact on the fire service", by Janelle Foskett, 7/9/2020. https://www.firerescue1.com/fire-products/financial-services/articles/survey-results-covid-19s-financial-impact-onthe-fire-service-yrbHYO7naQTjBXLt/.



What these dynamics suggest is that apparatus sales may be lackluster for several years to come, but will then experience a meaningful uptick as departments strive to offset the effects of accumulated depreciation. Of course, a meaningfully large federal infrastructure package could upend this anticipated trajectory by bringing more apparatus sales forward.

• Outlook

Globally, economic activity will remain below pre-pandemic expectations for several years. Exhibit 53 reflects 2022 GDP losses relative to pre-COVID-19 International Monetary Fund (IMF) forecasts by region. The strength of the anticipated recovery varies across countries and regions depending on the severity of the health crisis, the extent of domestic disruptions to activity, the exposure to cross-border spillovers, and the effectiveness of public policy support to limit continuing damage.<sup>53</sup>



Exhibit 53. GDP Losses in 2022 Relative to Pre-COVID Forecasts by Region

Source: 1. Sage. 2. International Monetary Fund, World Economic Outlook Update, January 2021. Notes: Em. Asia ex. CHN = emerging and developing Asia excluding China. LAC = Latin America and the Caribbean. SSA = sub-Saharan Africa. MECA = Middle East and Central Asia. EMDE = emerging market and developing economies. Em. Eur. = emerging and developing Europe. AE = Advanced Economies.

In general, advanced economies have been able to provide the most expansive fiscal support to households and firms. Central banks in these nations have reinforced fiscal policy with accommodative monetary policy, including by dramatically expanding money supply.

<sup>&</sup>lt;sup>53</sup> International Monetary Fund, World Economic Outlook Update. January 2021.



Not coincidentally, projected output losses compared with pre-COVID forecasts are smaller for advanced economies than other countries, a reflection of strong policy support and expected widespread availability of vaccines later in 2021. Recovery paths still vary within regions due to preexisting trends and structural rigidities entering the crisis, differences in behavior and public health responses to infections, and the adaptability of economic activity to low mobility.<sup>54</sup>

The IMF estimates that in 2020 total GDP contracted by 3.5 percent in the U.S. and 5.4 percent in Canada. The IMF's most recent forecasts embody an expectation that the U.S. economy will expand sharply in 2021 (6.4%) before slowing to 3.5 percent growth in 2022. Canada's economy is expected to grow 5.0 percent in 2021 and 4.7 percent in 2022.



Exhibit 54. IMF Projections: GDP Growth in the U.S. and Canada

Source: 1. Sage. 2. International Monetary Fund: World Economic Outlook Database, April 2021.

The faster the economic recovery, the better. Data indicate that FAMA units booked were down 4 percent from a year earlier during 2020's fourth quarter. That capped what turned out to by a lousy year, with total units booked down 12.2 percent compared to 2019.

<sup>&</sup>lt;sup>54</sup> International Monetary Fund, World Economic Outlook Update. January 2021.



The pandemic has ushered forth many transformations, including where people live. The growing specter of remote work in both Canada and the United States has diminished demand for proximity. Accordingly, there has been rapid movement to the suburbs. As an example of this dynamic, in January 2020, the value of building permits for single-family structures in Canada was in the range of C\$2.4 billion. One year later, the tally was C\$3.5 billion.<sup>55,56</sup>

Similar dynamics are apparent in the U.S. Single-family residential permits are surging as coastal cities experience a flurry of outmigration, resulting in diminished rents. Meanwhile, home prices in the suburbs are surging. The development of new subdivisions will at least eventually translate into robust new demand for greater firefighting capacity and shorter response times. In short, population is becoming more diffuse in the context of remote work and surging e-commerce, and that would generally tend toward greater demand for apparatus.

Moreover, while commercial real estate fundamentals have been ravaged by the pandemic (e.g., less demand for office space, shuttered retailers, empty restaurant spaces, and underoccupied hotels), it has turbocharged segments like fulfillment and data centers, which form the backbone of the e-commerce economy. That will help stabilize commercial tax base assessments while also creating an additional population of structures that require firefighting protection. This further strengthens the longer-term outlook for apparatus demand.

