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Plastics in Automotive

Competitive market intelligence and analysis focusing on current trends impacting North American plastics processors

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Plastics in Automotive: Overview

Plastics is key to future of lightweighting in automotive

When the U.S. government first unveiled its plans for new Corporate Average Fuel Economy standards, gasoline was selling for about $4 a gallon, and the expectation was that American consumers would be looking for more efficient cars.

Turns out, oil and fuel prices have plummeted and the American car buyer has gone rogue.

Or, in the case of one automaker, buyers have gone Rogue. Literally.

In September, October and November of 2015, Nissan Group sold more of its Rogue crossover vehicles in the U.S. than its Altima sedan – a vehicle that had been its North American sales leader.

In November 2015, sales for the Rogue grew nearly 50 percent compared to the same month in 2014, while sales for the Altima dropped 9.9 percent year over year.

While Altima likely will still end the year as Nissan’s biggest selling vehicle in the U.S. – it has sold 303,936 units through the first 11 months of the year compared to 260,711 Rogues – it still is an example of changing tastes for consumers, and demonstrates key issues for automakers and suppliers.

How, exactly, is the auto industry supposed to meet requirements for more efficient vehicles when car buyers aren’t interested in purchasing them?

“It doesn’t appear that things are going to change unless there’s some kind of a shock as it relates to fuel prices or oil in general, and that doesn’t appear to be on the horizon,” said Jeff Schuster, senior vice president of forecasting for consulting group LMC Automotive.

“We look to be in the environment of low gas prices, and the consumer wants to buy an SUV.”

But that trend is likely playing right into the plastics industry’s strengths as automakers try to meet market demand while also improving overall efficiency by both lightweighting parts and downsizing engines.

“In general, if the industry can find a way to build or produce the vehicles that people want, whether it’s an SUV or a CUV [crossover vehicle], and can hit the fuel economy target but without sacrificing anything in price or performance, there will be a big opportunity for those who can be a part of the solution,” Schuster said.

A new sales record?

This is obviously a good time to be in the North American auto industry, especially for those suppliers who get in on the right vehicles and with the right parts.

While the final numbers are still being counted for 2015’s total U.S. sales, the prediction in the final days of December was that it would top out at well over 17 million vehicles for the year.

That will easily top the 16.5 million cars and light trucks sold in 2014, and will also top the pre-recession sales mark of 16.9 million cars in 2006.
Ford Motor Co. analyst Erich Merkle says the number for the year could go even higher than 17 million.

“Our industry guidance for the year, we’re looking at about 17.7 million vehicles, somewhere right around 17.7,” he said in a call with analysts and the media. “It looks like this will be a record year for the industry.”

But analysts say this year will not be just an outlier in an otherwise humdrum industry.

The North American Automobile Dealers Association forecasts that 2016 will see volume climb to 17.7 million and in 2017, it predicts 17.2 million vehicles sold.

If those predictions hold true, it would be the first time ever that the U.S. industry has seen three consecutive years of sales in excess of 17 million.

“We think there’s another good solid, 22, 24 months at this level,” Bob Carter, senior vice president of Toyota Motor Corp.’s U.S. operations. “The economics, the interest rates, the employment – everything pretty much says that we should stay at this level.”

But this is also a business that has been burned by predictions in the very recent past. In 2007, the U.S. market saw healthy sales of about 16.1 million. In 2008, the Great Recession hit the auto industry first. Annual sales fell to 13.2 million for the year, although that final number doesn’t reflect the huge crater that began in late summer of 2008, after what had been a routine year for the first half.

“The car buyers went on strike,” is how one analyst put it at the time.

In 2009, General Motors and Chrysler were both forced into bankruptcy to restructure. Some of their major suppliers followed them into the same process. The industry recorded a meager 10.4 million in sales.

The majority of executives who survived the Great Recession then are still making decisions today, and they aren’t about to let themselves get caught unawares now, Schuster noted.

“Many of the suppliers in the industry are still waiting to see if things are going to go in the other direction,” he said. “Businesses are still being planned in a conservative way, so [production] capacities are very lean.”

**So where do you put your money?**

With strong forecasts, but tough lessons still on their mind, the question becomes one of where suppliers and automakers alike are going to invest their capital. Everyone wants a part of the next hot car or truck, but how do you decide which vehicle to bring to the market, where to build it and – for suppliers – whether to submit a bid to supply parts.

“There definitely are a lot of challenges and issues for the supply base,” Schuster said. “Do you follow an OEM or a major customer to a new location? What are the vehicles that are going to be produced there?”

In the U.S., for now, the hot vehicle seems to be anything that falls into the territory of the crossover, vehicles typically made on a car platform, but smaller than a sport utility vehicle. It has become the vehicle of choice for a range of buyers, both those looking to downsize from full SUVs and suburban dwellers who want to avoid the minivan, but still need extra space.

The CUV name also covers vehicles that once may have been considered a station wagon.

Ford Motor Co. has gone on the record as expecting that SUVs will become 40 percent of the U.S. market by 2020 and is placing its Escape compact SUV to be a major competitor. The Escape currently is the third best-selling CUV on the market, with 278,538 vehicles sold through the first 11 months of 2014, just behind Toyota Motor Corp.’s Rav4 – with 283,546 vehicles sold – while segment leader Honda had sold more than 314,000 of its CR-Vs.
Both Ford and Toyota are aiming for that top spot, however. Toyota’s Bill Fay told Automotive News, a sister publication of Plastics News that Toyota is positioning itself to sell 400,000 Rav4s.

And there’s another benefit to CUVs beyond new consumer interest.

If consumers are going to follow the lure of low gas prices back toward larger vehicles, at least these compact SUVs can also help the auto industry focus on its overall fuel economy by luring customers to something other than full-size trucks and SUVs.

A shifting production market
Bidding on parts for the SUV and CUV market also helps to concentrate your products geographically. Increasingly, automakers are shifting assembly of smaller cars to lower cost countries, reflecting both consumer buying habits and lower profits to be made from small cars.

In its new labor contracts with the United Auto Workers, both Fiat Chrysler Group and Ford indicated they will focus on crossover and SUV production in the U.S. while the bulk of car manufacturing will go to Mexico.

GM, so far, has resisted that trend, which extends beyond being a North American phenomenon. In Europe in December, Daimler AG was pressuring workers at its Smartville plant in Hambach, France, to take wage and schedule concessions to keep its two-seat Smart car assembly plant there, rather than moving it to lower cost regions in Central Europe.

Industry watchers say it simply makes sense to make larger vehicles in markets that want to buy those vehicles – and for buyers who are willing to pay more for them in comparison to a compact car or sedan.

“You can afford to pay a little more when you’re making trucks,” Dave Cole, chairman emeritus of the Center for Automotive Research told Automotive News. “The structural change in the industry has been so huge that I was kind of surprised by that – trucks here and cars in Mexico.”

But on the flip side, the growing auto production market in Mexico means new potential for business for those suppliers either already there or willing to invest in new production in the area.

Major Tier 1 suppliers have been investing in Mexico for several years and continue to. In December, Monaco-based Mecaplast Group launched construction of its newest plant, a $10 million injection molding facility in Silao, Mexico, to make cam covers.

It expects the new plant to be doing $37 million in business by 2019. It will join an existing plant 300 miles away in Puebla, Mexico, making similar parts and already doing $45 million in annual sales.

But both automakers and major suppliers are anxious to see more Tier 2 and Tier 3 suppliers move into Mexico. They need more support from mold makers and component molders, but so far that growth has been slow.

As a result, Mexico’s auto market ends up importing a lot of what it needs.

Mexico’s suppliers’ association, Industria Nacional de Autopartes AC (INA) says that Tier 1 companies in Mexico produced parts worth $76.8 billion in 2013, but had to import Tier 2-produced components worth $38.8 billion in the same year. That import number was up 7 percent in comparison to the previous year.

The Mexican government and INA would like to reduce that import number to $25 billion by 2019.

But expanding into Mexico isn’t as simple as learning the language, finding workers and buying machines, however.

Fuel economy gains slow amid light truck demand
As the industry looks for ways to create lighter, more fuel-efficient vehicles, the industry is seeing slower progress toward achieving the U.S. government’s fleet-wide fuel economy target of 54.5 mpg by 2025 as cheap gasoline fuels surging demand for light trucks.

Yet tailpipe emissions of new cars and trucks continued to get cleaner and beat their U.S. targets for the third year.

The EPA said in a report in December that the average fuel economy of new cars and trucks was 24.3 mpg in the 2014 model year, unchanged from 2013, when fuel economy rose 0.6 mpg. The 2014 model year was also the first since 2011 in which fleet-wide fuel economy didn’t increase.

The fleet-wide efficiency gains were offset by growing consumer demand for pickups, crossovers and SUVs amid a sustained period of inexpensive gasoline, which averaged $2 per gallon in the U.S. at the end of 2015, according to AAA.

According to the EPA, light trucks accounted for 41 percent of all new vehicle production in the 2014 model year, up from 36 percent in the 2013 model year.

Average carbon dioxide emissions of new vehicles were 13 grams per mile lower than the 2014 model year targets, the EPA said.

According to the EPA’s annual Fuel Economy Trends report, the average fuel efficiency of cars was also unchanged at 27.9 mpg. Truck fuel economy was 20.4 mpg, an increase of 0.6 mpg from 2013, the second-highest gain in 30 years, according to the EPA. Truck-based SUVs and pickups posted the largest mpg gains of any vehicle type, according to the EPA.

Based on preliminary data, the EPA projects fleet-wide fuel economy to average 24.7 mpg in the 2015 model year. The average fuel economy of new cars has increased 5 mpg in the last 10 years, a 26 percent improvement, according to the EPA.
“One of the key detractors why small companies can’t get down there is they can’t get financing,” said Ted Morgan, who co-leads the plastics industry team for consulting group Plante & Moran. “They have different capital structure [than big suppliers] and, frankly, if it’s their first foray into Mexico, it’s hard for them to get their banks to loan them money to open up the plant.

“There may be a desire, they just can’t get the financing to do it.”

**CAFE requirements still loom**

Back in the U.S., a growing focus for the growing number of light trucks on the road remains one that has been emphasized for the past few years: CAFE.

Rising fuel efficiency standards have focused on “54.5 miles per gallon by 2025,” although there actually are different requirements for cars vs. trucks.

In 2015, the goal for cars was 39 miles per gallon, while the target for full size trucks was 23.5 mpg. A smaller footprint truck sits between those two at 33 mpg.

In 2020, that will rise to 49 mpg for compact cars and 25 mpg for trucks. A compact SUV will have a 39 mpg target.

If buyers can be drawn toward the smaller side of the “light truck” scale, it will help the overall automakers’ average.

But even with an easier standard for a CUV vs. a compact car, carmakers will have to push hard to keep hitting those targets. And that is where plastics comes into play.

**Body panels and structures**

Which brings us back to that example of Nissan’s Rogue and an example of the bigger part a CUV can play in the overall car market, and where plastics come into the picture.

In 2013, Nissan brought production of its Rogue to Smyrna, Tenn. It had high hopes for the American-made model, which would go into production starting as a 2014 model year. It also opened its doors to a new assembly concept.

Rather than using its own in-house steel stamping to make the rear liftgate, it teamed with supplier Magna International Inc. to try out a new plan that Magna had first proposed 12 years earlier, in which Magna would produce a complete tailgate module using thermoplastic polyolefin rather than steel for the bulk of the part.

The Aurora, Ontario-based supplier would also deliver that liftgate to the production line, simplifying assembly in Smyrna.

And that TPO liftgate also came in 30 percent lighter than steel, providing a 10 percent fuel savings.

That is far from the only instance out there where plastics are playing a part in reducing weight and improving fuel efficiency.

In January 2015, the White House announced a federal research effort, the Institute for Advanced Composites Manufacturing Innovation, that would combine research efforts by industry, government and universities into fiber-reinforced plastics to speed development of lightweight composites in the auto industry. The effort is, in part, designed to look at ways to move carbon fiber out of niche vehicles such as high-end sports cars and into more day-to-day, mainstream cars and trucks.

Ford gave its involvement in the project – and its increasing interest in carbon fiber – big play at the opening of the 2015 North American International Auto Show when it said it was using carbon fiber extensively in its small volume GT supercar, but Raj Nair, group vice president and chief technical officer, said it is using the GT as a platform for further development of composites.

“When you see implementation of a lot of new materials, you see them come in in lower volume,” he said in an interview on the auto show floor just minutes after Ford rolled
out the GT. “Even aluminum came in first in lower volume, and now we’ve crossed that threshold where we’re the first manufacturer delivering an all-aluminum body in a very high volume.

“You’ll see similar trends, we think, for carbon fiber. So this introduction of the GT with its full carbon body structure and body panels is probably on a path for us to have increased implementation of carbon fiber in vehicles.”

The interest in using plastics in body panels and structures goes beyond the carbon fiber buzz, however, and shows how the auto industry is open to trying new things if it means reducing weight.

The top winner of the Society of Plastics Engineers’ auto division’s Automotive Innovation Award for 2015 was GM for its use of hollow glass microspheres from 3M Co. in a sheet molded compound body panel on the Corvette rather than using a more traditional calcium carbonate reinforcement.

The part, molded by Continental Structural Plastics, was 43 percent lighter than conventional SMC and 28 percent over mid-density grades of advanced SMC composites.

SPE also honored Audi AG for its use of a glass fiber reinforced epoxy in a coil spring, replacing what has traditionally been a metal part.

Body panels also may be getting more attention from France’s Cie. Plastic Omnium, which signed a memorandum of understanding to acquire the bulk of Faurecia SA’s exterior plastics operations, which includes bumpers and front end modules.

