Six Current & Future Bucket Truck Trends Guaranteed To Help Buyers Get More Out of Their Investment

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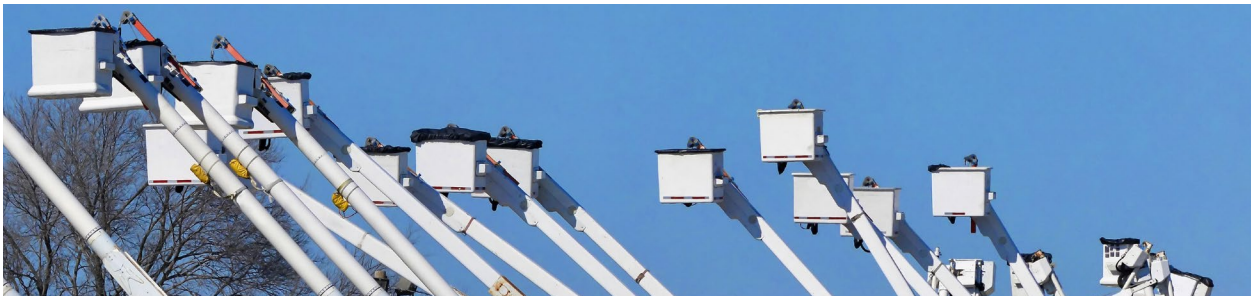
Six Current and Future Bucket Truck Trends

A 2020 Global Market Insights (GMI) report expects the bucket truck market to grow at a CAGR of 4.5% between 2020 and 2026[1]. This puts the 2026 projected market value at $1.5 billion. Drivers of this growth include infrastructure projects related to increased urbanization and industrialization across the globe, government-funded power grid upgrades in India, and increased adoption of bucket trucks in China and Japan.

What this projection doesn't take into account, however, is the Bipartisan Infrastructure Law (BIL) passed in November of 2020, which devotes $1.2 trillion for transportation and infrastructure spending in the United States[2]. BIL-funded projects include upgrades to the U.S. power infrastructure, upgrades to ports and airports, bridge rebuilds and repairs, and improvements to America's public transit infrastructure. Bucket trucks will be an essential part of completing this work, which could push the bucket truck market value beyond GMI's projections.

Standing in the way of growth is the significant investment required to purchase a new unit as well as the high cost to maintain them. However, current and future bucket truck trends are helping buyers get more out of their investments. The latest bucket truck design improvements can lower the total cost of ownership, enhance safety, reduce maintenance costs, lower GHG emissions, improve fuel efficiency, and more. These benefits stand to offset hesitation about acquisition costs.



Trend #1: Electrification and Electric Power Take Off

Electrification is more than a trend; government regulations and incentives are pushing it to the forefront of mobility. A growing number of states have espoused California's standards for emission regulations, which encourages use of low-emission vehicles and zero-emission vehicles. The electric passenger vehicle and light-duty truck markets have already grown as a result, and the commercial class truck market looks to be next.

Although fully electric bucket trucks aren't trending yet, using electric power to drive ancillaries is a feasible way to move toward electrification.

Electric Power Take Off (ePTO) is one of the first steps toward hybrid and all-electric powertrains. This technology allows for a bucket truck's auxiliary functions to be decoupled from the internal combustion engine (ICE) so operators may position the bucket without the engine idling.

1 gminsights.com/industry-analysis/bucket-trucks-market
2 https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/06/fact-sheet-the-bipartisan-infrastructure-deal/

How ePTO Works

Typically, an ePTO system consists of an electric motor, inverter, or motor controller, and a hydraulic pump powered by a DC power source such as a battery. The ePTO allows the user to only run the hydraulic work functions from the battery when needed, eliminating the need to idle an engine.

A rechargeable battery powers the ePTO, and typically holds its charge long enough for the operator to complete a day's work. Bucket trucks are an ideal application for this technology, as most return to a base at the end of the day and can be recharged overnight, when energy prices are at their lowest.

If, for some reason, an operator works the truck long enough to deplete the battery supply, the engine can turn on and the PTO can be engaged. The PTO would then be driving the hydraulic pump through the motor, and the motor would be charging the battery. In other words, the motor would act as both a motor and a generator.

In addition to partially electrifying bucket trucks, ePTO technology will also be able to run the work functions for electric chassis. In both cases, the truck only uses the power when it's needed to reposition the boom or operate on-board tools, resulting in a far more efficient use of energy.

Why ePTO Is Trending

Making the switch from a traditional PTO to an ePTO is trending because it significantly reduces idling, thereby improving fuel economy and reducing GHG emissions. If an all-electric bucket truck isn't possible today, ePTO is the next best step forward.