There are other factors at work. The postponed purchases of 2020 have likely generated pent-up demand. There has also been renewed awareness among policymakers of the importance of sufficient emergency response capacity, whether to respond to emergencies suffered by those experiencing flu-like symptoms or to combat wildfires. All of these considerations help explain why Congress recently passed a stimulus package that includes \$350 billion in assistance to state and local governments and is contemplating another package focused on infrastructure.

<sup>&</sup>lt;sup>55</sup> Denotes Canadian dollars.

<sup>&</sup>lt;sup>56</sup> Statistics Canada, "Building permits, January 2021". <u>https://www150.statcan.gc.ca/n1/daily-quotidien/210303/dq210303a-eng.htm</u>.



Rank	State	Aid	Rank	State	Aid	Rank	State	Aid
1	CALIFORNIA	\$27,230.7	18	MARYLAND	\$3,743.1	35	KANSAS	\$1,592.4
2	TEXAS	\$15,937.8	19	INDIANA	\$3,092.6	36	ARKANSAS	\$1,581.8
3	NEW YORK	\$12,843.7	20	LOUISIANA	\$3,031.4	37	IOWA	\$1,488.8
4	FLORIDA	\$8,883.6	21	MINNESOTA	\$2,852.1	38	UTAH	\$1,384.9
5	ILLINOIS	\$8,189.2	22	CONNECTICUT	\$2,830.9	39	WEST VIRGINIA	\$1,362.4
6	PENNSYLVANIA	\$7,346.1	23	NEVADA	\$2,756.9	40	RHODE ISLAND	\$1,136.1
7	MICHIGAN	\$6,589.1	24	MISSOURI	\$2,702.9	41	IDAHO	\$1,098.8
8	NEW JERSEY	\$6,290.8	25	OREGON	\$2,665.3	42	NEBRASKA	\$1,044.5
9	NORTH CAROLINA	\$5,479.1	26	WISCONSIN	\$2,549.5	43	MAINE	\$1,001.5
10	OHIO	\$5,407.6	27	SOUTH CAROLINA	\$2,515.2	44	NEW HAMPSHIRE	\$998.5
11	MASSACHUSETTS	\$5,324.6	28	KENTUCKY	\$2,196.8	45	DELAWARE	\$928.0
12	GEORGIA	\$4,888.6	29	ALABAMA	\$2,133.3	46	MONTANA	\$866.9
13	WASHINGTON	\$4,459.4	30	OKLAHOMA	\$1,881.5	47	ALASKA	\$853.4
14	VIRGINIA	\$4,324.3	31	MISSISSIPPI	\$1,816.9	48	NORTH DAKOTA	\$791.1
15	ARIZONA	\$4,212.5	32	D.C.	\$1,802.0	49	SOUTH DAKOTA	\$753.3
16	COLORADO	\$3,855.6	33	NEW MEXICO	\$1,761.6	50	WYOMING	\$739.7
17	TENNESSEE	\$3,751.8	34	HAWAII	\$1,650.8	51	VERMONT	\$680.3

Exhibit 55. Coronavirus State Fiscal Recovery Fund, Distribution of \$195.3 Billion in State Aid (\$ millions)

Source: American Rescue Plan Act of 2021, U.S. Bureau of Labor Statistics

Indeed, the industry's outlook has been rapidly brightening in recent months for three reasons. First, the economy has recovered faster than many anticipated. Second, many state governments did not suffer as much revenue loss in 2020 as expected. Third, massive federal stimulus, including an expected infrastructure package, should result in rapid recovery in units sold.

Exhibit 55 supplies estimates of the amount of money state governments will receive from the already passed American Rescue Plan Act. In addition to these monies, additional funds, often totaling in the billions, will be sent to cities and other communities.

The primary implication is rather straightforward. Many communities that had been in dire financial straits just a few months ago are now flush with cash. This more than any other factor shapes the increasingly benign outlook for apparatus sales going forward. Additionally, these positive impacts stand to be significantly bolstered by a federal infrastructure package that as of this writing is in its formative stages.



## Conclusion

• Great Expectations

The post-pandemic world is approaching. Economic recovery in North America is expected to be brisk in 2021 and 2022. Many state governments were able to weather 2020's fiscal storm reasonably well due to ongoing strength in income and retail sales tax collections. Ongoing federal stimulus has further improved financial conditions in both state and cities.