The deal will create a global player with more than 8 billion euros ($8.8 billion) in sales and, Plastic Omnium noted in a news release, allows it to emerge as one of the 25 largest auto suppliers in the world, one specifically focused on expanding the use of plastics in lightweight body applications.

Under the hood
Plastics also continues to find more homes in and around the engine, not only to reduce weight, but to make traditional internal combustion engines more efficient.

While Elon Musk and his Tesla car company may be the darlings of Wall Street, the fact remains that gasoline engines will remain the powertrain of choice in North America for years to come.

Whatever traction diesel may have had in the region vanished once Volkswagen AG admitted it had cheated on emission tests for years. Hybrid cars, meanwhile, remain just a fraction of the auto market.

Toyota has even reduced the global sales target for its next-generation Prius gasoline-electric hybrid car, which goes on sale in the U.S. early this year. While it had previously said it expected to sell 300,000 to 400,000 Prius cars annually, in December it said that it is far more likely to hit the 300,000 level, rather than the top of that mark.

Luckily, the automotive industry has found that there are additional fuel savings still to be had in a gasoline engine. That could come by reducing weight by using more plastic rather than metal, such as using plastic in an oil pan or for cylinder heads or cam covers, executives from BASF Corp. pointed out.

It’s increasingly in structural grille openings and used for front end modules, typically in hybrid parts combining both plastic and metal. And while full hybrids aren’t necessarily a big draw, the so-called “mild hybrid” is gaining attention.

A mild hybrid uses stop-start technology which shuts down engines when they’re idling at lights or stop signs, then automatically restart once the driver hits the accelerator, so they cut gas use without affecting the driver.
A key part of those systems is a small additional battery, which ensures everything keeps running properly when the engine shuts off, then restarts without a hiccup. Johnson Controls Inc., which makes absorbent glass mat batteries, which are enclosed in plastic, for stop-start, estimates that 85 percent of all European cars will use stop-start by 2020, along with 40 percent of the vehicles sold in the U.S. and China.

Improving heat and chemical resistance of nylon also is putting plastics in contact with the most demanding applications, such as turbo chargers that are making it possible for smaller engines to meet high profile performance demands.

Ford has been one of the highest profile users of that turbo boosting prospect, which allows a V6 engine to produce as much power as a V8 engine while using less fuel. Its flagship vehicle, the F150 pickup truck, now sells more V6 engines with EcoBoost than V8 engines.

DuPont Co. has worked closely with Ford on the EcoBoost project, both for key parts of the turbo system and to help develop an injection molded resonator within the blow molded ducts which eliminated a high-pitched whining sound.

The Wilmington, Del.-based materials giant’s nylon and other engineering resins play a big part in under-the-hood applications, and it estimates that 80 percent of the Ten Best Engines, as tracked by the auto publication Wards uses DuPont products for engine cooling, turbo ducts or electrification.

Both the performance and the sound quality were keys to getting consumers on board.

“If cost or performance becomes an issue, then it becomes a real challenge to sell consumers,” Schuster said. “With [fuel] prices down, it is hard to convince people to be green, but those are things that can still happen as long as you’re not restricting capability or performance. If you can still tow things, if you have torque and get it with a smaller engine, then they’re going to buy it.

“It was thought that the small engines didn’t have performance, but there is a lot going on with downsizing powertrains and those things are continuing to improve fuel economy.”

For an idea of how a very traditional looking – and performing – vehicle can still meet efficiency standards, just look at Ford’s best-selling truck. In November, it beat out three diesel-powered trucks from competitors GM, Nissan and Toyota to be named the “Green Truck of the Year”

“You don’t think of the 150 as ‘green’ because of its size, but it’s green in comparison,” Schuster said. “In general, if the industry can find a way to build or produce the vehicles, whether they’re large sedans or SUVs or crossovers, without sacrificing anything in price or performance, people will be interested.”
Economic trends and forecast:

Economic factors driving growth in automotive sector

In both its strength and duration, the current expansion in the U.S. automotive market continues to exceed expectations.

Total motor vehicle sales in the U.S. for the month of November continued to rise and the industry in the third quarter of 2015 had the strongest quarterly sales total in the past 10 years.

Would it be a mixed metaphor to say that the automotive industry is soaring?

Through November, total vehicle sales were up 5 percent when compared with the same period in 2014, and that is what we are forecasting for the annual total this year—a gain of at least 5 percent, to an annual total of well over 17 million units. It is worth noting that the number of cars sold this year will be flat-to-down when compared with last year, while the number of light trucks sold will rise by 10 percent to 12 percent.

Low gas prices are a large part of the explanation for the surge in light truck demand, but this segment is also getting a push from the strengthening recovery in the construction sector which represents a large end-market for pick-up trucks. And sales of delivery vehicles are getting a boost from the burgeoning amount of e-commerce activity.

According to Plastics News Economics Editor Bill Wood, for the North American plastics processors, mold makers, and equipment manufacturers who supply this industry, “the trend in the data on motor vehicle assemblies is more relevant because the above-referenced total vehicle sales data includes sales of both imported and domestically-produced cars.”

According to data from the Federal Reserve Board, total motor vehicle assemblies advanced by more than 6 percent in Q3 when compared with the same quarter last year, and they are up 4 percent for the year to date. Our forecast calls for an annual gain of at least 4 percent this year to a total of 12.2 million units assembled.

“In 2016, I expect a gradual improvement in the macroeconomic conditions that prevailed throughout 2015, and this will result in another year of strong market demand for motor vehicles. Specifically, my forecast calls for interest rates, gasoline prices and steel prices to rise only modestly from their current levels.”

— Bill Wood, Plastics News Economics Editor

Auto industry outlook

4% Gain in units assembled in 2014
5% Increase in sales through Nov.

“This will put the assemblies total at its highest level in over a decade.

"I am not implying that this represents a ceiling on the industrial capacity for American plants, but I do not think it is prudent at this time to push the forecast much higher," Wood said. "I will raise the forecast at a later date if it is warranted. For now I will say that, after a year of strong market demand in 2015, the U.S. auto industry will enjoy another year of strong market demand in 2016.”
The sluggish growth in income levels that extends back to the last recession has resulted in a large amount of pent-up demand for motor vehicles. The statistics about the relatively advanced age for the average car in America are still a factor.

According to Wood, at the current level of sales, the rate at which this pent-up demand is being sated is well-balanced with supply. It will take time for this situation to find equilibrium, which means that these levels of sales can be sustained for the foreseeable future.

Here’s why - even after several years of robust growth in vehicle sales, the total PCE for motor vehicles and parts in 2014 was still well below the pre-recession trend. Now some of this decline may be due to long-term secular trends. Millennials may not ever purchase as many cars as the preceding generations did. But the average age of a car in the U.S. is still around 11 years old, and there has not been any decline in the number of miles driven. “This indicates that there is still some upside in the cyclical recovery of the motor vehicle market,” Wood pointed out.

But even when sales are strong and production levels are high, there is still a question of whether anybody is making any money. “In 2005 (the last time the motor vehicle assemblies data was this robust), the industry’s profit levels were barely positive. This time around the story is much different,” Wood said.

According to the latest data from the Bureau of Economic Analysis, the auto industry’s profit levels are quite high and rose rapidly in 2015. Strong profit levels are important for all of the processor, tooling, and equipment companies in the plastics industry that supply the automotive industry. It means that invoices are paid quickly and new projects get funded.

“The rate of growth in the underlying sales and assemblies data will likely decelerate, but based on the recent trend in the profits data, I feel quite optimistic about the demand for plastics parts and equipment in 2016 ... and the profit levels of the companies that supply them,” Wood said.

The Plastics News Business Monitor Index decelerated in Q3, but the decline was modest overall and it was off of a very strong level in Q2. The Auto Index fell to 98.3 which is just below the breakeven level of 100. A closer look at the details suggests that the sub-100 figure for Q3 likely overstates the amount of deceleration.

Wood noted that increases were reported for the crucial new orders, production, and employees components.

“These gains were offset by declines in export orders, backlogs and prices received. Backlogs can be volatile. The drop in export orders should be expected given the recent surge in the value of the US dollar vis-à-vis other currencies,” he concluded. “But the decline in prices received should not be interpreted as market weakness. Rather it is the result of a decline in resin prices that is being passed on from processors to their customers.”

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### Plastics News Business Monitor Index: Automotive

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Source: Plastics News
Lightweighting overview:

Lightweighting is in auto industry spotlight

It’s not every year automotive plastics get a spotlight from the White House.

President Barack Obama in January 2015 announced a federal research effort to develop the supply chain for advanced composite materials. The Institute for Advance Composites Manufacturing Innovation (IACMI), launched officially in June, aims in part to reduce the cost of manufacturing advanced polymer composites like carbon fiber for automotive applications.

The initiative claims Oak Ridge National Laboratory, home to the Department of Energy’s 42,000-square-foot Carbon Fiber Technology Facility, among its founding partners.

With automakers striving to meet the U.S. government’s Corporate Average Fuel Economy (CAFE) standards, vehicle weight reduction has become a key focus of automotive engineering and design. The automotive industry increasingly looks to lightweight materials like carbon fiber, historically priced out of mainstream automotive use, to help meet their fuel efficiency goals.

A nationwide effort, IACMI is locating a key industry collaboration facility in Michigan. With this scale-up facility in the heart of automotive R&D, the Institute is well-positioned to support composites’ role in vehicles of the future.

A growing focus on lightweighting

Vehicle weight is a considerable factor in fuel economy. Of many possible solutions to meet CAFE standards – among them alternative fuels, electrification and advanced powertrain – lightweighting is increasingly a primary focus in automakers’ push to achieve fuel efficiency goals.

Automakers have already achieved improvements in fleet fuel economy through downsizing and engine efficiency programs, but as the industry faces progressively tougher regulations, OEMs are shifting focus to lightweighting.

A WardsAuto and DuPont survey released in August 2015 reported lightweighting as a top technology focus in the automotive design and engineering industry, where only a few years ago, powertrain improvements took the top spot.

But the survey results also noted concern about the cost of implementation of lightweight materials. Though respondents expressed confidence in the ability of the existing materials portfolio to meet OEMs’ requirements and lightweighting needs, many are not yet cost-effective for mainstream use. Work is needed in places to develop a robust supply chain, more efficient processing, and new joining technologies and surface treatments where traditional methods are not sufficient. Yet the drive for improved fuel efficiency continues to have a huge influence on vehicle design and innovation, with lightweighting taking the lead.

Carbon fiber

With continuing development of the carbon fiber supply chain, analysts predict large-scale automotive adoption of carbon fiber in the mid-2020s. Lux Research predicts a $6 billion market for automotive CFRPs by 2020. Both research organizations and automakers have shown great interest in building the carbon fiber supply chain and preparing the technology for wider implementation.

Carbon fiber had a high-profile moment at the 2015 North American International Auto Show with the unveiling of Ford Motor Co.’s new GT supercar. The high-performance vehicle has a carbon fiber passenger cell and structural carbon fiber body panels. Executives at the time described it as a jumping-off point for the company’s carbon fiber plans.

General Motors has used a carbon fiber hood on production models. Photo courtesy of GM
pointing to the common practice of introducing new technologies in low volumes and committing to develop carbon fiber components for a broader market.

It’s a course mirrored by other automakers. BMW AG, noted for its carbon fiber-intensive i3 electric vehicle, is now making extensive use of carbon fiber in its new 7 series car. In an example of the technology development necessary for widespread use of the material, the automaker now uses water assist, conventionally used in injection molding, for its high pressure resin transfer molding of carbon fiber parts.

**Natural fibers**

Though perhaps not having the same impact as a carbon-fiber supercar, another reinforcement material gaining popularity is natural fiber. Several automakers are creating programs to design parts using bio-based or renewable materials, like incorporating natural fibers into plastics.

When major automotive supplier Faurecia SA sold its exteriors business to Cie. Plastic Omnium, it retained its composites business, citing anticipated growth in the sector. In addition to carbon fiber, the business includes Faurecia’s natural fiber program, headlined by its hemp-reinforced NafiLean injection molding material. The supplier has been building capacity and is in the process of rolling out global production, touting the material’s design flexibility as well as weight reduction potential.

Other suppliers are developing their own alternatives to conventional reinforcement materials, often aimed at replacing glass fiber-reinforced plastics. In addition to weight reduction, natural fiber composites can offer other advantages like recyclability or less wear on tooling.

There is not yet a strong consumer demand in the U.S. for so-called “green” materials for automotive applications, though it carries more of an appeal in Europe. With the North American supply chain still developing, cost-effective adoption of some natural fiber materials remains a challenge.

As vehicle interiors trend toward more luxury and materials with a “premium” look and feel, consideration must be given to how natural fiber materials, with their inherent irregularities, can be made to suit that environment.

**A new generation of materials**

Suppliers continue to develop new materials and new fillers that can provide weight savings while meeting OEMs’ design and performance needs.

General Motors Co., working with Continental Structural Plastics, introduced sheet molded compound body panels reinforced with hollow glass microspheres from 3M Co. instead of more conventional calcium carbonate. The technology, which appears in the 2016 Chevrolet Corvette sports car, won the top prize in the Society of Plastics Engineers’ 2015 Automotive Innovation Awards.

And the demand is growing for high performance polymers to provide weight savings and other performance advantages in demanding automotive environments. Engine downsizing and turbocharging have created a need for materials that can withstand closer proximity to a vehicle’s engine. Materials suppliers in 2015 introduced new grades of high temperature-capable resins intended specifically for use in automotive air ducts and other under-the-hood components.

Chemical resistant resins are needed for underbody components prone to chipping and exposed to road salt and debris. General Motors Co. unveiled a strut mount for its Cadillac CT6 made with high-performance glass fiber-reinforced nylon, able to withstand rain, road salt, debris and vibration while also providing weight reduction and a smoother ride.
As automakers move beyond the “low-hanging fruit” of lightweighting, materials suppliers are responding with increased capacity and new grades that meet OEMs’ temperature and chemical requirements.

