FCA US Powertrain Innovations a Sure Bet for 2019 Model-Year

- Cutting-edge proliferation of eTorque mild-hybrid technology
- 6.2-liter HEMI® Hellcat gets horsepower boost and new high-output variation
- Patented, industry-first application of rear-axle lubricant heater
- Introduction of rev-matching in TorqueFlite nine-speed automatic transmission

FCA US LLC is doubling down on powertrain efficiency for the 2019 model year, while laying side bets on the market’s continued fascination with high-performance vehicles.

The introduction of eTorque to the high-volume Ram 1500 portends industry-leading proliferation of 48-volt, mild-hybrid technology – a clear demonstration of the Company’s commitment to deliver environmentally responsible solutions for customers who continue to demand optimal vehicle capability.

“Our system affords a no-compromise ownership experience by conserving fuel and supplementing torque,” says Bob Lee, Head of Engine, Powertrain and Electrified Propulsion, and Systems Engineering, FCA – North America. “In terms of refinement, the start-stop transition is seamless, while the power delivery is smooth and compelling.”

The eTorque mild hybrid system replaces the traditional alternator on the engine with a belt-driven motor generator unit that performs several functions. The motor generator unit works with a 48-volt battery pack to enable quick and seamless start/stop function and short-duration torque boosts to the engine crankshaft in certain driving situations, while capturing energy during braking for improved efficiency.

With the engine running, eTorque’s motor generator unit feeds 48-volt current to a 430 watt-hour lithium-ion Nickel Manganese Cobalt (NMC)-Graphite battery.

In addition to spinning the engine for restarts, the eTorque also recaptures energy during deceleration and braking to feed charge to the battery pack. eTorque also aids the driving experience by adding torque to the crankshaft at launch and during gear changes to minimize noise, vibration and harshness (NVH).
For 2019, eTorque is mated to the 3.6-liter Pentastar V-6 in the Ram 1500 full-size light-duty pickup. It is also available with the Ram 1500’s 5.7-liter HEMI® V-8.

**More power to you**

Inspired by the achievements of the 2018 limited-production, 840-horsepower, supercharged 6.2-liter HEMI® Demon V-8, FCA US:

- boosts by 10 horsepower the output of the 717-horsepower supercharged 6.2-liter HEMI V-8 in the 2019 Dodge Challenger SRT Hellcat
- introduces a high-output, 797-horsepower version for the 2019 Dodge Challenger SRT Redeye

The additional 10 horsepower in the Challenger SRT Hellcat engine is primarily attributed to increased air flow, courtesy of the car’s new, low-restriction dual-snorkel hood.

The same hood design, which is fully functional, combines with the unique Air Catcher headlamp and an inlet near the wheel liner to help boost the performance of the high-output engine. These three sources deliver a total flow-rate that is 18 percent greater than that in the Hellcat engine, or 1,134 cubic feet per minute – the equivalent to 89 adults simultaneously emptying their lungs in one second.

The high-output engine also features SRT Power Chiller™, which diverts air-conditioning refrigerant from the interior cabin to a chiller unit mounted by the low-temperature circuit coolant pump. Charge-air coolant, after being cooled by ambient air passing through a low-temperature radiator at the front of the vehicle, flows through the chiller unit, where it is further cooled.

The chilled coolant then flows to the heat exchangers in the supercharger. The combined effect of SRT Power Chiller and After-Run Chiller lowers intake air temperature by up to 45 degrees Fahrenheit.

Both engines benefit from After-Run Chiller. The industry-first feature helps reduce the effects of heat soak by running the engine cooling fan and low-temperature circuit pump running after the engine is shut down.

The high-output engine further distinguishes itself from the Hellcat version by major component upgrades that include:

- the largest factory supercharger of any production car: (2.7 liters compared with the Hellcat engine’s 2.4-liter blower)
- increased boost pressure: 14.5 psi versus 11.6 psi
- higher rpm limit: 6,500 rpm versus 6,200 rpm
• two dual-stage fuel pumps versus one
• a larger induction air box

**Turning up the heat**

The efficiency theme for model-year 2019 continues with the patented thermal management system featured in 4x2 versions of the Ram 1500. The innovation, which features a three-way valve in the engine cooling circuit, taps heated coolant to warm up rear-axle lubricant.

Once heated, the valve routes coolant to the rear axle, where it circulates through a cavity in the double-layer axle cover to warm the gear oil. The warmed gear oil is less viscous and brings the axle to peak operating efficiency faster – conditions that contribute to fuel-economy improvements in the range of two tenths of a mile per gallon.

Also, the system helps prevent the rear axle from exceeding maximum temperatures during demanding conditions such as hauling and trailer towing.

**A match made in revin’**

FCA US continues to transform its breakthrough nine-speed automatic transmission with a running change to the 2018 Jeep Compass that carries into the next model year.

“We identified an opportunity to deliver a more satisfying driving experience for our customers, so we took full advantage,” says Jeff Lux, Head of Transmission Powertrain, FCA North America.

Engineers developed new transmission shift-control and engine-control algorithms that align the transmission and engine speeds during situations such as a hard acceleration on the highway.

When a throttle input mandates a downshift, the transmission sends a signal to the engine to adjust its speed accordingly. The result is quicker response.

“Rev-matching can shave nearly a second off of a multi-gear downshift,” Lux says. “It leverages the wide performance band of this gearbox to get more out of the engine, when the driver wants more.”