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THE BIG STORY / SEPTEMBER 2019

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3.0L EcoDiesel V-6 in Ram 1500 at media event in Duluth, MN.

From large, gasoline V-8s to 6-cyl. diesels and even a turbocharged 4-cyl., shoppers in the market for fullsize and heavy-duty pickup trucks this year have a wide variety of all-new powertrains to savor.

Consider that within the span of 18 months, all of these engines

are flooding the truck market, many already on sale:

- All-new 7.3L gasoline V-8 in '20 Ford Super Duty pickups.
- Upgraded third-generation 6.7L Power Stroke diesel V-8 in '20 Ford Super Duty pickups.
- Upgraded Cummins 6.7L inline 6-cyl. High Output diesel in '19



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Joel Beltramo, Ford manager for gas V-8s, talks about new 7.3L heavy-duty V-8.



- Ram heavy-duty pickups.
- All-new standard 6.6L gasoline V-8 in '20 Chevrolet Silverado and GMC Sierra heavy-duty pickups.
- Carryover 6.6L Duramax diesel V-8 but new 10-speed Allison transmission and other drive-train improvements secure a tow rating of up to 35,500 lbs. (16,103 kg) in '20 Chevrolet and GMC heavy-duty pickups.
- Upgraded 6.2L gasoline V-8 with multi-mode cylinder deactivation in '19 Chevrolet and GMC pickups.
- All-new 3.0L diesel V-6 in '19 Ford F-150.
- All-new 3.0L diesel V-6 in '20 Ram 1500.
- All-new 3.0L diesel inline 6-cyl. in light-duty '20 Chevy Silverado and GMC Sierra pickups.
- All-new 2.7L turbocharged gasoline 4-cyl. with cylinder deactivation in light-duty '19 Chevy and GMC pickups.
- Fuel-saving eTorque 48V mild-hybrid systems mated to gasoline 3.6L V-6 and 5.7L V-8 in '19 Ram pickups.



THE BIG STORY

Chevy Silverado 2500 with 6.6L diesel V-8 pulls 14,000-lb. trailer near Mount Bachelor in Oregon.



This level of activity in pickup truck powertrains is unprecedented, and it illustrates how Detroit automakers have prioritized trucks in allocating precious product-development dollars. The outsize profit margins associated with pickups explains the motivation.

Industry critics say automakers have forsaken the internal-combustion engine in the push toward electrification and autonomous vehicles, and it is true that automakers – at least in Detroit – are spending much less on new engines for passenger cars than in the past.

Is this the last hurrah for internal combustion? True, the '20 model year brings us 760 hp in the Ford Shelby GT500 and a pushrod smallblock V-8 able to propel the all-new mid-engine Chevy Corvette to 60 mph (97 km/h) in less than 3 seconds.

Those halo cars are important for building brand excitement, but they sell in minuscule numbers relative to fullsize pickups.

We've already written about a number of these truck powertrains individually, but taken as a group they represent a truly impressive collection of state-of-the-art engineering dedicated to