**Collaboration and development**
The cascading benefits of material substitution become evident throughout the automotive supply chain. When any and every part in a vehicle is a potential target for lightweighting, increased collaboration between material suppliers and part designers can reveal new opportunities to reduce weight and complexity.

The automotive industry is seeing more collaboration in the supply chain, moving beyond simply taking a metal part and making it in plastic instead, and working to optimize performance and streamline assembly for multiple components.

Where parts and processes can be consolidated by using plastics – for example by eliminating a beauty cover by improving the finish of the underlying part, or developing a high-heat resin that can withstand a paint oven – the weight savings compound. And fewer materials going into a vehicle means less waste from the manufacturing process. Reducing weight in one part of the vehicle often enables other parts of the vehicle to be downsized, racking up further weight savings.

As the automotive supply chain continues to develop new materials and technologies and advance them for cost-effective widespread use, plastics remain a key utility for lightweighting.

Ford in December announced its new GT would swap traditional windshield glass for Gorilla Glass, the stuff in billions of smartphone screens worldwide, layered with a thermoplastic adhesive. Again, Ford stated its intent to develop the technology for more widespread use.

It’s a big move for a part and process that has remained largely unchanged for decades, signaling the industry’s interest in leaving no stone unturned in the push for lighter, more fuel-efficient vehicles.

With the support of IACMI, suppliers and the automotive industry, plastics are gearing up for the next frontier of automotive lightweighting.

Ford will use Gorilla Glass in its new GT. Photo courtesy of Ford Motor Co.
REGIONAL MARKET TRENDS
Overview: China

China’s auto sector struggles with overcapacity

China, the world’s largest automotive market and producer, has witnessed a grim year in 2015. A sluggish economy, stock market turbulence as well as overcapacity put tremendous pressure on global automakers and local brands alike.

China’s auto capacity increased by 2.6 million vehicles this year to reach 38 million vehicles in total, according to industry leaders at a recent forum in Nanjing. Actual sales are expected to come in at 25 million vehicles, leaving a striking overcapacity of 13 million vehicles.

In the first 11 months of the year, China produced 21.82 million vehicles, 1.8 percent higher than the previous year. Sales grew 3.34 percent year-on-year to 21.79 million vehicles, according to the latest data from China’s Ministry of Industry and Information Technology. Even these small gains couldn’t have happened without government stimulus in the form of a sales tax cut on small-engine cars that helped the market rebound towards the end of the year.

In the meantime, exports of Chinese-made cars have been on a sharp decline. Despite continuous growth in previous years, exports of assembled cars slipped 15.7 percent by volume in the first 10 months to 647,300 vehicles, and sales dropped 4.3 percent to $10.5 billion.

Companies that export cars to China have taken an equally heavy, if not worse, hit in the same timeframe, as China’s import of assembled cars tanked 23.6 percent by volume from Jan. to Oct. to 907,400 vehicles, and sales fell 25.8 percent to $37.6 billion.

Shifting trends

Passenger cars have outperformed the overall automotive market in China, reporting a 4.2 percent growth in units and a 6 percent growth in sales in the first 11 months. A total of 18.74 million passenger cars were manufactured and 18.68 million were sold. It’s worth noting the significant variances amongst the subcategories under passenger cars. When measured by volume, sedans and crossovers respectively posted a 6.3 percent drop and a 19 percent decline. In an opposite direction, SUV sales boomed with a 51.1 percent hike to 5.4 million vehicles, and MPV (multi-purpose vehicle) also gained a solid 8.8 percent.

Thanks to a host of factors including government incentives, passenger cars with engines 1.6 liters or less exceeded the overall passenger car growth rate by 2.25 percentage points. In fact, 1.6-liter-or-less cars represented 68.2 percent of total passenger car sales in the first 11 months and reported a 1.4 percent market share increase.

Another impactful trend observed in the 2015 Chinese automotive market is the surge of domestic OEMs against foreign transplants. While global brands – such as GM, Ford, Chrysler, VW, Toyota, Honda, etc. — still dominate the Chinese market via their joint ventures, domestic OEMs gained 3 percentage points of market share in the first 11 months, now representing 41.1 percent of the passenger car market.

Particularly in the SUV category, domestic brands made a home run, selling a total of 2.9 million SUVs, an 82.8 percent hike from a year ago. More importantly, domestic brands now claim dominance of the SUV market in China with a 55.2 percent market share.

Beside SUVs, another bright spot in the Chinese automotive market is new energy vehicles (NEVs) – plug-in electric vehicles and plug-in hybrids, as defined by China’s government incentives. This category continued to generate stellar growth – 223 percent to be exact – in 2015.
In the month of November alone, China produced 72,300 NEVs, which is 600 percent higher than the year-ago period. Specifically, plug-in electric passenger vehicles soared 700 percent, electric commercial vehicles increased by 1800 percent, plug-in hybrid passenger cars rose 200 percent, and plug-in hybrid commercial vehicles grew 97 percent. In the first 11 months, China manufactured a total of 279,200 NEVs, 400 percent higher than a year ago.

When it comes to financial performance, the tough market condition has taken its toll on automakers as well as suppliers. Before the government tax incentive fueled a rebound in November, the China Automotive Industry Association reported a Jan.-Oct. sales decline of 2.5 percent for the top 17 automakers in the country.

2016 Outlook
Cui Dongshu, secretary-general of China’s Passenger Car Association, projects a better market in 2016 than this year. He believes the market will turn around with parabolic growth. “The low benchmarks set by 2015 created good opportunities for 2016,” he said at a recent industry conference, “Passenger cars are expected to grow 10 percent, higher than the 2015 rate.”

He pointed out that the low-price segment (less than 50,000 yuan or $7,720) of the automotive market is fading out and that automakers should focus on the segment of 200,000 yuan ($30,878) and above for sustained growth. Consumers in this segment are looking for cars of high quality, attractive appearance, excellent interior, high fuel efficiency and features that cater to the younger crowd.

From a more systematic view, John Humphrey, senior vice present of global automotive practice for J.D. Power, cautioned that the Chinese auto industry can’t sustain its current structure. In a recent report on China’s Five-Year Plan for the auto industry, he noted China has way too many brands – as many as 90 – and way too much capacity, causing deflationary pricing in many segments.

That’s creating a lot of pressure on foreign automakers that have come to depend on China as a major source of revenue and profitability. They face aggressive competition from domestic brands, which enjoy government subsidies and benefit from government-mandated partnerships with foreign automakers.

Interior upgrade
China’s automotive interior trim market reached 80 billion yuan ($12.4 billion) in 2014 and is poised for further expansion. But Xiong Fei, who heads the R&D department for Zhejiang Geely Holding Group Co. Ltd., revealed some industry realities at a recent industry event. Geely is a leading Chinese automaker, which has owned Volvo Cars since 2010 and British taxi maker The London Taxi Co. since 2012.

According to Xiong, Chinese automakers are still making baby steps in automotive R&D, characterized by reverse engineering, imitation, lack of innovation, especially when it comes to interior trim. They tend to use more traditional materials and are not paying enough attention to eco-friendliness, he said. Overall, Chinese cars and components are 10-30 kg heavier compared to cars made by global leading OEMs.

In order to fight for market share against foreign joint ventures, Chinese brands often resort to offering additional features in their cars while maintaining price competitiveness, a major challenge for their procurement teams.

Xiong emphasized the importance of interior lightweighting, which not only can help improve fuel economy and reduce emissions but also create a safer and more comfortable driving experience for consumers.

Lightweighting in action
China has become the world’s largest emitter of greenhouse gases. Severe air pollutions are plaguing most major cities in the country and creating public health concerns. China’s transportation CO2 emissions doubled from 2000 to 2010, and are projected to grow by another 50 percent by 2020. Vehicle emissions are claimed to be
responsible for about 31 percent of city PM2.5 in Beijing and over 40 percent of city-center air pollution.

In response, the Chinese government has been tightening up fuel economy standards, ordering the auto industry to quickly and effectively boost fuel efficiency and reduce emissions. By 2015, the average fuel consumption of passenger cars is expected to go down to 6.9 liters per hundred kilometers. That number needs to be further slashed to 5 liters per hundred kilometers by 2020. Failure to comply with the standards can result in hefty fines.

China’s automakers are taking lightweighting seriously as they scramble to meet the fuel economy standards.

Specifically, Geely’s Xiong noted three major trends in lightweighting efforts.

Thickness reduction has become a common practice for reducing vehicle weight, and it requires material innovations to ensure safety and cost effectiveness. For instance, Xiong said, reducing the thickness of plastic bumpers from 3 mm to 2.5 mm (enabled by increasing flexural modulus from 1,300 MPa to 2,000 MPa) can lead to a 15 percent weight reduction.

According to Nanjing-based Changan Mazda Automobile – one of Mazda’s two Chinese joint ventures – the company has pushed the envelope and commercialized the thinnest plastic bumper to date in China.

Changan Mazda’s R&D Director Jin Guoqing used bumpers as an example of the company’s weight reduction initiatives. He said the company optimized plastic molds and processing techniques, which helped reduce the plastic bumper thickness from 2.6 mm to 2 mm. In addition to weight reduction, it also yielded a cost saving of 6 yuan (about a dollar) per bumper.

Streamlining and integrating components into modules has been gaining popularity in China and will embrace rapid growth in the next 10 years, according to Xiong.

Modular design/production reduces production time and labor, lowers weight and cost, improves quality, and optimizes supply chain management. A front end module, for instance, can cut out 3 kg of weight, and a rear door module can contribute 6 kg of weight reduction.

Innovative materials also play an integral part in automotive lightweighting.

Polypropylene is the most widely used interior and exterior plastic in China, thanks to its availability and affordability, Xiong said. Low density PP and microfoam PP can be 8-15 percent lighter than traditional interior panels. Natural-fiber-filled PP can be 10 percent lighter than traditional mineral-filled PP. Trunk divider panels made of paper honeycomb can be 30 percent lighter than traditional wood plastic panels with a bonus benefit of zero VOC.

State-owned SAIC Motor Corp. of Shanghai recently spoke about its lightweighting journey of its new M5 SUV, which took three years to develop and will be produced in Shanghai, Thailand, and the U.K. The company expects the Thai and British models to launch in May or June 2016.

Wang Kanlei, a chief engineer with SAIC, said the M5 started with 490 kg of body-in-white, including door covers. The company spent three months tweaking designs and managed to trim the weight down to 467 kg. The second step involved a significant amount of simulation, topology optimization as well as the use of composite materials, realizing another 29 kg of weight reduction.

The company said it identified critical parts and increased their weight when necessary but in the meantime cut down the weight of non-critical parts substantially. Under the guideline of “[reducing] one gram a day”, the company said, small improvements added up in scale. The final car body adapted thermoforming materials (7.4 percent) as well as non-metal materials (1 percent).
Changan Mazda’s Jin emphasized that lightweighting must be prioritized in the early stages of product development, otherwise it can become costly in later stages. It also requires optimized communication between mold production, processing, and procurement as well as close partnerships between suppliers and automakers.

Admittedly, cost remains a major roadblock for many Chinese automaker’s lightweighting initiatives. Naveco Ltd., a joint venture between SAIC subsidiary Nanjing Automobile Corp. and Iveco S.p.A. that makes light commercial vehicles, said it has experimented with various composite materials. “Composite materials can reduce weight by 40-50 percent,” said engineering manager Li Yanru, “But the cost would go up by 50 percent, which is simply unrealistic, especially for trucks.” She called for joint R&D with component and materials suppliers for more economically feasible solutions.

Commercial vehicles are in pressing need of lightweighting. Statistics show that commercial vehicles represented 24 percent of total vehicles in China as of the end of 2014, but they consumed 70 percent of the total fuel consumption.

**Material innovations**

Global and domestic plastics material suppliers have been working closely with automakers and Tier 1 suppliers in China to develop new products and concepts.

In 2015, China’s first all-plastic backrest frame and seat pan made a debut at the Chinaplas show. The lightweight concept seat was jointly developed by BASF, SAIC, and Shanghai Yanfeng Johnson Controls Seating Co. Ltd. for SAIC’s IGS concept car.

Using BASF’s Ultracom continuous fiber reinforced thermoplastic composite to replace metal, the seat is up to 20 percent lighter and provides more knee space for second row passengers. The Ultracom system also includes Ultramid polyamide overmolding compound that enables scratch-resistant surfaces. The injection molding of the all-plastic backrest frame enables freedom in seat design and ergonomic comfort, BASF said, providing more possibilities for personalized seats and interior.

Indeed, high-performance fiber-reinforced thermoplastic composites is one of the fastest growing areas in China’s automotive industry. Carbon fiber, for instance, is expected to grow more than 20 percent per annum during 2015-2017.

Interior and exterior trim supplier Ningbo Huaxiang has been exploring the use of lightweight materials to replace wood for interior trim, such as carbon fiber made from bamboo, a locally abundant plant. In addition, seeking a bigger global presence, the company has made a series of successful overseas acquisitions, including Germany’s HIB Trim Part Solutions Group, which supplies carbon fiber interior trim to BMW, Daimler and Volkswagen.
Overview: Mexico

Mexico’s auto industry seen as growth market for processors

M exico is on course to produce 5 million light vehicles a year by 2020, 20 percent more than previously predicted, the head of the country’s automotive industry association said on June 3, 2015.

Injection molders are among those likely to benefit from the increase, Eduardo Solís, president of the Asociación Mexicana de la Industria Automotriz AC (AMIA), told Plastics News.

Solís based the estimate on new investments being made by light vehicle OEMs in Mexico.