EMISSION REDUCTION

An ePTO is powered by an electric motor instead of the engine, which means the engine can be powered off while operators perform their work.

Eliminating hours of idling a day adds up: A 37,000 GVWR bucket truck uses 1.5 gallons of diesel per hour while idling with the PTO[3]. If a bucket truck idled to power a traditional PTO 6 hours a day, five days a week, over the course of a year it would burn 2,340 gallons of diesel. Burning diesel fuel emits 22.45 pounds of CO_2 per gallon[4], meaning just one bucket truck could reduce carbon emissions 5,253.3 pounds simply by using an ePTO instead.

LOWER MAINTENANCE COSTS

Beyond reducing emissions, ePTO can also help reduce maintenance costs. When a truck idles to power a traditional PTO, engine hours may suggest it's time for maintenance, even though the truck may not have traveled enough miles to warrant service. The costs of overservicing add up, not to mention the downtime associated with bringing the truck into the shop for service.

Using an ePTO requires zero engine hours, so bucket trucks are maintained at proper intervals, and fleets spend less on oil, parts, and fluids as well as technician labor hours.

Cutting out idling reduces fuel costs. [A] bucket truck equipped with an ePTO uses 2,340 gallons of diesel per year. At $4.50 per gallon, that's a fuel savings of more than $10, 000 per year for a single truck.

LOWER TCO

Eliminating unnecessary maintenance lowers total cost of ownership (TCO) on its own. But taking idling out of the equation while an operator is in the air reduces engine hours, too. An ePTO puts less stress on the engine, allowing fleets to extend the lifecycle without increasing maintenance costs.

Cutting out idling also reduces fuel costs. In the example above, the bucket truck equipped with an ePTO uses 2,340 gallons of diesel per year. At $4.50 per gallon, that's a fuel savings of more than $10, 000 per year for a single truck – a significant reduction in TCO.

3 https://www.anl.gov/sites/www/files/2018-02/idling_worksheet.pdf
4 https://www.eia.gov/environment/emissions/co2_vol_mass.php

Trend #2: Noise Reduction

While significant attention has been given to reducing air pollution for years, reducing noise pollution is an environmentally responsible trend that is gaining momentum.

Electric power take off is one way bucket trucks can contribute less to noise pollution. Because a bucket truck's engine doesn't have to run to operate the boom, the only time an operator and others nearby encounter engine noise is when the truck must move. For bucket trucks, that's not very often.

While engine noise can be intrusive, it's also a sound familiar to operators and the public. Without that white noise, the sound of the hydraulics system becomes more apparent and, although it's quieter than the engine, it may seem more intrusive because the sound is higher-pitched and unfamiliar.

Making sure pump and motor speeds aren't under- or over-speeded is one way to reduce this noise. Systems can also be designed with dampeners, like rubber mounts and other dampening materials, to reduce noise.

Pairing a quiet or zero-noise pump with an ePTO is another option and is ideal for bucket trucks that operate in environments where noise reduction is important, like a residential area or golf course.

One low-noise pump option is the Parker PGP500H, which has very low pump pulsations and a helicoidal rotor profile that dramatically reduces vibrations. Helicoidal gear pumps deliver the quietest and most efficient pump solution for high pressure, resulting in a silent, continuous transmission of fluid.

Why Noise Reduction Is Trending

EXTENDED HOURS OF OPERATION

Bucket trucks often operate in areas with noise regulations that restrict work to specific hours. With a low-noise build, operators can extend work hours: Utility, telecom, and cable repair technicians can work late in the evening until a problem is solved, which in turn improves customer satisfaction. Or a tree trimmer can begin earlier in the day and generate more revenue from working longer hours.

IMPROVED COMMUNICATION

When a technician is up in the bucket, the noise of the hydraulics and/or the engine makes it difficult to communicate with coworkers on the ground. A system with an ePTO, a low-noise pump, and proper dampening materials makes it possible for the person on the ground and the person in the air to communicate over the course of the job.

Opening up the lines of communication between the ground and the bucket enhances safety and helps the job get done faster, easier, and more efficiently.

Trend #3: Enhanced Controllability

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the movement of hydraulic fluid and delay control response. Hot weather can cause hydraulic fluid to run faster, making controls more sensitive. Both circumstances can cause the bucket to jolt suddenly or position the bucket in an unsafe area, posing a serious safety risk.

Amid climate change, OEMs are minimizing this risk by selecting materials that are less susceptible to temperature swings and make for consistent joystick control.