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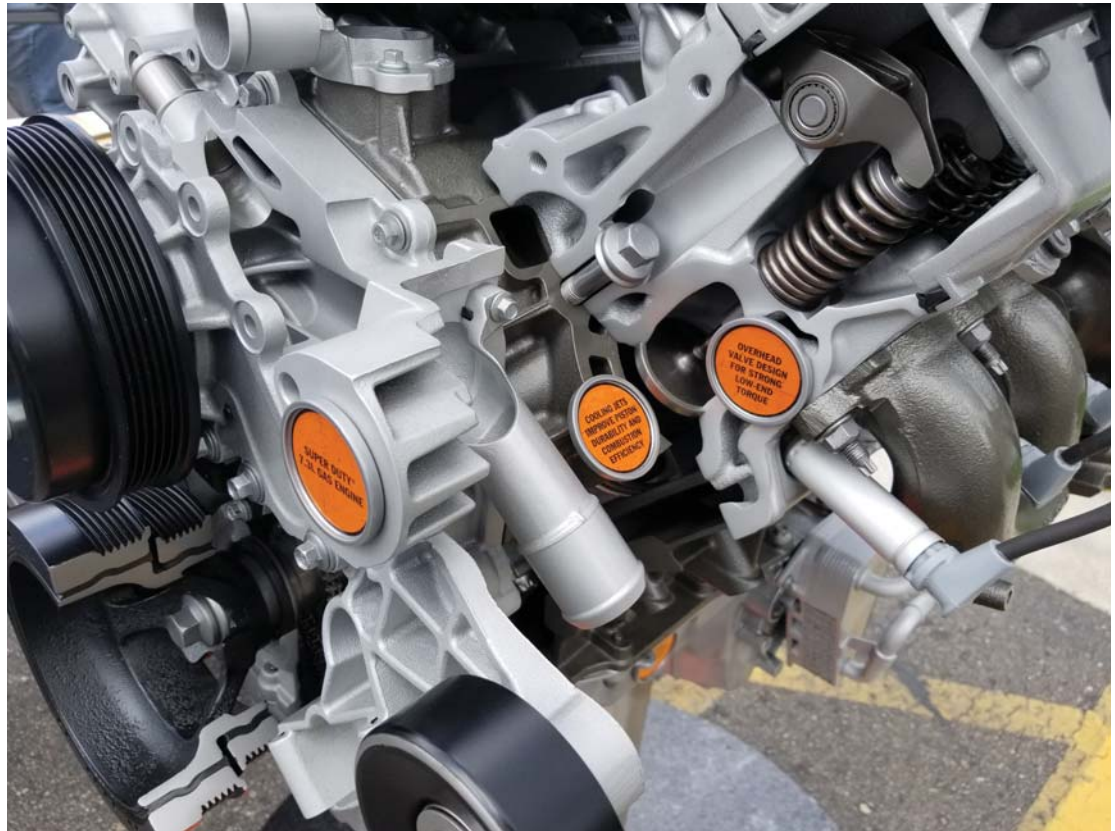
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Cutaway of Ford's all-new 7.3L gasoline V-8.



lightweight materials, reduced friction and improved efficiency.

Many of these new powertrains will be tested in this fall's Wards 10 Best Engines & Propulsion Systems competition, which enters its 26th year with a new name that reflects the industry's interest in hybrids, battery-electrics and hydrogen-powered fuel cells.

Where do truck powertrains go from here? Automakers don't willingly reveal future product plans.

But you may have seen the

recent Ford event in a railyard where a prototype all-electric F-150 had enough torque to pull a double-decker train loaded with 42 F-150s – a total of 1.25 million lbs. (567,000 kg). Ford has confirmed it will bring an all-electric F-150 to market, in addition to an F-150 Hybrid that goes on sale next year.

In its 2018 Sustainability Report, General Motors confirmed it is developing an all-electric pickup truck as part of a full lineup of



FORD TRUCK POWERTRAIN MIX

% Installation based on U.S. Sales Oct. 2018-March 2019

	2.7L ECOBOOST V-6	3.0L DIESEL V-6	3.3L V-6	3.5L ECOBOOST V-6	5.0L V-8	6.2L V-8	6.7L POWER STROKE DIESEL V-8
F-150	14.0	4.4	20.6	41.8	19.2		
F-Super Duty						43.1	56.9

Source: Wards Intelligence

RAM TRUCK POWERTRAIN MIX

% Installation based on U.S. Sales Oct. 2018-March 2019

	3.0L DIESEL V-6	3.6L PENTASTAR V-6 WITH 48V ETORQUE	5.7L HEMI V-8 WITH 48V ETORQUE	5.7L HEMI V-8	6.4L HEMI V-8	6.7L CUMMINS DIESEL I-6
Ram Classic 1500	3.0	32.2		64.8		
Ram 1500		8.3	18.0	73.7		
Ram 2500					37.2	62.8
Ram 3500					32.3	67.7

Source: Wards Intelligence

EVs. Cadillac will be the lead brand for GM’s EV push, so it seems doubtful the pickup will be the first vehicle launched from this next-generation lineup.