“That’s a hard forecast,” he said, adding it was the first time he had mentioned the 5 million milestone in public.

Light vehicle production will top 3.4 million in 2015 and 4 million in 2017, Solís said.

He told Plastics News that injection molding is one of the activities the automotive sector is eager to develop, along with machinery, stamping, casting and forging.

According to AMIA, citing statistics from Mexico’s economy ministry, between 1999 and 2014, foreign direct investment in the auto manufacturing sector, including vehicle OEMs and suppliers, totaled $37.6 billion.

Leo Torres, Ford Motor Co. de México’s purchasing director, said that “big investments will keep coming into Mexico.”

But he added that the government “should align policies to maintain and generate more investments. Academia should align its vision to improve our technical conditions.” Infrastructure needed to be improved and utility consumption costs reviewed, Torres explained.

According to Daron Gifford, management consulting partner at Plante Moran, there are several key trends that are impacting the automotive supply chain, including the growth of the Mexican auto market.

“We’re seeing the OEMs expanding and establishing new plants in Mexico for vehicle production, which has the Tier 1 suppliers evaluating how much it will cost to serve these OEMs, and how do they expand effectively?” he said.

There’s a skills shortage in Mexico as well.

“There’s only so much expertise to go around, so we’re seeing a lot more plant automation,” Gifford said. “The suppliers already in Mexico are challenged, as they’re not always located where their OEM customers are putting in new plants.”

Gifford noted that suppliers are trying to figure out whether to import parts from the U.S., ship from other plants in Mexico, or site a plant near the assembly plant. To do that, they need enough assurance they’ll get a return on their investment.”

Growth brings opportunity

Having identified Mexico as a key growth market, specialty materials developer Celanese Corp. opened its first technology and business center in the country in September, 2015.

Located in Querétaro, 135 miles northwest of Mexico City, the facility offers training in plastics and polymer technology, plastics design, molding and color to clients in Latin America.
**Mexico: Key to global manufacturers**

Mexico is the second largest economy in Latin America and a critical location for Celanese and other global manufacturers. In addition:

- Mexico has 10 free-trade agreements covering 45 countries in all regions of the world, making it a destination for global manufacturers and their suppliers.
- Many automotive OEMs have numerous plants in Mexico and plans for continued investments over the next few years, with similar investments in medical, electronics and appliances.
- Recent structural reforms to energy policy are stimulating new exploration, extraction and processing opportunities, offering potential to lower energy costs.

According to Travis Jacobsen, training courses offered at the company's training center include:

- Fundamentals of plastics
- Designing with plastics
- Fundamentals of injection molding
- Specialized/advanced training

Training resources for customers include:

- Resident field technical experts for troubleshooting with customers
- Access to trainers from the global Celanese network
- Options for computer-aided engineering, laboratory and presses

It is modeled on the technology centers the company runs in Seoul and Shanghai, which support manufacturers in Asia. Irving, Texas-based Celanese has similar facilities in Frankfurt and Auburn Hills, Mich.

Amit Gupta, Celanese's commercial director of engineered materials for the automotive industry, described the facility to *Plastics News* as a "customer experience center." He added that sectors such as aerospace, medical devices, electronics and white goods, will also benefit. "This is another step towards getting closer to the customers," he said.

Celanese has been operating in Mexico with a sales office in Mexico City since 1944, an acetate production site in Ocotlán since 1945 and a chemicals production site in Cangrejera since 1982.

Global marketing communications manager Travis Jacobsen shared with *Plastics News* some of the reasoning behind Celanese's decision to build the 4,000-square-foot structure in Querétaro.

"Celanese plans to build a strong presence and pipeline in Mexico to achieve the following key objectives," said Jacobsen:

- Grow our customer base and intimacy with regional partners
- Expand our capabilities to help customers develop solutions with our technical engineers and supported by our sales managers
- Tailor commercial support to meet growing needs of our diversifying customer base
- Identify opportunities with our customers to introduce and trial Celanese's complete polymer portfolio
- Share and translate success stories from outside Mexico and Latin America
- Maintain a strategic and logistic hub for Latin America, Europe, and Asia
- Collaborate with local distribution partners

How much Celanese invested in the center, which stands on 5,400 square feet of land and employs 10, including R&D technologists, for the moment, has not been revealed.

"We chose to put the center here (in Querétaro) because you are getting more and more local decision-making from within Mexico," Todd Elliott, Celanese's vice president and general manager for global sales, said in a separate interview.

Mexico, he said, will be the world's fifth largest car maker by the year 2020. While the company's other technology centers are equipped with varying amounts of processing machinery, for the time being at least Querétaro will not have any, Elliott told *Plastics News*.

Through November, Mexico assembled 3,176,135 light vehicles, 164,847 (or 5.5 percent) more than in the same 11-month period of 2014, according to national automotive industry association AMIA (Asociación Mexicana de la Industria Automotriz AC).

Of the total, an unprecedented 2,552,245 were exported, an increase of 4.3 percent on the 2,447,796 exported through November, 2014.

Seventy-two percent were shipped to the United States, 5.9 percent more than a year earlier, 10.7 percent went to Canada (8.7 percent up) and 3.5 percent were exported to Germany (8.5 percent up).

By contrast shipments to Brazil totaled 57,303, down 41.3 percent on the January-November period of 2014.
Canada’s automotive industry boasts manufacturing activities, a well-developed vehicle dealer network, plus an aftermarket organization which has grown into a world-class distribution system and service provider.

A globally competitive sector, the Canadian automotive industry is integrated into NAFTA. It is the world’s 10th largest economy.

A major contributor to the Canadian economy, the auto industry employs more than 500,000 people.

But some of the luster is gone from the Canadian auto industry. It was once the world’s fourth largest auto-producing nation. The country has seen its auto sector shrink in the last decade because of high labor costs, a strong Canadian dollar and the government’s reluctance to offer financial incentives to manufacturers or suppliers.

Canada’s struggles contrast with the Southern U.S. and Mexico, where nearly two dozen auto plants have sprung up in the last two decades. Audi, Hyundai, BMW and Toyota are on track to open new Mexico plants in the next few years.

Although the total volume of vehicles built in Canada increased slightly to 2.382 million last year, the country continues to lose market share to the U.S. and particularly Mexico.

In order to attract more investment and production for its struggling auto sector, Canada in 2015 tapped retired industry executive Ray Tanguay to head a new automotive investment committee intended to advise the Canadian and Ontario governments on auto policy.

The goal of the committee is to attract more investment and production for its struggling auto sector.

In 2016, the retired Toyota executive-turned-auto czar is approaching manufacturers with a provocative message: Making cars and parts up north is much more competitive than you think.

“There’s perception, and there’s reality,” Tanguay, 66, told Automotive News, a sister publication of Plastics News. “And the reality is that when you take a holistic approach and look at all the costs, all the indirect costs, we are not that far off from plants in the Southern United States and Mexico.”

Tanguay, who retired in 2015 after 24 years with Toyota, readily acknowledged that hourly labor rates in Canada are significantly higher than in Mexico and in the Southern U.S. states -- including Tennessee, South Carolina and Alabama -- that have been drawing new auto plants over the past several years.

But he argued that if manufacturers focus on total costs, they’ll see a much tighter race. In Canada, he says, health care is less expensive for employers and equals about a $3-an-hour advantage over U.S. costs. Energy is half as expensive as in Mexico, and corporate taxes are lower than in both the U.S. and Mexico.

“You can’t just look at a micro-detail like the hourly rate,” he said.

Canada’s proximity to major U.S. population centers cuts transportation costs, and in-transit security isn’t an issue, Tanguay noted. In Mexico, trains hauling cars have to be guarded, covered or both to prevent them from being stripped of components in transit.

Significant savings also come from the high quality of Canadian production, which cuts
recall and repair costs and helps boost a manufacturer’s pricing power, Tanguay said. The most recent J.D. Power Initial Quality Study recognized 29 Canada-made vehicles among top performers -- and three that are made in Mexico, he said.

“If a car has longer dependability, that has value,” Tanguay said.

Ron Harbour, a partner at consulting firm Oliver Wyman and publisher of the Harbour Report, a scorecard of auto manufacturing efficiency, said Tanguay raises some valid points. “There’s no doubt Canadian plants have done really well in quality surveys,” he said, adding that “true productivity comes from quality improvements.”

Still, Harbour thinks it will be tough to persuade manufacturers to build new assembly plants in Canada.

It’s a similar outlook for suppliers, said Bob Young, vice president of purchasing for Toyota’s North America manufacturing operations.

Suppliers that already have production north of the border are very competitive in supplying Canadian auto plants, Young said. “But it’s not economical for them to set up [new plants] in Canada today,” he said.

Tanguay said he’s aware of the size of his challenge. He’s hopeful the new Labour Party government in Canada will be more generous and quicker than the previous government to offer financial incentives and tax breaks to attract and keep manufacturers in the country.

In October, Canadians ended 10 years of Conservative rule under Prime Minister Stephen Harper, electing the Liberal Party’s Justin Trudeau.

Trudeau and the Liberals campaigned by pledging a greater willingness to spend money to stimulate the economy and create or preserve jobs -- a key issue for automakers and parts suppliers hoping Canada will offer more financial incentives to bring production to the country and improve its competitiveness.

“Tanguay is working on a highly detailed, longer-term strategy for Canada that he expects to present in the spring. “You have to understand the current conditions,” he said, “what is the competition and what are the pros and cons of other locations.”

Trade issues

North of the border, suppliers are split over the Trans-Pacific Partnership, the trade deal that Canada signed and will soon have to ratify.
Trudeau also has left unclear his position on the Trans-Pacific Partnership, a 12-nation, free-trade agreement that would likely open up Canadian automakers and suppliers to more competition from lower-wage nations.

According to the deal, Canada agreed to phase out its 6.1 percent tariff on imports of Japanese vehicles over a five-year period, much shorter than the 25 years that the U.S. was able to negotiate.

That’s bad news for the Canadian retail arms of Ford, Chrysler and GM, who will face tough competition from some Japanese cars and trucks years before their American counterparts, says Flavio Volpe, president of the Automotive Parts Manufacturers Association. “On the sales side, they’re looking at more robust competition from Toyota and Mitsubishi in five years, while in the U.S., it’s 25 years,” he said.

The TPP was agreed to in principle in October 2015 and it mandates that tariffs on autos and auto parts be reduced to zero in all 12 member countries, the pace at which the tariffs are removed was negotiated separately.

The TPP will restore a level playing field among vehicle manufacturers that was lost as other free-trade deals extended benefits to countries such as Mexico and South Korea. However, the Japanese were able to put pressure on Canadian negotiators for a quick phase-out of the tariff in part because of the Canada-Korea trade deal that quickly dropped tariffs on Korean cars, according to Volpe.

The deal could prove to be a problem for some auto parts suppliers.

Terms of the deal
While complete terms of the agreement have not been made public, it is known that the amount of content made in a TPP country needed for a vehicle to be imported tariff-free has been lowered to 45 percent.

As a result, automakers can put parts made in low-cost regions that are not part of the TPP, such as Thailand and China, into a vehicle and still import it tariff-free to Canada. As a result of the deal, the auto industry has been pushing Canadian prime-minister designate Justin Trudeau for help to attract more investment and offset the impact of the TPP.

In recent years, Canada has a checkered track record in attracting new auto investment compared with Mexico and the southern United States, where governments dole out hundreds of millions of dollars to finance new assembly plants.

Mark Nantais, president of the Canadian Vehicle Manufacturers’ Association, which represents Canadian units of the “Big Three” U.S. auto makers, said the need for assistance goes beyond the TPP.

“Canada has not gotten its fair share of new auto investment and that’s because these other jurisdictions are pursuing auto investment very, very aggressively,” he said.

In easing the domestic-content rules for vehicles and car parts, the TPP overrides rules in NAFTA that have protected Canadian auto jobs for decades.

Under NAFTA, the content rule was 62.5 percent. The threshold would now be 45 percent for cars and certain higher-value components, allowing more foreign parts to be used by auto makers in Canada, the United States and Mexico.

David Worts, executive director of the Japan Automobile Manufacturers Association of Canada, said the auto parts industry in Canada does well when vehicle plants in Canada are doing well. Worts cited Honda’s announced investment in Alliston and Toyota’s commitment for the next-generation Lexus RX and the second RAV-4 plant in Cambridge, Ontario.

What’s more, innovative, reliable and competitive Canadian suppliers will continue to benefit. These supplier relationships in Canada have been forged over almost 30 years, and will not change just because the TPP rules differ from NAFTA, Worts noted.

Investment program drives innovation
In 2015, Canadian lawmakers approved a budget that included a $100 million investment to support product development and technology demonstration by Canadian automotive parts suppliers over the next five years.

Vehicle manufacturers are demanding a supply of innovative products to meet new fuel efficiency, emission and safety standards and address the growing consumer interest in connected and automated vehicle technologies.

Suppliers that can demonstrate an ability to meet these demands will not only succeed in winning business from domestic manufacturers, but will be well positioned to market their solutions globally.

Economic Action Plan 2015 proposes to provide $100 million over five years, starting in 2015–2016, for the creation of the Automotive Supplier Innovation Program, to help Canadian automotive suppliers gain a competitive edge through new innovative products and processes.

The program will help research and development projects to become commercially viable by supporting product development and technology demonstration on a cost-shared basis with participating firms.

The Automotive Supplier Innovation Program will complement existing initiatives supporting the automotive sector, such as the Automotive Innovation Fund, by strengthening Canada’s parts supply base and creating a favorable environment for automotive research and development, while providing firms with new opportunities to enter global supply chains.
The crisis in Brazil’s auto industry continued to deepen as 2015 came to a close, with production tumbling further as carmakers idled assembly lines and slashed payrolls, pushing the outlook for recovery to late 2016.

