

BONUS
CONTENT



**ELECTRIFICATION
STARTS WITH
ON-HIGHWAY
APPLICATIONS**

EQUIPMENT MARKET OUTLOOK

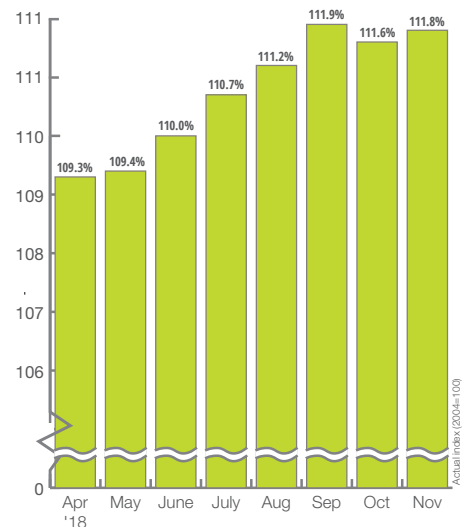
ON-THE-GO

JANUARY 2019



U.S. Leading Indicator:

- The Conference Board mildly revised the data for its U.S. Leading Indicator. Updated data ticked down from September to October and then rose mildly in November.
- The Indicator monthly growth rate tentatively peaked in September. This tentative peak suggests U.S. Industrial Production could enter a slowing growth trend around the second quarter of 2019.

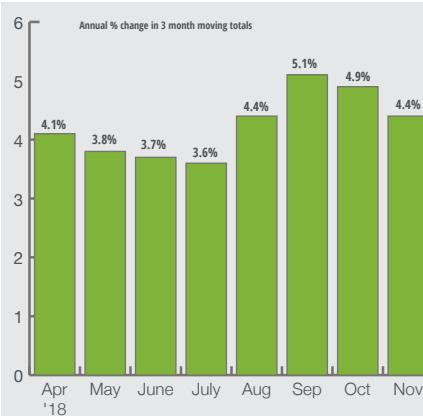


U.S. Industrial Production reached record highs over the last 5 months. However, declining leading indicators signal a transition to slowing growth is likely to occur in the first half of 2019. The U.S. machinery and truck production series are growing at a fast pace suggesting near-term growth opportunities.

Europe Agriculture Machinery Production and Europe Heavy-Duty Truck Production annual trends ticked down with the most recent month of data, but both remain above their respective year-ago levels. Annual Europe Construction and Mining Machinery Production is at the highest level in five-and-a-half years, but the pace of growth is slowing.



U.S. Industrial Production:

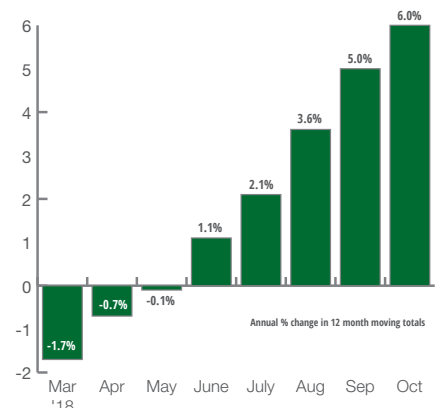


- Average Production over the most recent 3 months was up 4.4% from the same 3 months 1 year ago.
- The majority of leading indicators suggest that the tentative September peak in the quarterly growth rate will hold. However, more data is needed to confirm a trend reversal.



U.S. Total Public New Construction:

- U.S. Total Public Construction during the 12 months through October totaled \$300.7 billion, up 6.0% from the prior year.
- The pace of growth is rising, and ITR Checking Points point to further accelerating growth in at least the coming quarters.



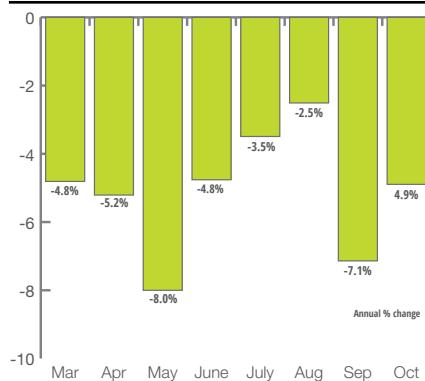
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QUESTIONS?

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China Diesel Bus Production:

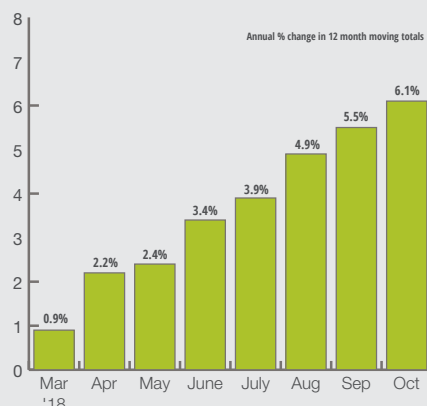


- Annual China Large Diesel Bus Production is at the lowest level in over 9 years.
- Expectations for slowing growth in China Industrial Production into the second half of 2019 suggest there is likely limited upside in the Large Diesel Bus market in at least the coming quarters.