In short, there are many reasons for growing optimism regarding units ordered. The latest industry survey data indicate that more than 80 percent of responding member companies expect their employment levels to increase and 75 percent expect capital investment to rise over the next three years. Even in the short-term, more FAMA members expect orders and sales to increase in the next six months than expect them to decrease (44% expect orders/sales to increase; 27-28% expect orders/sales to decrease).

True, 2020 was a lousy year, with total units booked down 12.2 percent compared to 2019. However, it may be that this was simply due to the chaos unleashed by pandemic and that there is now an abundance of pent-up demand for apparatus that will become apparent during the months and years to come.

There are several other reasons for optimism:

- 1. There has been considerable discussion of additional economic stimulus, including in the form of stepped-up federal infrastructure outlays;
- 2. The lack of substantial order growth in prior periods implies a build-up in highly depreciated assets, setting the stage for a more forceful equipment replacement cycle during the years ahead;
- 3. The surge in homebuilding in many American suburbs stands to expand many local tax bases while increasing demand for apparatus;
- 4. While many commercial real estate segments are characterized by large-scale vacancy and decreasing values, other segments are emerging to fill the economic and fiscal void, including data and fulfillment centers;
- 5. Wildfires and pandemic have created greater perceptions of danger, inducing more policymakers to think carefully about emergency response capability and capacity; and
- 6. The Biden administration recently passed a \$1.9 trillion stimulus package, which includes \$350 billion to support state and local government finances.



Even economists are able to recognize such factors. The issue is not one of need or desire, but the ability of local and state governments to finance apparatus purchases in the context of all the issues the pandemic will leave in its wake. Some communities, many of them suburban, will escape the pandemic with reasonably solid finances and growth prospects. Other communities, particular densely-populated, pricey and large American and Canadian cities, are likely to be less well positioned given the diminished importance of proximity to brick-and-mortar commercial centers.

In sum, industry prospects have improved rapidly as the pandemic's influence over North American life steadily ebbs. The massive response by central governments and banks to the crisis has left behind less damage than anticipated and greater appetite and purchasing power for firefighting apparatus.



# Appendix

### FAMA Members: Units Booked

Exhibit A1. FAMA Mehibers-10tal		0.5. State, 2017	2019 v 2020			
State	2019	2020	Net	• 2020		
Alaska	15	37	22	146.7%		
Alabama	57	65	8	14.0%		
Arkansas	22	23	1	4.5%		
Arizona	97	61	-36	-37.1%		
California	313	295	-18	-5.8%		
Colorado	80	75	-5	-6.3%		
Connecticut	53	46	-7	-13.2%		
District of Columbia	12	11	1	-8.3%		
Delaware	20	15	-5	-25.0%		
Florida	244	219	-25	-10.2%		
Georgia	124	115	-9	-7.3%		
Iowa	36	37	1	2.8%		
Idaho	20	19	-1	-5.0%		
Illinois	142	129	-13	-9.2%		
Indiana	100	81	-19	-19.0%		
Kansas	46	52	6	13.0%		
Kentucky	48	35	-13	-27.1%		
Louisiana	94	80	-14	-14.9%		
Massachusetts	97	78	-19	-19.6%		
Maryland	66	82	16	24.2%		
Maine	26	25	-1	-3.8%		
Michigan	107	107	0	0.0%		
Minnesota	79	88	9	11.4%		
Missouri	85	65	-20	-23.5%		
Mississippi	62	39	-23	-37.1%		
Montana	17	7	-10	-58.8%		
North Carolina	150	158	8	5.3%		
North Dakota	17	17	0	0.0%		
Nebraska	35	26	-9	-25.7%		
New Hampshire	17	27	10	58.8%		
New Jersey	142	96	-46	-32.4%		
New Mexico	48	50	2	4.2%		
Nevada	16	44	28	175.0%		
New York	320	241	-79	-24.7%		