Brazil’s automotive industry has been in retreat since the government ended tax incentives.

The poor economic situation in Brazil, which is in a recession and is dealing with high inflation and rising unemployment, has put a damper on consumer spending.

The auto industry has been one of the sectors most affected by the economic downturn in Brazil, whose economy, according to government figures, contracted 4.5 percent in the third quarter of 2015 compared with the same period in 2014.

The impact on the auto industry in the country also is having an adverse effect on plastics processors serving the end market in that region.

Automobile output in Brazil fell 14.2 percent in November from October and 33.5 percent from a year earlier, national automakers’ association Anfavea said in December.

The auto industry, which contributes about a quarter of Brazil’s industrial production, has suffered the brunt of the country’s deepest downturn in 25 years due to tight credit, rising unemployment and crumbling consumer confidence.

Brazil is one of the five top automotive markets in the world and a major revenue source to global automakers.

Brazilian President Dilma Rousseff in September 2015 made an exception to austerity measures in order to extend easier credit to automakers.

Officials in the Brazilian auto industry were forecasting an 18 percent fall in vehicle production for 2015. Jobs for many in the auto-parts industry, which employs 200,000, may be threatened.

Brazilian automakers have laid off nearly one in 10 workers over the last year. Anfavea President Luiz Moan said the drop in output reflected the closure of more than 30 factory shifts, as inventory levels lingered near record highs.

Anfavea expects sales to fall again next year, with a “more sustainable” recovery coming in the final quarter of 2016, Moan said, underscoring the slim odds of a swift economic rebound.

Sales will still be high enough to ensure that automobile penetration will continue expanding in Brazil. However, the rate will slow down.

With loans difficult and costly to obtain on top of dismal consumer confidence, shoppers for new vehicles were scarce in Brazil in 2015.

“It’s still a very difficult moment for the market,” Moan said. “There is no short-term recovery in sight due to Brazil’s recession.”

The auto crisis in Brazil was having a ripple effect on the auto industry in neighboring Argentina.

Fiat Argentina’s plant was forced to halt production in mid-December due to a shortage of Brazilian parts.
Company president Cristiano Ratazzi said shipments have been held at the border for days while waiting for export permits, whose issuance stopped since the change of government.

Other plants could also be forced to stop production. “We’re using the parts we still have, but we don’t know for how long lines will continue operating,” a Toyota executive said.

Brazil is a major base of operations for Fiat Chrysler Automobiles NV, Volkswagen AG, General Motors Co and Ford Motor Co.

According to Anfavea data, Fiat remained Brazil’s top seller of cars and light trucks in November, with about 36,400 new vehicles. GM extended its lead over VW, with about 30,700 units sold, ahead of its German rival’s roughly 24,900 new registrations.

Ford sold around 19,200 vehicles, up 18 percent from the previous month, according to Anfavea. Exports remain the only bright spot for Brazil’s auto sector, with foreign sales of 369,459 vehicles during the first 11 months of 2015, a gain of 18.9 percent over the same period last year.

The increase in auto exports was partly attributable to the Brazilian real’s sharp decline against the dollar.

Economic outlook
Economists reduced their outlook on Brazil’s economic performance for 2015 and 2016 as the recession in Latin America’s largest economy showed no signs of recovery.

Brazil’s gross domestic product was expected to shrink 3.62 percent in 2015, according to a weekly central-bank survey of 100 economists.

Analysts see continued contraction of 2.67 percent in 2016.

As a result of the economic turmoil, the biggest names in Brazilian retail, construction, steel, autos and oil are slashing capital spending budgets as they abandon hopes of a swift recovery in Latin America’s largest economy and in global commodity markets.

Light at end of tunnel
There is light at the end of the tunnel however. A revolution in vehicle technology is on the horizon in Brazil as automakers vie to regain their competitive footing.

Materials suppliers to Brazil’s plastics industry are hoping that a focus on market development in more innovative high-performance products and technologies can combat falling demand among commodity grades of materials in a year of economic recession.

But industry leaders told Plastics News during the Feiplastic 2015 fair, held May 4-8 in São Paulo, that they expect the Brazilian economy to recover in about two years. Until then, they will develop new demand for specific markets and position themselves to capitalize on an industry that must become more innovative.

As the OEMs are facing additional pressures, suppliers are charged with operational excellence, contributing to efficiency wins, managing logistical costs and ultimately leveraging their potential to influence the solutions in the industry.

Luis Carlos Sohler, head of the polycarbonates business unit for Bayer in Brazil, said further use of LEDs in lighting will drive growth for the company in the region.

Gisele Santos, Industry Team Automotive manager for BASF in South America said that despite the challenging environment, there are indicators that the automotive market will rebound and Brazil will remain a key player. “This is an opportunity for Brazil to reinvent itself and BASF is going to play a role, offering solutions to meet the current and future needs of our customers.”

Santos said the downturn has given materials suppliers like BASF an opportunity to think more holistically about what else could be offered in an effort to help their customers and more effectively meet targets.

Trends impacting auto sector in Brazil
There are three key trends emerging for Brazil’s automotive market:

■ Low cost vehicles – in the midst of an economic decline, there will continue to be a higher demand for low cost vehicles.

■ Lightweight structures – automakers continue lightweighting vehicles and increasing the overall fuel efficiency with higher potential for fuel reduction through engine downsizing and lean burn technologies.

■ Production process improvements – modular product structures, small and more agile production cells and assembly line improvements will play a key role as they allow for rapid changeovers and customization.

Brazil’s plastics sector bets on innovation to beat slump
Brazil’s auto industry saw sales drop 7.1 percent in 2014 while production fell 15.3 percent, but the replacement of aluminum parts with plastic to make vehicles lighter is creating new demand for materials companies and processors.

Consumption of nylon and other plastics have increased significantly in comparison to Brazil’s new vehicle production in recent years, according to Marcos Curti, director for Engineering Plastics in Americas at Solvay’s Rhodia unit.

“Innovation is pushed by market challenges,” he said. “It is not the first time we’ve seen a crisis in Brazil, and this is surely not going to be the last one.”

Borealis expects Brazil’s Inovar Auto incentive will boost new technology for the country’s auto industry. File photo
MATERIALS TRENDS
The price of resins, the building blocks of plastics in automobiles, is closely tied to crude oil – which continues to fall to near-record lows.

This can mean lower resin prices for plastics processors.

Including plastics that are reinforced by glass or fiberglass, plastics account for about 360 pounds of the total weight in the average U.S. light vehicle, according to the American Plastics Council.

Plastic is used in such parts as instrument panels, interior trim and bumpers. About one-third of these parts are made of polypropylene. Carbon fiber also is gaining traction as a material of choice for body panels, hoods and trunk lids.

Material substitution replacing heavier iron and steel with weight-saving advanced composites and other plastics is essential for boosting vehicle fuel economy.

Material substitution is dependent on mechanical properties, cost, design and manufacturing capabilities. In addition to reduced fuel consumption, weight reduction enables smaller power plant and energy storage systems, with corresponding cost and/or performance benefits as well as secondary weight reductions in load bearing structures.

Plastic composites and other advanced plastics offer significant lightweighting potential. Fiber reinforced plastic (FRP) composites are typically 25-35 percent lighter than steel parts of equal strength. Low- and ultra-low-density sheet molding compounds (SMC) advances are also facilitating weight reductions.

As North American auto production rises to record levels, raw materials such as steel, aluminum and copper ought to be more expensive.

Instead, they’ve gotten cheaper — a lot cheaper. Automakers and suppliers are spending about $1,325 per vehicle for their raw materials — $669 less than the same period a year ago, according to a study released during the third quarter by AlixPartners.

Prices are soft because Chinese manufacturers have sharply scaled back their purchases, while economies in Europe and Japan remain shaky, said Mark Wakefield, director of AlixPartners’ automotive practice in the Americas.

But who gets to hang onto that windfall? Do automakers or their suppliers keep the extra cash?

“There is a lot of gamesmanship about who keeps what,” Wakefield said. “Nobody expected this big a price drop.”

AlixPartners calculated costs by tracking prices of 15 raw materials from August 2014 through October 2015. Every commodity had a big decline, from palladium, down 25 percent, to crude oil, which dropped 51 percent.

It’s not just manufacturing costs that have declined; shipping costs are down sharply, too. Diesel fuel prices fell 25 percent to $2.90 per gallon in that same period. As a result, component shipping costs have fallen $147 per vehicle, AlixPartners estimates.

Over the years, automakers and suppliers have developed two major strategies to cush-
The first approach is for automakers to buy commodities such as resin, steel or aluminum in bulk, then resell to their suppliers. This allows automakers to get bigger discounts on volume purchases.

The second strategy is to index the price of certain raw materials so that a component’s price can be adjusted every three to six months. This works for steel and aluminum — materials that can be bought or sold via public exchanges.

Indexing gained popularity when raw material costs were going up. Automakers and suppliers realized it was inefficient to renegotiate contracts every time raw material prices fluctuated. Indexing created an automatic mechanism to deal with that.

Problem solved, right? Well, not quite. AlixPartners estimates indexing covers just 70 percent of total commodity purchases, leaving the rest open to negotiation.

If it’s a specialized material, for example, there may be no public benchmark price. So the onus is on the automaker to call in the supplier and try to claw back earlier expenditures. And that’s what is happening in the current environment, says Wakefield.

Even if a material is indexed, the supplier benefits if the contract calls for price adjustments only every six months or so, rather than on a quarterly basis.

So, how long will the party last? Quite a while, if crude oil prices are any indication.

Brent crude oil, the international benchmark for oil prices, will average $57 a barrel in 2016, according to a poll of 11 banks published recently by The Wall Street Journal. That’s up from $44 a barrel in late November 2015 but down $100 in the summer of 2014.

The refiners’ acquisition cost per barrel of imported crude oil is expected to average $45.30 in 2016, $58.00 in 2017, and $67.00 in 2018.

“There are strong deflationary pressures that are spreading, such as lower global energy prices, China’s economic restructuring, and a forecast for slow price recovery in commodities,” said MAPI Foundation Chief Economist Daniel J. Meckstroth.

Likewise, steel prices seem certain to remain weak for a while. On Nov. 6, ArcelorMittal announced third-quarter losses of $700 million, and the world’s largest steelmaker blamed it on cheap steel exports from China and weak customer orders.

“China is the biggest consumer, and they are ratcheting down,” Wakefield said. “And among the raw material producers, nobody wants to be the guy that takes capacity out.”

Moreover, the dollar is stronger than ever, so raw materials can be imported at bargain rates.

Nevertheless, Wakefield is advising clients to update their indexing formulas to take the guesswork out of raw material prices. “Customers don’t necessarily have to lock in long-term contracts” for raw materials, Wakefield said. “But you do want to have a fair relationship with your suppliers.”

Resins are being used to produce a number of interior parts, such as this console for an Audi. File photo

“There are strong deflationary pressures that are spreading, such as lower global energy prices, China’s economic restructuring and a forecast for low price recovery in commodities.”

— Daniel Meckstroth, MAPI

MAPI: Manufacturing growth to accelerate through 2018

Manufacturing production has been flat during the fourth quarter of 2015, but the new year should start far stronger, according to the most recent U.S. Industrial Outlook quarterly report from the MAPI Foundation.

Growth in manufacturing, including the auto sector, will have a positive impact on materials suppliers.

The research affiliate of the Manufacturers Alliance for Productivity and Innovation forecasts 3.3 percent growth in the first half of 2016, following a 3.3 percent annual rate increase in the third quarter of 2015.

The MAPI three-year forecast calls for 2.6 percent growth in 2016, 3 percent in 2017, and 2.8 percent in 2018 — all down slightly from the third-quarter outlook.
Executive Spotlight

Larry Doyle, President, Conair Group

Peter Armbruster, National Sales Manager, Conair Group

Larry Doyle is president of Conair Group. He joined the company in June 2006 and assumed his current role in June 2012. He was previously vice president, global sales & marketing. Prior to coming to Conair, he spent seven years in progressively more responsible sales and marketing positions with Demag Plastics Group (now Sumitomo Demag), eventually becoming Director of Sales and Marketing. He also served as International Sales Coordinator for Autojectors, a company that became part of Milacron Inc. in 1998. Doyle serves as the chairman of the NPE 2018 Operations Committee. He holds a bachelor’s degree in Political Science and Philosophy from the University of North Carolina at Chapel Hill and is a graduate of the General Management Program (GMP 15) from Harvard Business School.

Peter Armbruster is national sales manager at Conair Group. He joined the company in late 2010 as regional manager and was promoted to national sales manager in April 2013. He is responsible for all sales regions and local independent sales agents in the U.S. and Canada. From 2008 until he joined Conair, Armbruster was a regional vice president of sales for Novatec. He started his plastics industry career in 1996 as a senior designer with the ACS Group and left ten years later as a group regional manager. From 2006 to 2008, he was a technical sales manager with an international supplier of aircraft seating. He studied Automated Manufacturing System Engineering Technology at Lake Superior University in Michigan.

Q: What are some of the current trends among plastics companies serving the automotive end market with regard to lightweighting?

Doyle: The most significant trend is that plastics continue to be the materials of choice when it comes to weight reduction in automotive. The methodology can vary – from gas injection to chemical foaming to thin-walling to filling and reinforcing to add strength – but what it boils down to is that plastics are lighter than most other materials used in automobiles and so they are being used in increasing volumes.

Armbruster: From our perspective, as an auxiliary equipment supplier, light-weighting has not dramatically changed the technologies we offer automotive processors. Those companies that use foaming additives will have more stringent requirements for blender accuracy, and so the advancements we have introduced, including feed-forward dispensing algorithms, come into play. Where abrasive fillers and reinforcements are used, our new R-PRO slow-speed vacuum conveying system can help to reduce equipment wear and minimize pellet fracturing caused by high-speed systems, without any compromise on throughput. In general, however, while lightweighting has an impact on the way materials are molded or extruded, it does not significantly affect the conditioning and handling of the materials.