For now, let’s take a closer look at the current truck offerings.

HEAVY-DUTY DIESELS TOWING 35,000 LBS.

Ram was first to reach the threshold of 1,000 lb.-ft. (1,355 Nm) of torque with its Cummins

6.7L inline 6-cyl. in the ’19 2500/3500 heavy-duty pickups – a benchmark heralded at last January’s North American International Auto Show.

Available since spring, Ram’s HO Cummins I-6 uses a new compacted graphite iron block, redesigned pistons, connecting rods and cast-iron head, and the 400-hp engine is 60 lbs. (27 kg) lighter than the one it replaces. The variable-geometry turbocharger

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GM TRUCK POWERTRAIN MIX

% Installation based on U.S. Sales Oct. 2018-March 2019

	2.7L TURBO 4-CYL. WITH DE-ACTIVATION	3.0L DIESEL V-6 (LATE AVAILABILITY)	4.3L V-6	5.3L V-8 WITH DE-ACTIVATION	5.3L FLEX-FUEL V-8 WITH DE-ACTIVATION	6.0L V-8	6.0L V-8 CNG/LPG	6.2L V-8	6.6L DURAMAX DIESEL V-8
Chevy Silverado	3.9	0.2	11.4	65.2	12.6			6.7	
Chevy Silverado HD						38.4	0.2		61.4
GMC Sierra	1.4	0.2	1.2	53.5	2.2			41.5	
GMC Sierra HD						20.3			79.7

Source: Wards Intelligence

delivers boost pressure of up to 33 psi (2.3 bar).

But it's GM that – at least for now – holds the crown for heavy-duty towing capability: 35,500 lbs. (16,103 kg) with the Duramax 6.6L diesel V-8 in the '20 Chevrolet Silverado and GMC Sierra heavy-duty 3500 rear-wheel-drive regular cab pickups.

You'll need a commercial-vehicle license to haul that much on public roads. GM says more than 90% of heavy-duty truck owners use their vehicles for trailering.

The Duramax engine carries over from '19 with the same 910-lb.-ft. (1,234-Nm) torque rating, but the extreme towing capability comes courtesy of a new 10-speed Allison transmis-

sion, more robust axles and larger driveshaft. A larger variable-speed fan helps keep the Duramax cool.

Ford has updated its third-generation 6.7L Power Stroke diesel V-8 in '20 Ford Super Duty pickups, with a redesigned electronically actuated variable-geometry turbocharger for better response and a new 34,100-psi (2,351-bar) direct-injection fueling system capable of spraying up to eight times per stroke for improved noise attenuation.

Sleek new steel pistons replace the larger aluminum ones and have been designed to handle higher cylinder pressures and output, and the block, heads, connecting rods and bearings



Ram 1500 with new 3.0L EcoDiesel V-6 easily tows 5,000-lb. boat trailer near Duluth, MN.



have been enhanced as well. A new variable-displacement oil pump replaces the gerotor unit in the previous engine.

How all these improvements will impact the 6.7L Power Stroke's performance will be revealed Sept. 26, when Ford announces towing, payload and power ratings. We'll have to wait until then to see if Ford can top the 1,000-lb.-ft. torque level established by Ram with the Cummins.

GM, FORD SQUARE OFF WITH NEW GAS HD V-8s

Step down from the burly diesels and we find GM and Ford squaring off with all-new gasoline

V-8s for their heavy-duties.

Ford's all-new 7.3L gasoline V-8, going on sale later this year and to be assembled in Windsor, ON, Canada, joins the current 6.2L V-8 and replaces the 6.8L V-10 in '20 Super Duty pickups.

Ford's new engines over the past 20 years have launched almost exclusively with overhead-cam designs, including the 6.2L and 6.8L HD engines. But the new 7.3L employs a cam-in-block overhead valve design similar to GM's small-block and Ram's Hemi V-8s.

Ford's hulking 7.3L V-8 can run on compressed natural gas and is rated at 430 hp and 475 lb.-ft. (644 Nm) of torque, which



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Chevy Silverado's new 6.6L gasoline V-8 for heavy-duty pickups.