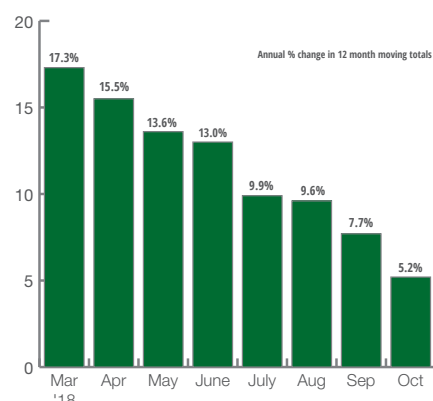
U.S. Private Nonresidential New Construction:

- The most recent 3 months of U.S. Private Nonresidential New Construction totaled \$119.6 billion, up 6.1% from the same 3 months 1 year ago.
- The long-term nature of Nonresidential Construction projects means the effects of a strong U.S. economy in 2018 will translate into 2019 growth in Construction.



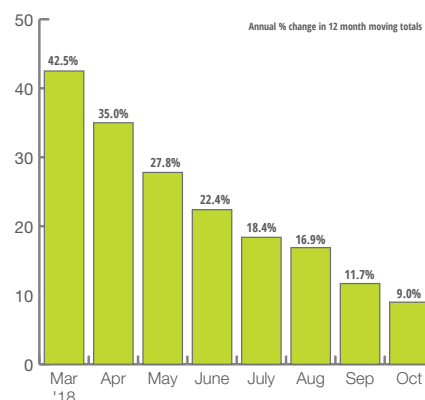
U.S. Construction Machinery, New Orders:

- Annual U.S. Construction Machinery New Orders ticked down to \$35.3 billion in October but were still 5.2% above the year-ago level.
- Decline in the ITR Leading Indicator™ suggests Construction Machinery New Orders will remain on the back side of the business cycle (slowing growth or recession) through at least the first half of 2019.

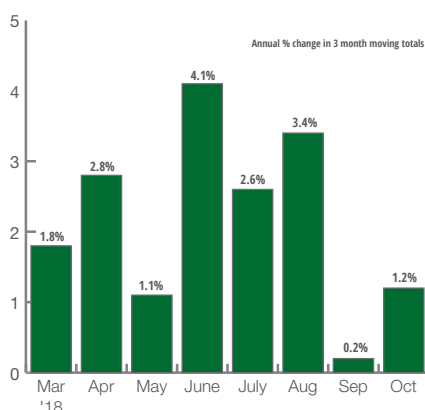


U.S. Mining, Oil & Gas Field Machinery, New Orders:

- Annual U.S. Mining Machinery New Orders totaled \$18.6 billion in October. Annual New Orders have contracted in recent months but remain 9.0% above the year-ago level.
- Lower Oil Prices will likely hinder New Orders, particularly during the second half of 2019 and likely beyond; plan accordingly.



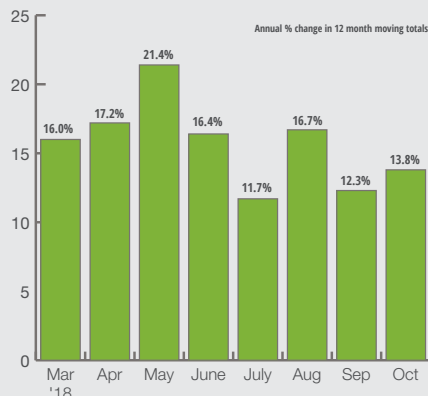
Germany Industrial Production:



- Quarterly average Germany Industrial Production ticked up in October, coming in 1.2% above the same 3 months 1 year ago.
- The downward movement in the quarterly growth rate for Production is generally consistent with the downward movement in quarterly Germany Exports.



U.S. Defense Industry, New Orders:

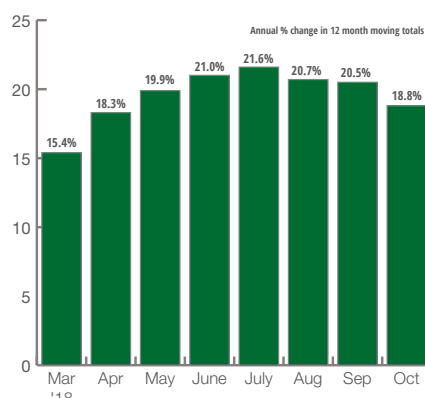


- Annual U.S. Defense Capital Goods New Orders in October totaled \$144.0 billion, up 13.8% from 1 year ago.
- New Orders are at a record high level and are expected to rise further in the near term, due in part to positive trends in U.S. Real Gross Domestic Product.