Q: Then what would you say is the single biggest change that has taken place in the automotive industry in the last few years and how has it affected the companies that supply plastics components to automotive OEMs?

Doyle: I think the biggest change has come in the way automotive suppliers look at capital investment.

We’ve seen a lot of consolidation among automotive processors since the downturn in 2008 and 2009 and yet, as volumes have increased in the past couple of years, we see companies being very diligent and very deliberate in how they look at capacity expansion. They’re taking a much more serious approach to when and how they add capacity than they ever have before. Today, it is totally ROI-driven. They will not add capital equipment until they know the volume is there and that existing capacity will be unable to deliver it. Consequently we, as suppliers to those suppliers, have to develop a very convincing case for the promised return on their investment, and then we need to provide them with something that really makes a difference.
Armbruster: Quite often that ROI case involves helping them make better use of resources like energy, water and raw materials. Consider water, for example: in some areas of the country, there are serious water shortages that make conservation important and we need to show that our cooling systems are using as little water as possible. In northern climates, we see manufacturers willing to invest in systems that use the natural cooling Mother Nature provides during half the year instead of refrigeration that is driven by electricity. When it comes to raw materials, processors are putting greater emphasis on materials management, including proofing technology in their new material distribution systems. This comes from a desire to ‘make every pellet count,’ of course, but it also is driven by quality concerns. Errors can be extremely costly when they lead to wasted material and scrap parts, but if any bad parts get shipped to a customer, the repercussions can be even worse... like being required to implement 100% inspection or even incurring financial liabilities.

Q: What are some of the other challenges that plastics processors serving the auto OEMs will face in the near future?

Doyle: The question of falling oil prices has got to be causing uncertainty for the auto companies and their suppliers. We are now at a level we haven’t seen since early 2009 and not far from pricing levels that extend as far back as 1987. Consumers are interested in buying and driving cars again and there is renewed interest in larger vehicles that tend to be more costly to operate. This is all good for automotive, but what does the future hold? We all know how volatile oil prices can be. So I can imagine automotive molders are asking themselves ‘how do I manage this growth when I know it may only be short-term?’ Not only do they need to forecast the overall volume and what it will mean for their business, but what is the mix going to look like? If we see growth in the large-vehicle market – and there does seem to be a growing need for bigger exterior body panels – does that mean they need to think about adding more big-machine capacity? It certainly would be easier to decide to add two or three 500-ton presses than it would be to add one 2500-ton machine. And the support structure, including auxiliary equipment, for a large-tonnage machine is also more complex and application specific. Merge all this uncertainty with a need for financial caution or restraint, and you will definitely be confronted with some very tough decisions.

Q: So, what is your outlook for the auto market over the next three years? What about longer term?

Doyle: The growth so far has been very well-controlled. We have not seen a huge spike. We think that bodes well for the near-term future. Short of an economic catastrophe, we should continue with stable growth. Longer term, the automotive plastics industry needs to look at the same big-picture questions that the OEMs are discussing. Will millennials continue to buy cars the previous generations have? With trends toward urbanization and ride-sharing systems like Uber, the car industry of the future may look very different than it does today.

Armbruster: Ongoing concerns about fossil-fuel consumption and related climate issues will undoubtedly continue to impact the market. Even today, CAFE standards are influencing automobile design and driving the OEMs toward lighter-weight materials and plastics. People are already driving vehicles with higher MPG ratings and lower emissions. I think that is only going to intensify. On the one hand, that can lead to an increase in the use of plastics, but it could also lead to longer-term changes in lifestyle and consumer preferences that may reduce the overall number of cars made each year.

Q: How will all that impact equipment suppliers like Conair?

Doyle: I think we will continue to see moves toward greater connectivity on the plant floor. Today’s “smart factory” requires equipment that is smarter and more integrated. That’s driven by the need for higher quality, but it is also a key factor in the efficiency that automotive processors demand. Think of controls that can identify mechanical faults before they become problems and shut down production; or, web-enabled systems that allow production personnel to make better use of their time by not having to run around the plant every time there is an alarm. Equipment with data-gathering capabilities can automatically channel information to a central database so that managers can make more informed decisions. All of these technologies are available in one form or another...
today and we are certain they will only become more important to automotive processors in the coming years.

Armbruster: As we have been discussing, there is a trend toward precision and an emphasis on quality. Just look at automotive interiors. They are made almost entirely of plastics and consumers have become accustomed to a certain level of quality, if not luxury, even in economy and middle-market vehicles. That requires tighter tolerances and higher standards of fit and finish and it really challenges the skill of the processors and the makers of the equipment they use.

The Conair Group

Based in Cranberry Township, Pa., Conair is a leading producer of auxiliary equipment for plastics processing, producing and marketing more than 450 different products, including resin-drying systems, blenders, feeders and material-conveying systems, temperature-control equipment and granulators.

Extrusion solutions include gravimetric control systems, film and sheet scrap-reclaim systems and downstream equipment for pipe and profile extrusion. Conair is also a leader in plastics process integration, engineering and installing complete manufacturing systems that help plastics processors manage their raw materials, handle their manufactured parts and improve their process yield.

Conair had a busy 2014, taking the wraps off several new products during the year.

In December, the company announced it is using Microsoft SQL Server, the relational database management system used in general business applications, for its gravimetric blenders, including TrueBlend and TrueWeigh equipment.

Closed loop control, and the ability to connect auxiliary equipment to the molding press, extruder and other equipment, has resulted in auxiliaries playing a larger role in the work cell. For example, in continuous extrusion of blown and cast film and sheet, auxiliary equipment such as blenders and feeders can monitor and control the extruders.

In June, Conair Group took the wraps off its EarthSmart adiabatic cooling towers, which the company says reduces water and energy consumption, and prevents contamination of process fluid. The cooling tower maintains stable fluid temperatures even in hot water, according to the company.

The fluid circulates in a closed loop through tubing in the tower. Adiabatic, wetted panels are mounted in front of the cooling tower coil, through which process water flows. As ambient air passes through the panels, water evaporates, reducing the temperature of the flowing air so that it cools the process fluid.

In March, Conair expanded its web-enabled control software to make its TrueFeed feeders controllable with most networked devices, adding to its combination of Internet-controlled blenders, dryers and material-handling controls.

Existing FLX users can add gravimentric feeder control to their Web-enabled control suite at no additional cost in the third-generation software upgrade.

Conair offers auxiliary solutions across the entire spectrum of auxiliary equipment and plastics processes. The company was founded in 1956 by small-town entrepreneur John Reib. It was soon the dominant name in the auxiliary equipment market and remained that way when the company was bought by GWH Holdings Co. in 1986.

Conair has manufacturing facilities in Franklin Pa., and Pinconning, Mich., along with facilities in China, India, Taiwan, Singapore and Mexico.
Executive Spotlight

Probir Guha, VP of advanced R&D, Continental Structural Plastics

Probir Guha is vice president of advanced research and development at Continental Structural Plastics. He has 26 years of experience in the automotive and manufacturing industries. Prior to joining CSP, Guha was vice president of technology in the corporate technical center, vice president of research and development in the plastics division, and a chemical engineer at ThyssenKrupp Budd. Guha was also vice president of technology at Venture Industries, materials manager at Rockwell International, technical director at Interplastics Corp. and general manager of research and development at British Oxygen of India Limited. Guha earned a bachelor's degree in chemical engineering at the Indian Institute of Technology, a master's degree in polymer engineering at the University of Detroit Mercy and an MBA from Wayne State University. Guha holds 10 patents and has 37 patents pending.

Q: Earlier this year, CSP's Tough Class A Ultra Lite was used in a production vehicle after being approved by a major automaker. What advantages can this material provide an automaker in terms of lightweighting?

A: With the properties that it gets in terms of density and mechanical properties, we have found that it affords all of the regular advantages of sheet molded compound in terms of design, sheet flexibility, etc. Plus, as opposed to previous low-density materials, it has better properties with paint and mechanics. It is an extremely valuable and competitive material with aluminum for body panels. We are in the same range of weight savings as afforded by aluminum with a cost advantage.

Q: What are some of the current trends among plastics companies serving the automotive end market with regard to lightweighting?

A: The biggest trend that I am seeing right now is a move towards the use of carbon fiber. We are looking at carbon fiber and hybrid fiber and different processes. We ourselves have been looking at liquid injection and SMC processes. The focus is the same, which is to give cost-viable lightweighting solutions. This can include body panels and pickup boxes. The weight reduction is something the OEMs are demanding and will demand more and more. We also see how aluminum is being used and that means the industry is willing to pay a premium for weight reduction. Our first offering is the Ultra Lite. We are looking at other materials.

Q: From your perspective, how has the use of plastics in automobiles evolved in recent years?

A: Over the past several years, there were many thermoplastics that offered lightweighting but they didn't meet e-coat. The high-temperature e-coat process is best described as a cross between plating and painting. Some of our products, including Class A Ultra Lite, are offering cost-effective alternatives and they can handle the e-coat process.

Q: How involved are auto OEMs and plastics processors in the development of materials?

A: We do work with the OEMs as we develop these new materials. As we get a new material, we try to determine what we need to do to differentiate ourselves. Before we had Ultra Lite, we were told that if we did not have a lighter material than aluminum, we were not going to get the program. The OEMs put prospective materials through a slew of tests. Then, if it passes the tests, acceptance comes. The more involved they are in refining the process, the better it is for all participants.

Q: There are a number of innovations in materials. What new plastic materials are gaining traction for use in vehicles today, such as polycarbonate?

A: We are looking at polyesters and other materials. Our Ultra Lite technology is being used in body panels and boxes. Carbon fiber is also gaining attention. There also is a mixing and matching of materials to be as light as or lighter than aluminum with a cost advantage.
Q: What opportunities can lightweighting present for plastics companies serving the automotive end market?

A: Ford used aluminum to build an F-150 and they achieved a 700 pound weight reduction and this was in response to new standards. With the use of carbon fiber, we can achieve that sort of weight reduction and beyond.

Q: Where do you think the biggest opportunities are for weight savings in interiors?

A: We are focused on body panels and pickup boxes. The OEMs are looking at the pickup boxes as an area for weight savings that have been made of steel or aluminum. They had a polypropylene liner for dings and dents. Those are replaced by an SMC. When you apply other materials, we can be significantly lighter than aluminum and a liner. Several OEMs are looking at this.

Q: How can plastics processors serving the automotive OEMs get some of those weight savings opportunities into the market since some of them, such as cross-car beams, may seem like a radical shift for some customers?

A: The glass fiber or the carbon fiber provide much of the strength. The plastic provides the shape that is needed. We believe that the technology that is being developed for carbon fiber use in floor plans will offer great performance and weight savings. The OEMs are looking at composites for secondary structural parts. Thermosets and thermoplastics like nylon are providing alternatives.

Q: What are some of the challenges that plastics processors serving the automotive OEMs are facing in 2016?

A: Most of the challenges we’ve faced come from the use of other materials, such as aluminum. Our biggest challenge is the newness of composites and other materials. Composites have been used effectively in aerospace and that helps us. Our success with Ultra Lite helps us. It offers a comfort level for what composites can do for the OEMs. They have internal programs looking at weight savings through the use of composites.

Q: What new demands do you foresee coming from the automotive industry for the next two product cycles?

A: What we are seeing is in body panels, because of the shapes they are using, it is difficult to use metals. I would anticipate new applications as a result. Another thing is in the pickup box, with the use of carbon fiber, we are seeing an increased interest because of the weight savings and cost savings. In China, we are seeing a move toward electric vehicles and we are going to be seeing more of that here.

Q: What is your future outlook for the automotive market over the next three years?

A: We are going to see more and more applications that will go to composites. We are going to see more and more carbon fiber used in pickup boxes and in structural applications. We are going to see the newer composites offering a more viable alternative to aluminum.
Laurent Burelle, CEO of Plastic Omnium, is a high-energy executive who at 65 says he plans to retire “sometime in the next 50 years.” There is no time to slow down because Burelle wants to boost revenue 32 percent to 7 billion euros by 2018 at the French supplier of bumpers and fuel tanks founded by his family in 1946. Burelle sat down for an interview with Automotive News, a sister publication of Plastics News.

Q: How would you summarize Plastic Omnium today?

A: We are the world leader in gasoline fuel tanks, painted body panels and plastic structural parts. We are growing fast in selective catalytic reduction systems. We have new orders, new plants, new customers in new countries and new technologies. All that is fueling the growth we foresee for the 2016-2018 period.

Q: What are the goals for 2018?

A: We plan to reach 7 billion euros ($7.68 billion at current exchange rates) in revenue by 2018, up from 5.3 billion last year. I am optimistic because our market shares are increasing. In bumpers, we plan to expand from a 10 percent global share in 2014 to 15 percent in 2018. In fuel tanks, we were at 21 percent last year and plan to be at 24 percent by 2018. The [selective catalytic reduction] business supplied 200,000 systems last year, but we already have booked orders for 2.2 million units for 2018.

Q: Are megaplatforms changing the way Plastic Omnium does business?

A: The globalization of platforms is making the orders bigger and bigger. We are negotiating orders of more than 1 billion euros over the life cycle on a regular basis. This is quite new for us. It is a risk and an opportunity: a risk if we lose the contract or do not fulfill it properly; a nice opportunity if it is well-executed.

Q: Will the rise of megaplatforms result in supplier consolidation to create bigger players?

A: Yes. You need the financial strength and the global production footprint to supply in different regions. A recent order we got from a big German automaker includes five different countries to supply. Luckily, we already have plants in all those countries. Financial strength is needed to invest in development before you start supplying.