Exhibit A1. FAMA Members-Total Units Booked by U.S. State, 2019 v. 2020



State	2010	2020	2019 v. 2020		
State	2019	2020	Net	%	
Ohio	137	145	8	5.8%	
Oklahoma	66	32	-34	-51.5%	
Oregon	37	35	-2	-5.4%	
Pennsylvania	172	169	-3	-1.7%	
Rhode Island	10	13	3	30.0%	
South Carolina	100	64	-36	-36.0%	
South Dakota	12	11	-1	-8.3%	
Tennessee	65	74	9	13.8%	
Texas	301	288	-13	-4.3%	
Utah	22	30	8	36.4%	
Virginia	129	91	-38	-29.5%	
Vermont	16	14	-2	-12.5%	
Washington	86	58	-28	-32.6%	
Wisconsin	78	81	3	3.8%	
West Virginia	26	36	10	38.5%	
Wyoming	17	17	0	0.0%	
American Samoa	0	0	0	-	
Guam	0	0	0	-	
Hawaii	21	11	-10	-47.6%	
Northern Mariana Islands	0	0	0	-	
Puerto Rico	2	15	13	650.0%	
Virgin Islands	2	0	-2	-100.0%	
Total U.S.	4,106	3,729	-377	-9.2%	

### Exhibit A2. FAMA Members-Total Units Booked by Canadian Province, 2019 v. 2020

Province	2010	2020	2019 v. 2020		
FIOVINCE	2019	2020	Net	%	
Alberta	56	35	-21	-37.5%	
British Columbia	62	38	-24	-38.7%	
Manitoba	29	32	3	10.3%	
New Brunswick	14	11	-3	-21.4%	
Newfoundland and Labrador	11	3	-8	-72.7%	
Nova Scotia	13	15	2	15.4%	
Northwest Territories	2	3	1	50.0%	
Nunavut	2	2	0	0.0%	
Ontario	132	74	-58	-43.9%	
Prince Edward Island	3	3	0	0.0%	
Quebec	37	40	3	8.1%	
Saskatchewan	7	4	-3	-42.9%	
Yukon	0	2	2	-	
Total Canada	368	262	-106	-28.8%	



### **FEMA Grants**



Exhibit A3. FEMA AFG & SAFER Grants, FY2005-FY2019

Source: Sage; Fema.gov; 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. SAFER: Staffing for Adequate Fire and Emergency Response. \*FY2019 figures are preliminary