Dearborn claims is best in class. The 7.3L is optional on Super Duty pickups and will be mated to Ford's new 10-speed TorqShift automatic transmission.

Upgraded content includes a variable-displacement oil pump, extra-large main bearings, forged steel crankshaft for durability and piston cooling jets to help manage temperatures under heavy load.

At GM, an all-new 6.6L gasoline OHV V-8 with cast-iron block and aluminum heads is standard on

'20 Silverado and Sierra HD pickups, rated at 401 hp and 464 lb.-ft. (629 Nm) of torque.

While Ford's 7.3L uses port injection with variable valve timing, GM's 6.6L employs high-pressure direct fuel injection to better control combustion.

GM's new gas 6.6L, paired with a 6-speed automatic transmission, uses a forged steel crankshaft and forged powder-metal connecting rods for strength and durability.

A longer stroke than in the 6.0L



Ford's sleek new steel piston in upgraded 6.7L Power Stroke heavy-duty diesel V-8 is half the size of aluminum piston it replaces.



gas V-8 helps boost torque 21%, and we appreciate that extra grunt in a Silverado 2500 while towing a 12,000-lb. (5,443-kg) earth mover along the foothills surrounding Mount Bachelor in central Oregon this past summer.

Along the way, the weight of the trailer is readily apparent and yet the truck does not strain under load, seeming to breathe easily.

GM says 70% of its heavy-duty pickups are sold with Duramax diesel V-8s, while the remaining 30% are gasoline V-8s that go primarily to fleets.

LIGHT-DUTY DIESEL SHOWDOWN

The next compelling batch of head-to-head rivals comes in the light-duty diesel realm, where Ram, GM and Ford all are marketing their long-awaited 3.0L diesel 6-cyl. engines.

Ford had a head start here, launching its 3.0L Power Stroke in the F-150 a year ago and winning a 2019 Wards 10 Best Engines trophy.

This fall for the '20 model year, Ram will begin selling its third-generation 3.0L EcoDiesel with a starting price of \$36,890 in the



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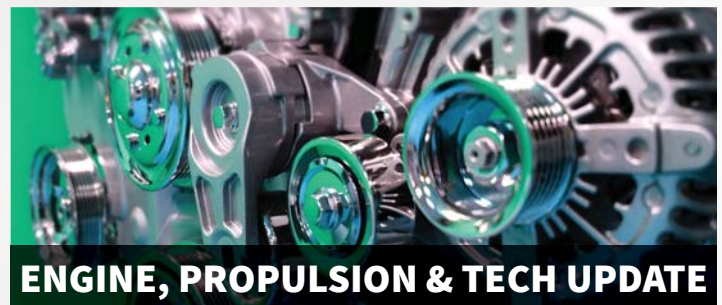
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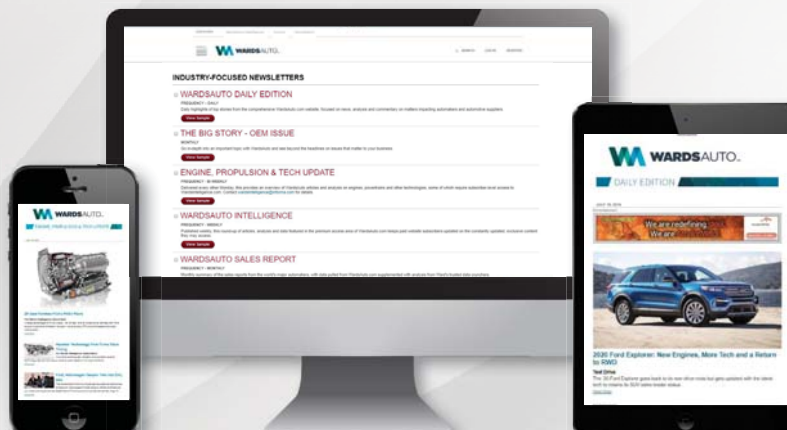
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2-wheel-drive Tradesman Quad Cab. Unlike Ram's previous 3.0L diesel, the new one (designed and built in Italy) will be offered on every trim level.