Q: Are the megacontracts making Plastic Omnium’s growth predictions more accurate?

A: Absolutely. We have already booked 90 percent of our planned revenue for 2017 and 75 percent for 2018.

Q: How is your company adapting to China’s vehicle sales slowdown?

A: We are still growing more than the market. Last year, the industry grew by about 7 percent, and we are up by 22 percent. Of the eight new plants we planned to open in 2015 and 2016, four will be in China.

Q: Plastic Omnium is working on a fiberglass reinforced plastic floorpan for PSA. Can you share some details?

A: It provides weight savings of about 8 kilograms (18 pounds). We expect to be in production for PSA by 2020. Then, if you move to more expensive carbon fiber, the savings for the floorpan could reach 15 kilograms (33 pounds).

Q: Is Plastic Omnium producing carbon-fiber parts?

A: We supply a carbon-fiber interior structural part to a luxury German flagship that reached the market in October.
PROCESSOR AND OEM PROFILES
Magna International Inc.

Based in Aurora, Ontario, Magna is the largest automotive supplier in North America, and the third-largest in the world according to a ranking from Plastics News’ sister newspaper Automotive News.

Magna controls one of the automotive supply industry’s most diverse product portfolios, including a variety of plastic parts and components.

The company is the largest injection molder in North America according to Plastics News’ 2015 ranking with $2.015 billion in molding sales.

Magna has 54 manufacturing and assembly facilities in the U.S., employing 21,250 workers, according to its website.

Globally, the company has 285 manufacturing operations and 83 product development, engineering and sales centers in 29 countries. It has more than 125,000 employees worldwide.

The company molds ABS, PP, PVC, nylon, hi-temp thermoplastics, thermoplastic polyester, PC, thermosets and acrylic.

In October 2015, Magna announced it would build a new exteriors manufacturing facility in South Carolina, a $50.8 million investment.

The company plans to move into the new facility in June 2016, according to a news release from the South Carolina Department of Commerce. The 165,000-square-foot facility in Greenville County, S.C., will produce exterior molded and painted assemblies for BMW AG.

BMW’s Spartanburg, S.C., factory manufactures several BMW X sports utility vehicle models that are exported globally.

In September 2015, Magna announced plans to set up a new injection molding section at the Magna Mirror Systems Monterrey plant. The company also will add 41 percent more floor space to increase the plant’s area to 135,000 square feet, introduce an automated paint line and add an assembly line. Construction has begun and should be done in August 2016.

In March 2015, the company began building a $135 million automotive exteriors manufacturing facility in Querétaro. In the first quarter of 2016, the 285,000-square-foot site will begin molding and painting fascias and rocker panels for global auto producers with assembly plants in Mexico.

The unit will start with seven 4,000-metric-ton injection molding presses and two 2,000 metric tonners, sourced from KraussMaffei Group.

As part of its business strategy, in November Magna entered into a 50/50 joint venture with Chongqing Hongli Zhixin Automotive Parts Manufacture Co. Ltd. to provide complete seating systems and seating components to Changan Ford and other customers in China.

The JV is expected to strengthen Magna’s position in China by providing additional regional knowledge of customer and market expectations, enhancing the competitiveness of its cost structure through vertical integration and facilitating faster response times.
IAC is the second-largest injection molder in North America, with 2014 injection molding sales of $1.96 billion in the region, according to the latest Plastics News’ 2015 ranking.

Built from the former global interiors divisions of Lear and Collins & Aikman, IAC has a broad base of experience with automotive interiors icons like Stankiewicz, United Technologies, Automotive Industries and Masland Industries.

The firm, which manufactures instrument panels, door panels and interior trim, generated global sales of $5.9 billion in 2014. The company employs 32,000 people worldwide and has factories in 19 countries.

IAC molds a wide range of materials, including ABS, HDPE, LDPE, LLDPE, PP, PS PVC, SAN/SMA, TPE, nylon, hi-temp thermoplastics, thermoplastic polyester, PC, thermosets, acetal, acrylic and post-consumer resin.

In July, IAC underwent a shuffle at the top of its organization when CEO Jim Kamsickas left the company to become CEO of Dana Holding Corp. while Steve Miller — a key player in the automotive supply chain for several years — took over as CEO of IAC.

Miller, the former Chrysler vice chairman who subsequently ran several automotive suppliers, joined IAC on July 20 and assumed the role of president and CEO on Aug. 7.

“Steve’s corporate roles often have drawn upon his turnaround experience, but that is not the case here,” IAC Chairman Wilbur Ross said. “Our interest is in his automotive experience and relationships.”

IAC expanded its Alabama operations in 2015 with a new 126,000-square-foot facility located adjacent to its existing Anniston manufacturing operation. The expansion brings IAC’s total production capacity in Anniston to 262,000 square feet.

As part of its business strategy, IAC in July 2015 continued its aggressive global expansion with the inauguration of its newest facility located in Hangzhou, China. This marked the company’s 11th facility opening in seven countries in the past two years, increasing its total number of worldwide locations to 102.

The new Hangzhou location initially is manufacturing door panel and center console assemblies for Changan Ford, along with door trim components for Shanghai General Motors and instrument panel and center console components for Chery Jaguar Land Rover.

Reinforcing the company’s vertical integration strategy, the new IAC operation provides a range of cut, sewn and wrapped interior components, utilizing highly crafted materials, such as leather, simulated leather and cloth solutions featuring an array of custom stitch patterns.

Hangzhou is IAC’s 14th new location in China since 2006, bringing the total number of Asian locations to 29, including the company’s new regional headquarters in Shanghai (June 2014). Prior to Hangzhou, the company most recently opened two manufacturing facilities in Changshu, China in October 2014.

At 78,577 square feet, the state-of-the-art Hangzhou plant is strategically located near regional logistics hubs and several OEM customer assembly plants.

In May 2015, the company also celebrated the opening of its new 90,000-square-foot Arteaga, Mexico, manufacturing operation to support the automotive industry’s continued growth in the country.
Johnson Controls Inc.’s automotive business supplies door and instrument panels, overhead systems and interior electronics.

Globally, the company employs 130,000 at more than 240 plants worldwide.

As part of its business strategy, in August 2015 JCI announced the spin-off of its automotive seating and interiors units, further distancing itself from injection molding.

The transaction is expected to close in September 2016.

The automotive interiors product line includes injection molded components like instrument panels, door panel substrates and trim, along with plastic skins and skin composites. Those parts are now manufactured by Yanfeng Automotive Interiors, JCI’s joint venture with Shanghai’s Yanfeng Automotive Trim Systems Co.

JCI’s other automotive supply business, Power Solutions, says it is the world’s largest supplier of auto batteries, with more than 150 million units sold each year.

Before the joint venture, JCI’s seating division was purchasing its plastic components from the interiors unit. Yanfeng Automotive Interiors now supplies those parts.

JCI’s seating unit and operations that fall under Yanfeng joint venture will form a new, independent company, headed by Bruce McDonald, currently vice chairman and executive vice president at Johnson Controls.

The Auto Experience business was nearly as large as Power Solutions and Building Efficiency combined in the 2013-14 fiscal year, but recorded the lowest profit levels, and the auto interiors business in general has thinner margins.

Before 2010, about 80 to 90 percent of Johnson Controls’ orders were for complete seat systems, according to one official. Now, about 80 to 90 percent of the company’s orders are for individual components, according to company officials.

This will not mark the first time JCI has built a major business platform, only to sell it off. In 1992, it had $445 million in blow molding for packaging in North America alone — tying it with Constar International Inc. as the biggest blow molder in North America in Plastics News’ first ranking of blow molders.

Amcor now owns those JCI rigid packaging holdings.

In 1998, it sold its Uniloy Plastics Machinery Division — a maker of blow molding and structural foam molding machines — to Cincinnati Milacron Inc. Those operations remain as part of the restructured Milacron LLC machinery giant, which became a public company in 2015.
Preh GmbH

Preh is a supplier of modules and complete systems for automobile electronics

Preh is the North American arm of Preh GmbH, a German-based supplier of injection molded electronic controls to automotive companies. It has 4,500 employees worldwide.

The company opened a U.S. sales office for the automotive business in 2003 and founded a new manufacturing plant in Monterrey, Mexico, in 2005.

As part of its business strategy, in June 2014 the company announced it was investing $12 million in a new R&D center at its headquarters in Bad Neustadt, Germany.

The extension was approximately 81,806 square feet, the company said.

The ongoing construction is part of Preh’s investment program, which began last year. Preparatory measures for the R&D center were under way, with a dispatch and customs office already operating. The groundbreaking for the new center took place during the second quarter of 2015 with completion of the project planned for the fall of 2016.

President and CEO Michael Roesnick was set to retire at the end of the year after 16 years at the helm. His successor, Christoph Hummel, has been a member of the car component supplier’s and automation specialist’s executive board since 2008. Roesnick will take up the post of chairman of the supervisory board in May 2016.

Hummel temporarily served as president and CEO of Preh in Novi, Mich., and was a key figure in developing Preh’s North American business.

Preh is a subsidiary of the Joyson Group in Ningbo, China. Preh reported sales of $667 million in 2014, employs around 4,200 people and has locations in Germany, Portugal, Romania, Mexico, the U.S. and China.

Faurecia North America

Faurecia North America is a division of France-based Faurecia SA.

The company had injection molding sales of $185 million in 2014, according to Plastics News data.

The company had total global sales of $25 billion in 2014. It molds ABS and PP.

Faurecia SA is the sixth-largest automotive supplier in North America, according to rankings from Plastics News’ sister publication Automotive News. Faurecia already operates plants for interior systems and emissions control technologies in nearby Louisville.

One of the largest automotive suppliers in North America and the world, France-headquartered Faurecia operates business units in automotive seating, interiors systems, emissions control technologies and automotive exteriors. Its interiors division supplies a variety of products including instrument panels, door consoles and decorative trim.

Faurecia SA has a growing bio-composites division that extends beyond injection molding parts for the auto industry, and to the material itself.

As part of the company’s business strategy, Faurecia North America President Mark Stidham said he sees value in staying the course as major competitors are stepping
away from the global automotive interiors supply chain.

“We see the interiors space ... as space that’s going to, in general, be important for motor vehicles going forward, even as we look at some of the disruptive industries and technologies that can change the way cars function and work, such as the connected cars and autonomous cars,” Stidham said. “We see the interiors space as being very, very valuable to the OEMs, so we want to hang on to it.”

Faurecia is working to demonstrate it has the capacity to meet the needs of the industry, Stidham said.

The company recently took over and revitalized a manufacturing facility in Saline, Mich., from Ford Motor Co. The company is also putting resources behind developing what Stidham calls the “next generation” of plastic materials, including natural fiber composites. Faurecia’s NafiLean material, a bio-composite containing hemp and polypropylene, was launched in Europe in 2012 and the company is now in the process of deploying its production globally.

Lightweighting is still on the menu for OEMs looking to reduce emissions, and interiors remain a key target in that area. Faurecia sees material choice staying relevant even as the market shifts toward OEMs bringing more engineering and design in-house, and plans to capitalize on that with its proprietary materials.

Faurecia is also working to improve efficiency throughout the company, in part through a strategy of standardization. Standardizing processes and equipment enables the company to cut costs while still meeting the individual design needs of its customers.

In May 2015, Faurecia SA and Italy’s Magneti Marelli started production at a joint-venture plant in Brazil delivering interior and exterior parts for vehicles assembled at the new Fiat Chrysler Automobiles BV plant in Goiana, Brazil.

The joint venture produces vehicle interior parts such as the instrument panel, cockpit, center console and door panels, as well as exterior parts such as bumpers and spoilers. Future expansions will likely be targeted around growing the company’s geographical footprint, adding more locations closer to customers.

In a consolidation of the French automotive sector, in December 2015 Faurecia SA announced it is selling its automotive exteriors business to Cie. Plastic Omnium SA in a transaction valued at $732.4 million.

The deal does not include Faurecia’s composites business, its plant for Smart in Hambach, France, or two joint ventures in Brazil and China. The business to be sold, which includes bumpers and front end modules, had 2014 sales of 2 billion euros ($2.2 billion), according to a news release.

The acquisition would nudge Plastic Omnium to above 8 billion euros ($8.81 billion) in sales, placing it among the 25 largest automotive suppliers worldwide. Its greater reach will also enhance its ability to support larger contracts that are resulting from the globalization of vehicle platforms.

Faurecia also has big plans for its composites business, which develops parts including an all-composite liftgate and an exposed-carbon fiber roof, as well as interior and seating components. Company leaders are confident composites will be "very useful" in the long term, Chief Financial Officer Michel Favre said in a conference call. As automakers continue to look for ways to remove weight from vehicles to help meet emissions standards, Faurecia expects the demand for composite products to grow, especially through 2020 and later, he said.

“We see the interiors space ... as space that’s going to, in general, be important for motor vehicles going forward, even as we look at some of the disruptive industries and technologies that can change the way cars function and work, such as the connected cars and autonomous cars. We see the interiors space as being very, very valuable to the OEMs, so we want to hang on to it.”

— Mark Stidham, Faurecia North America
Based in Canton, Ohio, dlhBOWLES manufactures windshield washer assemblies, sunroof drain tubes, and air suspension lines. It recently has moved into more complex, assembled products — such as an actuation system for turbochargers. It also produces vacuum break-assist assemblies.

The company’s Canton headquarters is the center of automated manufacturing, injection molding, extrusion, and mold and die making, plus new product development. DLH also has design engineers based at the factories of major customers. DLH employs 600 people and generates annual sales of about $50 million.

The company extrudes the tubing and profile, injection molds fittings and then builds the tubing assemblies. DLH, which makes its own tooling, has invested in automated tube forming equipment and all-electric injection presses.