Using Parker thermoplastic hoses is one way to mitigate the effects of temperature fluctuations. For instance, the Parflex TOUGHJACKET is a nonconducting hose that offers controllability despite extreme abrasion and temperature variations.

Parflex hoses are designed to keep hydraulic fluid moving properly and maintains the compressibility of the hose. Parker thermoplastic hoses maintain steady hydraulic fluid flow for consistent control regardless of changing weather conditions.

Valves make a difference, too. Controllability is all about consistency of the implement movement asked for by the operator. These trucks work in every and all weather conditions, cold to hot climates and everything in between. That is a lot to ask of the hydraulic control valve. Parker's L90LS pre-compensated application adapted control valve meets or exceeds all the system demands requested. Smooth controllability and pressure compensation for minimal multi-function interaction.

Why Controllability Is Trending

SAFETY

Controllability is critical for operator safety.

At 150 feet in the air, one small joystick error can instantly jeopardize safety. Without proper materials to provide insulation and consistent controllability, it can be easy for operators to be caught off guard and make a mistake.

Consider an operator that begins repairing a bridge in the morning when the weather is cool, and the joystick moves the bucket a few inches at a time. But later in their shift, when the weather heats up so does the hydraulic fluid, and without notice those few inches become a foot. This causes a sudden and unexpected shift that can lead to serious injury.

Using materials that stand up to weather extremes prevents dangerous overcorrections and ensures joysticks operate consistently throughout the day and between seasons.

LESS WEIGHT

Thermoplastic components are lighter than their counterparts. A properly designed hydraulics package can reduce the weight of a bucket truck, improve fuel economy, and reduce emissions.

Trend #4: Sustainable Material Choices

Choosing bucket truck materials that meet customer specs and offer the best performance will always be a priority. Increasingly, manufacturers also consider whether the materials they use are sustainable. This includes the type and amount of energy required to make materials as well as what happens to them when the truck reaches the end of its life.

Why Making Sustainable Material Choices Is Trending

ENVIRONMENTAL CONCERNS

Selecting materials that require less energy to produce reduces a bucket truck's carbon footprint. Choosing sustainable materials also prevents harmful chemicals from contaminating soil and air.

Making sustainable material choices helps manufacturers reduce a bucket truck's carbon footprint from beginning to end. It also makes the model more attractive to buyers working toward sustainability targets. Increasingly, sustainability is the tie breaker between two otherwise identical machines.

Trend #5: Internet of Things and Sensors

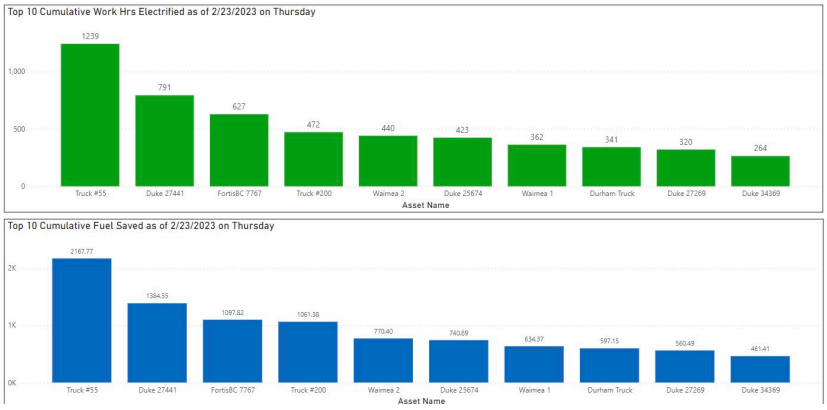
The Internet of Things (IoT) refers to using sensors, telematics devices, and software to connect and exchange data between devices and systems over the Internet or other communications networks.

For bucket trucks, that could be a GPS-enabled telematics device that allows a bucket truck's location to be seen and tracked at any time. Telematics also enable geofencing, which allows fleet managers to establish geographic boundaries for equipment. When an asset moves outside of the predetermined boundary, the system issues an alert.

Telematics can also be tied to a bucket truck's hydraulics

system to improve prognostics and diagnostics, alerting an operator or fleet manager to a probable or present failure. This information is advantageous for keeping up with maintenance, avoiding costly repairs, and preventing system failures that result in downtime. It can also make maintenance and repairs easier by providing data on the component that needs to be replaced and the part number so a technician can acquire the part quickly and reduce repair time.

Parker's Mobile IoT solution collects data used to create a wealth of reports on battery usage, fuel saved, emissions reduced, service hours and much more. This info can be used to compare a fleet. By identifying optimally performing machines compared to others, preferred work patterns can be identified and shared to improve performance across the fleet.