As is the case with its competitors, the new Ram diesel engine is not cheap: a \$4,995 stand-alone option, representing a \$3,000 premium over the gasoline 5.7L Hemi V-8 with eTorque 48V stop/start system.

At the same time, GM is launching its 3.0L Duramax diesel inline 6-cyl. in the Chevy Silverado and GMC Sierra, carrying a \$2,495 premium over the Silverado's enormously popular 5.3L small-block gasoline V-8.

FCA's new EcoDiesel V-6 is designed for high towing capacity (12,560 lbs. [5,698 kg]), but GM's new Duramax 3.0L is more powerful, with 277 hp (compared to 260 hp in the new Ram).

GM also appears to be positioning its new 3.0L Duramax as the most fuel-efficient light-duty diesel on the market, rated at 23/33 mpg (10.2-7.1 L/100 km) city/highway. Meanwhile, its tow rating lags the new Ram, at 9,300 lbs. (4,218 kg).

The 3.0L Duramax is priced the same as the 6.2L gasoline V-8 that represents the flagship powertrain for the Silverado and Sierra. With its 17-mode Dynamic Fuel Management cylinder deactivation system, GM's 6.2L V-8 earned a 2019 Wards 10 Best Engines trophy.

After test drives this year in Oregon of the 3.0L diesel Silverado and in Minnesota of the 3.0L diesel Ram, we can confirm both engines are shockingly quiet, smooth and capable.

Like Ford's Power Stroke, the GM and Ram offerings quite possibly could erase old memories of loud, smoky, unreliable diesels in the 1970s and 1980s. These engines feel right at home in large pickups.

For sheer gruntability, the Duramax, with its 460 lb.-ft. (624 Nm) of torque at 1,500 rpm, comes in second to the Ram EcoDiesel's 480 lb.-ft. (651 Nm) at 1,600 rpm.

At Chevy's recent fuel-economy challenge during the 3.0L Duramax test drive, we managed to achieve 33.9 mpg (6.9 L/100 km). In the Ram 1500 with its 3.0L



THE BIG STORY

EcoDiesel, we topped 30 mpg (7.8 L/100 km) on a 65-mile (105-km) route, most of it highway.

For comparison, some Wards editors topped 26 mpg (9.0 L/100 km) while driving nearly 800 miles last fall in a Ford F-150 equipped with the Power Stroke 3.0L diesel V-6.

Wards has not yet towed anything with Ford's 3.0L Power Stroke or GM's 3.0L Duramax, but pulling a 5,000-lb. (2,268-kg) boat with Ram's 3.0L in Minnesota was a breeze.

So that caps our highlights of this year's truck powertrain offerings.

In last year's Wards 10 Best Engines competition, GM's new 2.7L turbocharged gasoline 4-cyl. with cylinder deactivation did not make the list. But FCA's eTorque 48V mild-hybrid system mated to the gasoline 3.6L Pentastar V-6 made the cut, so it will be among the nominees we'll evaluate this fall. (The eTorque system also is available with the 5.7L V-8 in Ram pickups.)

Toyota and Nissan also sell full-size pickups in the U.S. But unlike

their Detroit rivals, they are actually shrinking their powertrain offerings.

Nissan is eliminating the slow-selling Cummins 5.0L diesel in the Titan XD, and Toyota is dropping its 4.6L V-8 and the flex-fuel variant of its 5.7L V-8 offered in the Tundra.

That leaves only one engine for Nissan and Toyota: the 5.6L gas V-8 in the Titan and the 5.7L gas V-8 in the Tundra.

Nissan says it will announce updates to its 5.6L V-8 in the Titan at the upcoming State Fair of Texas, which begins Sept. 27 and is a rally of sorts for pickup truck owners. **WA**



This story was written by Managing Editor Tom Murphy, who has worked at Wards for 22 years, covering technology and

leading selection each year of Wards 10 Best Engines, 10 Best Interiors and 10 Best User Experiences.