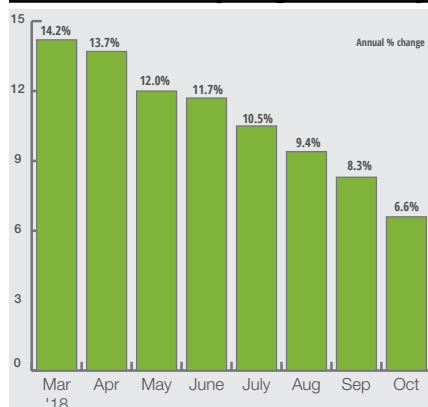


U.S. Farm Machinery Production:

- Annual U.S. Farm Machinery and Equipment Supplies totaled \$30.0 billion, up 18.8% from 1 year ago. Supplies are growing at a slowing pace.
- Accelerating growth in the U.S. Agricultural Machinery and Equipment Producer Price Index indicates rising prices may be inflating Machinery and Equipment Supplies data, which is denominated in dollars.



Europe Ag & Forestry Machinery Production:



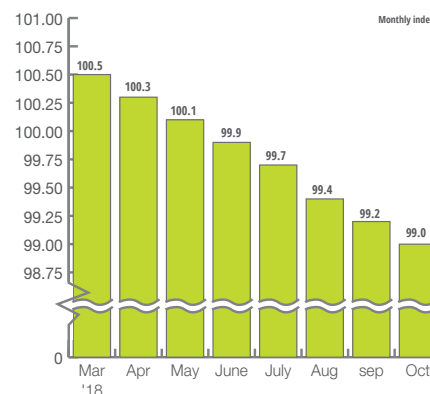
- Annual Europe Agriculture Machinery Production ticked down in October but is up 6.6% from the year-ago level.
- ITR Checking Points™ indicate further rate-of-change descent is likely in the near term.



Europe Leading Indicator:

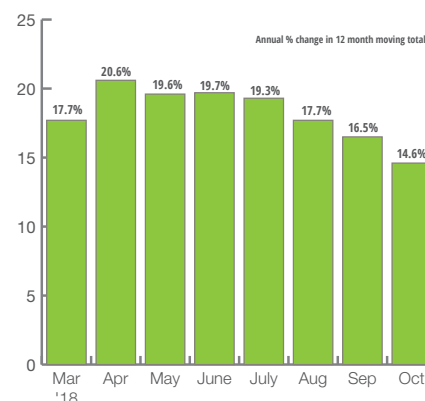
Editor's Note:
Please note that this chart has been modified on the Y-axis to show the trend more easily.

- In October, the Europe Leading Indicator declined to the lowest point since late 2012.
- Trends in the Europe Leading Indicator growth rate point to slowing growth or recession in Europe Industrial Production in 2019. This negative signal is corroborated by trends in the Eurozone Manufacturing Purchasing Managers Index.



U.S. Heavy-Duty Truck Shipments:

- U.S. Heavy-Duty Truck Shipments during the 12 months through October totaled \$32.2 billion, up 14.6% from the prior year. Shipments are in a slowing growth trend.
- Expected slowing growth in U.S. Wholesale Trade of Durable Goods during 2019 indicates that rate-of-change descent in Heavy-Duty Truck Shipments will likely persist during at least the majority of 2019.





ELECTRIFICATION STARTS WITH ON-HIGHWAY APPLICATIONS

THE ON-HIGHWAY INDUSTRY
HOLDS THE MOST
POTENTIAL FOR GROWTH,
ACCORDING TO INDUSTRY
RESEARCH CONDUCTED
BY WAYTEK AND OEM OFF-
HIGHWAY AND SUPPORTED
BY PREVALENT INDUSTRY
RESEARCH FIRMS.

The industry's acceptance and investment in electrification technologies are growing exponentially, as more and more suppliers and manufacturers are pursuing robust programs in several heavy-duty vehicle industries.

The most prevalent is the on-highway vehicle market, which has seen the likes of Meritor, Dana, Daimler, Volvo, Peterbilt and more develop and launch prototypes or plans for zero-emissions, electrified, or automated pursuits.

🔗 Bosch electronic horizon uses high-definition map with topographical data of the route ahead to inform the engine and transmission of the most efficient driving strategy.