### Exhibit A4. AFG Grants Awarded by State, FY2018 v. FY2019 & FY2005-FY2019 Total

State / AFG Grants	EX/2019	EX/2010	Net Cha	0/ <b>Cl</b>	FY05-FY2019
(\$ in Millions)	F 1 2018	F 1 2019	inet Cng.	% Cng.	Total
Alaska	\$1.58	\$0.09	-\$1.49	-94.4%	\$15.94
Alabama	\$20.19	\$14.02	-\$6.17	-30.6%	\$259.76
Arkansas	\$2.40	\$1.62	-\$0.78	-32.5%	\$71.28
Arizona	\$4.59	\$9.50	\$4.91	107.1%	\$76.34
California	\$16.03	\$23.87	\$7.83	48.9%	\$318.29
Colorado	\$3.50	\$4.27	\$0.77	22.0%	\$54.80
Connecticut	\$4.90	\$9.21	\$4.31	87.9%	\$77.18
District of Columbia	\$0.00	\$0.91	\$0.91	-	\$5.74
Delaware	\$1.16	\$1.05	-\$0.11	-9.3%	\$13.85
Florida	\$11.05	\$12.53	\$1.49	13.5%	\$156.57
Georgia	\$6.38	\$7.99	\$1.60	25.1%	\$101.60
Iowa	\$3.63	\$3.06	-\$0.57	-15.7%	\$93.89
Idaho	\$2.22	\$0.81	-\$1.40	-63.3%	\$34.40
Illinois	\$11.48	\$14.33	\$2.85	24.9%	\$235.15
Indiana	\$5.41	\$9.50	\$4.09	75.5%	\$136.09
Kansas	\$1.83	\$0.71	-\$1.11	-60.9%	\$52.03
Kentucky	\$4.95	\$6.93	\$1.98	39.9%	\$133.77
Louisiana	\$2.60	\$2.71	\$0.11	4.2%	\$80.08
Massachusetts	\$14.20	\$19.94	\$5.75	40.5%	\$174.67
Maryland	\$5.65	\$12.17	\$6.52	115.5%	\$98.94
Maine	\$3.00	\$2.30	-\$0.90	-28.2%	\$49.30
Michigan	\$10.81	\$11.51	\$0.70	6.5%	\$196.71
Minnesota	\$3.39	\$6.19	\$2.79	82.4%	\$152.46
Missouri	\$7.38	\$5.49	_\$1.88	-25.5%	\$131.03
Mississioni	\$2.12	\$4.50	\$2.30	112.8%	\$77.62
Montana	\$0.58	\$1.50	\$0.25	112.070	\$13.52
North Carolina	\$13.40	\$11.88	\$0.23 \$1.51	11 3%	\$211.72
North Dakota	\$13.40	\$1.03	\$0.64	-11.370	\$21.64
Norm Dakota	\$0.35 \$1.95	\$1.05	\$0.04	59 70/	\$21.04
New Hampshire	\$1.05	\$0.77 \$2.22	-\$1.09 \$1.09	-30.770	\$30.63
New Hampshile	\$2.23	\$3.32 \$8.50	\$1.09	19.70/	\$39.02 \$152.62
New Jersey	\$7.10	\$0.30 \$0.27	\$1.04	10.770	¢19.65
New Mexico Novada	\$0.40	\$0.37 \$1.02	-\$0.09 \$0.73	-10.070	\$16.01
New York	\$1.19	\$1.92	\$0.73	14.6%	\$10.03
Ohio	\$10.23	\$20.91	\$2.07	14.070	\$303.04 \$257.01
Ohlahama	\$20.00 \$2.25	\$30.13	\$9.29 \$0.15	44.370	\$557.91 \$67.19
Okianoma	\$2.25	\$2.40	\$0.15	0./%	\$04.18 \$01.12
Dregon	\$9.00	\$5.24	-\$3.70	-41.8%	\$91.12
Pennsylvania	\$24.62	\$30.23	\$5.01	22.8%	\$405.11
Rhode Island	\$6.05	\$4.14	-\$1.91	-31.6%	\$43.89
South Carolina	\$4.53	\$8.17	\$3.64	80.3%	\$114.29
South Dakota	\$1.24	\$0.78	-\$0.45	-36.6%	\$23.29
Tennessee	\$9.61	\$8.12	-\$1.49	-15.5%	\$146.41
lexas	\$6.88	\$9.83	\$2.95	42.8%	\$1/5.30
Utah	\$2.45	\$0.54	-\$1.91	-//.9%	\$34.69
Virginia	\$9.20	\$6.70	-\$2.51	-27.2%	\$107.80
Vermont	\$2.03	\$0.73	-\$1.30	-64.2%	\$18.94
Washington	\$11.55	\$10.05	-\$1.50	-13.0%	\$158.11
Wisconsin	\$5.24	\$5.22	-\$0.02	-0.3%	\$141.90
West Virginia	\$2.91	\$3.95	\$1.04	35.7%	\$77.00
Wyoming	\$0.88	\$0.08	-\$0.80	-91.2%	\$10.52