Sensors can also impart valuable information to improve control, safety, and productivity.

For safety, Impact Sensors can be added to a machine and integrated into the IoT system to create an Impact Solution.

The design and deployment of bucket trucks demands two requirements above all others:

- **Safety for the operators**
- **Operational integrity for the vehicles**

Achieving these dual goals requires constant monitoring of impact event and unsafe conditions.

For productivity, a boom equipped with the appropriate sensors can collect data on how long the bucket was in the air and how many times it's been raised and lowered for a truer picture of maintenance needs.

Sensors can also take the guesswork out of raising and lowering the boom to a precise location. Sensor-equipped systems can position the bucket exactly where the operator tells it to, whether that's 20 feet in the air or parking it on the truck, so even an inexperienced operator can position it correctly.

Why IoT Capabilities Are Trending

THEFT PREVENTION

During an attempted theft, geofencing alerts a fleet manager or owner that a bucket truck has left the predetermined area. As it travels, its GPS device will report its location, dramatically increasing the likelihood authorities will recover it. Finding a stolen bucket truck eliminates replacement costs, while also reducing the significant man hours that would otherwise be spent working with the authorities, filing reports, and finding a replacement.

Geofencing can also increase productivity by 20%.

SAFETY

Sensors enable precise bucket positioning at the touch of a button, reducing the risk of accidents.

Precise positioning creates a safer work environment, especially for inexperienced operators becoming familiar with controls and when working in delicate situations, like near live powerlines or under a bridge.

Sensors also keep operators safe when the wind picks up. Sensors called "accelerometers" detect windy conditions and automatically trigger the control system to operate at half speed so the boom lowers slowly, bringing the operator to the ground safely.

Parker's Mobile IoT solution for off-road equipment as a safety technology, businesses can also correct unsafe driving in real-time and receive tools to coach and provide performance feedback to employees. The investment in the technology becomes incredibly worthwhile when

considering the cost of an IoT solution versus the cost per accident.

MAINTENANCE

Maintenance intervals can vary greatly depending on how often the boom is raised and lowered. A truck that only repositions the bucket a few times a day will have longer intervals than another that engages the lift multiple times per shift.

Sensors provider a truer picture of when a boom needs preventive maintenance by recording the number of times it is raised and lowered. These data paint a truer picture of boom use and wear so bucket trucks are only pulled from the field when maintenance is truly warranted, reducing downtime as well as oil, fluids, parts, and labor costs.

Sensors are also useful for detecting when a hydraulic pump filter needs serviced, helping the filtration system to operate at its best.

ACCURATE BILLING

Location and lift frequency can be used to monitor productivity.

If a company hires a contractor to service six locations but the boom is only raised twice, the work likely hasn't been completed. Or if a contractor bills for eight hours of work but the boom is only raised for two hours, a company will have evidence of inaccurate billing.

Likewise, sensors allow managers to compare productivity across the fleet by evaluating the number and length of stops each technician makes in a specific period. This information can be used to benchmark productivity and set goals for technician performance.

Trend #6: Optimizing to Surpass Customer Needs

Although customers' specs always drive a bucket truck build, manufacturers are working with suppliers to optimize systems and deliver even greater value. This could look like corrosion-proof parts for a truck that operates in hurricane territory or insulated hoses for another that works in subzero temperatures.

An experienced parts provider will understand the specs and application and use that information to select materials that improve performance. Working with a partner that is collaborative, excels at problem solving, and can design systems to exceed customer expectations elevates the customer experience.

At Parker, collaboration includes listening to what worked or didn't work for an existing bucket truck and understanding what changes the customer or manufacturer would like to see. Whether it's a small project with a specific challenge to solve or a complete revamp of a truck, we can design an optimized solution. We'll bring a truck into the shop and run tests to gather data, benchmark results, and validate that the solution delivers.

Why Optimizing to Customer Needs Is Trending

LONGER SERVICE LIFE

Picking materials that stand up to challenging operating conditions, fit the application, and improve performance result in a longer service life.

INCREASED SALES

Optimizing a build to meet and exceed a customer's needs improves customer satisfaction. Selecting the right parts pushes satisfaction to the next level by delivering value adds like improved fuel efficiency, ease of serviceability, improved safety, and reduced emissions. The result is brand loyalty and repeat sales.

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The Future of Bucket Trucks

These six trends are paving the way for a more efficient, sustainable, and productive future for the bucket truck market.

As you set out to design the next generation of bucket trucks, select a manufacturing partner that can provide the components and engineering expertise to capitalize on the latest trends.

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