According to a survey conducted by Waytek in partnership with OEM Off-Highway, 40% of the survey participants think the truck, bus and municipal transportation holds the most potential for growth. Navigant Research's latest report on fleet electrification, Light, Medium, and Heavy Duty EVs in Fleets: Global Market Analysis and Forecasts, shows that the medium-and heavy-duty vehicle segments point to future growth. The introduction of Tesla's semi in 2017, as well as BYDs refuse truck 2018 launch are just a couple of examples.



⬆ Thor Trucks is a California-based transportation lab focused on electrifying commercial fleets.

i Head to www.OEMOffHighway.com/trends/electrification for all of the latest relevant industry news and product announcements in the electrification market space.

Much of the electrification development of fleet vehicles is being propelled forward by continued battery innovation, energy economics and government regulation

of transportation pollution, according to Navigant's report. "Cost reductions in batteries and other plug-in EV (PEV) technologies are reducing the purchase price of PEVs. Simultaneously, oil prices are projected to rise in the near term, increasing the economic benefit of PEV fleets. In addition, governments are incentivizing PEV adoption with purchase incentives and emissions reduction goals."

But, while battery costs may be dropping, according to Waytek's electrification survey, it also is the greatest hurdle the industry faces. Rapid charging, overall battery size and weight, and energy disbursement during continuous operation are target areas for battery technology advancement in order to make electrification a commercially viable reality.

One survey participant writes, "It's not about whether or not electrification can compete from a performance perspective, because it most certainly can. The trick is going to be storing such volumes of energy efficiently within the confines of the vehicle and replenishing these energy reserves (refueling) by readily available means."

➡ AxleTech is developing a heavy-duty e-powertrain system with Thor Trucks, a fleet-focused transportation lab building fully electric commercial trucks.





⬆ During IAA 2018, Hyundai Motor debuted its fuel cell powered truck designed to be more aerodynamically efficient.

IDTechEx Research projects that the market for electric trucks and vans will reach \$480 billion by 2028. It starts by noting that the technology improvements for electrified road vehicles has been slow, citing local and national government regulatory incentives as the main driver for renewed focus on electrifying trucks.

“Most trucks run on diesel, and the ongoing announcements by certain countries and cities that they will ban diesel from a certain date in the future causes increasing uncertainty and risk for those making and using conventional trucks, including possible collapse in resale values.”

Volvo Group Venture Capital AB, a subsidiary of the Volvo Group, announced an investment in Momentum Dynamics Inc. – a leading company in high power wireless charging of electric vehicles.

Momentum Dynamics is a Philadelphia-based company developing and commercializing high power inductive charging for the automotive and transportation industries, especially suitable for commercial electric, autonomous and connected vehicles.

Wireless electric charging allows any type of vehicle to automatically and without supervision connect to the electrical power grid without the use of wires or cables. Without the need for a driver to plug in their vehicle to a charging station, automatic and bi-directional “electric fueling” may occur frequently and opportunistically – resulting in efficient use of battery capacity, longer driving ranges and improved uptime.

“For Volvo Group we are strengthening our competence and knowledge of charging and electricity distribution within the ecosystem around electric transportation and energy supply. We see partnership, cooperation and



📌 At IAA 2018, Volvo Trucks presented its autonomous future transport solution concept intended to be used for regular and repetitive tasks.

investments as the way forward in a fast-changing environment,” says Stefan Söderling, Investment Director at Volvo Group Venture Capital.

Leading up to and during 2018’s IAA Commercial Vehicles, several manufacturers including MAN Truck & Bus and Renault Trucks announced the electromobility and autonomous products they would introduce to the industry. In fact, the show’s

theme was “Driving Tomorrow” due to the current industry trends of digitization, connectivity, automated driving and alternative powertrains.

“The digitization of traffic opens up completely new opportunities for making mobility smoother and more efficient in large metropolitan areas and beyond. That reduces emissions,” said Bernhard Mattes, President of the German Association of the Automotive Industry (VDA)—organizers of IAA—during a pre-show media event. “Most importantly, digitization, connectivity and automated driving will bring about a quantum jump in road safety.”

He went on to say that digitization aids connection of various transport modes within the transport and logistics chains which is “necessary because we need the interplay of all types of transport in order to cope with the increasing volumes of freight.”

Renault Trucks said in its pre-IAA announcement that electromobility emerged very early as the answer to the problem of air quality and noise pollution in the city. However, in regards to long-distance road transport the company said diesel will remain the dominant energy source for many years.

The Waytek survey results again support this sentiment with a majority of responders predicting electric powered equipment would become more prominent than fuel-powered in 10-30 years. The long-term rate of adoption will eventually see electric power become the dominant power source of vehicles over fuel-power. ➡

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