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



### Exhibit A5. SAFER Grants Awarded by State, FY2018 v. FY2019 & FY2005-FY2019 Total

State / SAFER Grants	EV2019	EV2010	Not Cha	0/ Cha	FY05-FY2019
(\$ in Millions)	F I 2016	F 1 2019	INCLUDE.	76 Chg.	Total
Alaska	\$0.51	\$0.17	-\$0.35	-67.3%	\$13.60
Alabama	\$2.37	\$0.79	-\$1.57	-66.4%	\$64.80
Arkansas	\$1.10	\$1.30	\$0.20	17.8%	\$22.24
Arizona	\$6.36	\$27.81	\$21.45	337.6%	\$142.75
California	\$40.59	\$47.43	\$6.83	16.8%	\$499.89
Colorado	\$1.85	\$2.08	\$0.22	12.1%	\$41.04
Connecticut	\$2.81	\$0.13	-\$2.68	-95.4%	\$52.38
District of Columbia	\$1.51	\$0.00	-\$1.51	-100.0%	\$10.66
Delaware	\$0.00	\$0.29	\$0.29	-	\$4.06
Florida	\$31.69	\$53.53	\$21.84	68.9%	\$369.11
Georgia	\$7.00	\$11.04	\$4.04	57.7%	\$102.86
Iowa	\$0.40	\$1.74	\$1.34	335.8%	\$17.48
Idaho	\$1.14	\$0.00	-\$1.14	-100.0%	\$15.35
Illinois	\$5.55	\$5.90	\$0.35	6.3%	\$83.58
Indiana	\$16.45	\$7.37	-\$9.07	-55.2%	\$87.94
Kansas	\$0.00	\$3.84	\$3.84	-	\$23.50
Kentucky	\$1.08	\$1.57	\$0.50	46.3%	\$22.40
Louisiana	\$0.56	\$18.37	\$17.81	3198.3%	\$65.19
Massachusetts	\$17.30	\$8.40	-\$8.90	-51.4%	\$205.12
Maryland	\$20.32	\$17.08	-\$3.24	-15.9%	\$114.43
Maine	\$0.00	\$0.00	\$0.00	-	\$8.00
Michigan	\$7.59	\$2.67	-\$4.93	-64.9%	\$216.67
Minnesota	\$5.82	\$3.47	-\$2.35	-40.4%	\$26.76
Missouri	\$5.95	\$2.62	-\$3.33	-55.9%	\$58.29
Mississippi	\$4.36	\$0.19	-\$4.17	-95.6%	\$19.02
Montana	\$1.89	\$0.91	-\$0.98	-51.9%	\$17.30
North Carolina	\$11.74	\$12.80	\$1.06	9.0%	\$113.88
North Dakota	\$0.50	\$0.00	-\$0.50	-100.0%	\$9.96
Nebraska	\$0.90	\$0.00	-\$0.90	-100.0%	\$18.73
New Hampshire	\$0.66	\$3.20	\$2.55	387.6%	\$15.89
New Jersey	\$21.40	\$1.70	-\$19.70	-92.1%	\$281.14
New Mexico	\$1.40	\$1.49	\$0.09	6.2%	\$16.08
Nevada	\$3.01	\$10.77	\$7.77	258.3%	\$56.06
New York	\$14.34	\$14.56	\$0.22	1.5%	\$112.98
Ohio	\$12.46	\$14.35	\$1.89	15.2%	\$209.14
Oklahoma	\$3.09	\$0.00	-\$3.09	-100.0%	\$42.09
Oregon	\$5.41	\$3.47	-\$1.94	-35.8%	\$74.16
Pennsylvania	\$8.35	\$9.12	\$0.76	9.2%	\$147.02
Rhode Island	\$3.94	\$5.88	\$1.94	49.2%	\$56.36
South Carolina	\$7.78	\$3.26	-\$4.52	-58.1%	\$60.39
South Dakota	\$0.43	\$1.15	\$0.73	170.3%	\$5.94
Tennessee	\$5.76	\$3.43	-\$2.33	-40.5%	\$70.76
Texas	\$32.06	\$20.91	-\$11.15	-34.8%	\$195.64
Utah	\$0.72	\$2.61	\$1.89	261.3%	\$25.38
Virginia	\$10.44	\$15.18	\$4.74	45.4%	\$106.85
Vermont	\$0.00	\$0.06	\$0.06	-	\$1.43
Washington	\$14.62	\$5.21	-\$9.42	-64.4%	\$149.15
Wisconsin	\$1.69	\$1.15	-\$0.54	-32.1%	\$18.75
West Virginia	\$1.23	\$0.55	-\$0.67	-54.9%	\$11.35
Wyoming	\$0.49	\$0.46	-\$0.03	-5.6%	\$7.90

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



## Median Rates of Career/Volunteer Firefighters in the U.S.



Exhibit A6. Median Rates of Career Firefighters per 1,000 People by Region & Population Protected, 2018

Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020.



Exhibit A7. Median Rates of Volunteer Firefighters per 1,000 People by Region & Population Protected, 2018

Source: 1. Sage; 2. National Fire Protection Association (NFPA). "U.S. Fire Department Profile-2018". February 2020.



## Local Government Direct Expenditures on Fire Protection



Exhibit A8. Growth in Local Govt. Direct Expenditures on Fire Protection in the U.S., 1980-2017

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 2017 dollars (inflation adjusted).



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