In 2014, the company opened its first assembly plant in Mexico, to serve automakers in that country. The 30,000-square-foot plant opened in Matamoros in the fourth quarter of that year.

The company’s growth has continued after the recession of 2008 and 2009. The rebounding auto industry remains the core business, but DLH has diversified its product offerings, developing new products like the turbo actuator, a high-volume line of quick connectors and a battery coolant manifold for electric cars.

In July 2015, Morgenthaler Private Equity purchased the former DLH Industries Inc., and merged DLH with another company it owns, Bowles Fluidics Corp. of Columbia, Md. Both companies make components for handling automotive fluids, such as hoses and nozzles for windshield washer systems. DLH has expanded into other automotive areas including fully assembled actuation systems for turbochargers, and vacuum brake-assist assemblies.

Denso International America Inc.

Denso International America is a leading global automotive supplier of advanced technology systems and components in the areas of thermal, powertrain control, electronics and information and safety. It is the world’s largest supplier of climate control systems. Its customers include all of the major OEMs.

Its parent company, Japan-based Denso, has 126,000 employees globally, operating in 35 countries.

Consolidated global sales for the fiscal year ending March 31, 2015, totaled $35.9 billion. The company recently announced it would be expanding its North American headquarters in Southfield, Mich., by purchasing an 81,000-square-foot building next to its current campus near Telegraph Road and Civic Center Drive in Southfield.

As part of its business strategy, each year Denso invests about 9 percent of consolidated net sales back into R&D. Denso also consistently ranks at the top of the automotive industry for patents generated each year.

In August 2015, Denso announced it will be adding 500 jobs and investing $400 million to expand its electronics manufacturing capabilities and build a new warehouse at its manufacturing facility in Maryville, Tenn.

The warehouse is due to be completed by October 2017.
Lacks Enterprises Inc.

Tier 1 automotive supplier Lacks Enterprises ranks No. 9 in Plastics News’ 2015 survey of North American injection molders, with molding sales of $530 million.

The company makes decorative chrome trim for the automotive and appliance markets.

The company has 2,850 injection molding employees at five plants with 95 presses. It molds ABS, TPE, nylon and PC.

Overall, Lacks Enterprises occupies more than 1.6 million square feet of space in 22 facilities in North America and Europe. Every aspect of the company’s high-tech production processes is managed in its own facilities to ensure the highest quality is maintained.

The company’s injection molding capabilities range within 150 to 4,200 tons, and its proprietary plating processes are applied in the most secure and controlled environment.

Lacks also has made significant investments to ensure its facilities are efficient and practical to operate, while maintaining the high level of security and quality assurance that our customers deserve.

Continental Structural Plastics

Continental Structural Plastics Inc. of Auburn Hills, Mich., manufactures lightweight SMC structural components, automotive body panels and other products, with annual sales of $600 million, according to the company.

In December 2015, the company introduced the Tough Class A (TCA) Ultra Lite, a sheet molding compounding formulation with a lower specific gravity of 1.2 that does not sacrifice mechanical properties, surface quality and adhesion requirements.

Continental said the material has been approved by major automakers and will go into a production vehicle beginning in January.

TCA is a sheet molding compounding formulation with a lower specific gravity of 1.2 that does not sacrifice mechanical properties, surface quality and adhesion requirements.

In October 2015, Continental Structural Plastics debuted its Chinese joint venture CSP Victall.

The 322,000-square-foot facility in Tangshan, Hebei province, has started production, the company said. It will produce lightweight composite components for the automotive, heavy truck and bus, construction and agriculture markets in China. It also will compound and sell advanced composite raw materials.

Chinese automotive OEMs currently use 3.8 million tons of composites and plastics annually, compared to 7.6 million tons used by North American OEMs, CSP said.

“We see tremendous opportunity for lightweighting in China, especially given new Chinese regulatory policies and the push toward vehicle electrification,” said Frank Macher, chairman of CSP Victall and chairman and CEO of Continental Structural Plastics.

CSP Victall is a 50/50 joint venture between CSP and Qingdao Victall Railway (Group) Co. Ltd., a Chinese manufacturer of modular products and parts for high-speed trains, intercity trains and other transportation equipment.
SRG Global Inc., a subsidiary of Auburn Hills-based Guardian Industries Corp., generated $1.05 billion in revenue in 2014, according to Plastics News’ most recent ranking of injection molders.

SRG Global, Inc. manufactures chrome plated plastic parts for automotive, commercial truck and household appliance industries.

The company has eight plants, two technical facilities and an advanced development center in North America. It molds ABS and PP.

The company’s science and technology center in Taylor, Mich., is focused on developing coatings and advanced manufacturing methods. It is staffed with 105 scientists from a wide range of disciplines.

The Taylor facility and advanced development centers in Líria, Spain; and Suzhou, China, help SRG enhance manufacturing processes and accelerates development and delivery of the next generation of materials, coating technologies and sub-systems.

With full-scale injection molding operations on three continents, SRG Global is equipped to fulfill any request for custom molded plastic parts across the globe.

Machines ranging from 150 to 3,500 tons mold parts of any shape or size. A variety of molding technologies – gas-assist, dual-shot and rotary – facilitate complex processes such as coupling multiple materials.

SRG was created in 2008 when Guardian Industries bought Seigel-Robert Inc.’s automotive unit. The company specializes in molding, chroming and clear coating.

In October 2015, SRG held an opening ceremony to celebrate the expansion of its Irapuato, Mexico, facility that will support the company’s continuing production of high-value coatings on plastics.

The expansion houses a chrome plating line. The line is one of the most modern of its kind for this process, where safety and sustainability have been the driving factors in its design.

In August 2015, SRG unveiled its integrille active grille shutter system, which it maintains combines decorative features with fuel efficiency. SRG estimates that by 2020, around 18 percent of the global market will have these types of systems.

In June 2015, SRG debuted its new Asian headquarters in Changning District, Shanghai, China.
Plasan Carbon Composites Inc.

Dedicated to automotive carbon fiber, Plasan Carbon Composites is the leading Tier 1 supplier of carbon fiber parts and assemblies in the United States. We specialize in the production of Class A and structural parts for mid-volume production cars.

Plasan Carbon Composites was established in 2006 when private Israeli company Plasan SASA Ltd. purchased the automotive division of Vermont Composites and began vehicle parts production in Bennington.

Plasan formed to both produce parts using standard manufacturing, while also investing in long-term research to come up with a new processing method. Its Pressure Press molding format, which is going into full production this year in Walker, is capable of a 17-minute cycle time, including curing.

According to the company website, Plasan expects to generate about $60 million in sales in 2015, up from just $5 million in 2011, as it continues to develop its programming and work with OEMs on new carbon fiber applications.

The supplier anticipates the luxury car market to adopt carbon fiber along a similar trajectory as sports cars, starting first with option packages and then moving across the model range, said Jim Staargaard, president of Plasan Carbon Composites.

Despite its “controlled growth” strategy while validating its technology on lower production programs, Plasan plans substantial expansion in West Michigan moving forward, according to company officials.

Currently, Plasan is actively engaged in the prototyping process with three transportation OEMs, which the company declined to identify.

In 2014, Plasan launched its biggest and highest profile project — making two body panels for the 2014 Corvette Stingray.

Plasan developed its own proprietary molding process that will be used for the Corvette’s hood and roof, and opened a new plant in Walker, Mich., to make the parts.

Plasan also uses more traditional molding systems on a variety of other auto parts, including key panels on Chrysler Group LLC’s Viper.

Japanese materials major Toray Industries Inc. invested in a 20 percent stake in Plasan Carbon in 2013.

Carbon fiber has been a hot topic in the auto industry for more than a decade thanks to its potential for lighter weight parts. However, the expense of the raw material combined with the slow processing time of traditional autoclave production has hampered efforts to expand it into mainstream production.

While the Corvette, with an estimated production run of about 20,000 vehicles annually, is not a mainstream car it is still the biggest single production run for carbon fiber in North America.
Toyoda Gosei North America is a subsidiary of Toyoda Gosei, a Japanese molder headquartered in Kiyosu, Aichi Prefecture, Japan.

Toyoda Gosei is a leading specialty manufacturer of rubber and plastic automotive parts and LEDs.

Today, the Toyoda Gosei group provides a variety of high-quality products internationally, with a network of approximately 100 plants and offices in 18 countries and regions.

Through its flexible, integrated global supply system and leading-edge technologies for automotive safety, comfort, and environmental preservation, Toyoda Gosei is a global supplier that aims to deliver the highest levels of satisfaction to customers worldwide.

The company reported global sales of more than $6.3 billion in fiscal year 2014 ending March 31.

As part of its global business strategy, parent company Toyoda Gosei Co. Ltd. in August 2015 added a second production plant in Brazil by taking a 30 percent stake in plastic auto parts producer Pecval Indústria Ltda.

The investment in Pecval, a wholly-owned subsidiary of another Japanese firm, Shimuzu Industry Co. Ltd., is the latest in a series of expansions in Central and South America for Kiyosu-based Toyoda Gosei as it sees its Japanese customer base expand in the region.

Pecval, in Indaiatuba, Brazil, also makes interior and exterior parts, including radiator grilles and instrumental panel components, although it seems like it could be a smaller investment.

Toyoda Gosei’s latest Mexican venture is Toyoda Gosei Irapuato Mexico S.A. de C.V., located in Irapuato. The company is scheduled to start operations in April 2016 and will supply radiator grilles, console boxes and other plastic parts to auto makers in the North American market.

The company said it is investing about $67 million to build the plant, and it plans to hire 280 employees by fiscal 2019.

The Irapuato facility is Toyoda Gosei’s fourth manufacturing firm in Mexico: TAPEX Mexicana S.A. de C.V. produces safety systems such as airbags, while Toyoda Gosei Automotive Sealing Mexico S.A. de C.V. makes sealing products, including weatherstrips.
Processor Profiles

U.S. Farathane Corp.

U.S. Farathane is a supplier of plastic injection molded components to automakers, such as General Motors Co., Ford Motor Co. and FCA US LLC.

Farathane is a former Plastics News Processor of the Year.

The firm has been a leading source of plastics manufacturing, supplying the automotive industry for over 40 years.

Through highly technical research and development, coupled with a diverse and knowledgeable management team and dedicated associates, U.S. Farathane has continued to grow each year.

In Plastics News’ 2015 ranking of injection molders, the company was No. 10 with sales of $500 million in the most recent year, up from $402 million the previous year.

The company has more than 2,700 employees globally. It has 11 North American facilities.

The company molds HDPE, PP, PVC, TPE, nylon, PC and acetal.

As part of its business strategy, in 2015 U.S. Farathane opened a new manufacturing operation in Riverside, Mo.

The plant primarily supplies General Motors Co.’s Fairfax Assembly Plant, Charles Browne, general manager of the new plant, said. Representing an investment of $51.6 million, the operation is expected to hire 267 over the next three years.

The operation is located in a 220,000-square-foot spec building in Riverside’s Horizons Business Park and includes 16 presses from 310 tons to 3,000 tons of clamping force with more to be added in 2016.

In January 2015, private equity firm the Gores Group acquired Auburn Hills, Mich.-based injection molder U.S. Farathane Corp.

U.S. Farathane CEO Andy Greenlee and several members of its management team will remain as part of the deal.

As part of its production strategy, U.S. Farathane also does compression molding and extrusion. The company started extruding plastics in 2004, and expanded a year later when it bought the Ligon Bros. Manufacturing Co.’s plastic extrusion business in Almont, Mich.
Processor Profiles

Mitchell Plastics

Mitchell Plastics is a leading Tier 1 supplier of automotive interior mechanisms and decorative components. It has more than 2,200 employees at six plants in North America.

Mitchell Plastics specializes in interior parts, with an ability to provide complex assemblies that combine both functional parts, such as air vents, with decorative trim. It has 18 paint lines throughout its facilities along with capabilities in vacuum formed foil trim.

Its main production is at two sites in Ontario—in Kitchener and Waterloo — along with molding in Huntsville, Ala. Earlier this year, it acquired a controlling interest in the joint venture DA Inc. in Charlestown, Ind. The Indiana site now operates under the Mitchell Plastics name.

Mitchell Plastics expanded into Mexico, constructing a manufacturing facility in Querétaro that began operations in March 2014.

Mitchell has supplied parts to Mexico for several years from its existing operations in the U.S. and Canada, but having a presence in the country adds to its ability to provide parts for various automakers.

The Querétaro operation includes 155,000 square feet of manufacturing space for injection molding and painting.

Miniature Precision Components Inc.

Miniature Precision Components Inc. is a provider of thermoplastic components for the automotive industry. It had $275 million in injection molding sales, ranking No. 26 in Plastics News’ 2015 ranking of North American injection molders.

The company has 1,500 employees at five plants and 140 presses. It has annual resin throughput of 30 million pounds.

The company processes ABS, HDPE, PP, PVC, TPE, hi-temp thermoplastics, nylon, PC and acetal.

MPC was founded in 1972 and is headquartered in Walworth, Wis. It has locations in Walworth, Prairie du Chien, Richland Center, and Janesville, Wis.; Southfield, Mich.; Morrison, Tenn.; Nogales, Ariz.; Santa Ana and Sonora, Mexico. It also has a facility in Nagoya, Japan.

It offers products, such as harnesses, engineered molded assemblies, coolant assemblies, carbon canisters, mega assemblies, valve and cap assemblies, CAC ducts, and reservoirs.
**Processor Profiles**

**Lakeside Plastics Ltd.**

Lakeside Plastics Ltd. is a custom injection molder serving the automotive market. The company molds and assembles for General Motors Co. and Tier 1 auto plants in Canada, the U.S. and Mexico.


It has 350 employees, 45 presses and annual resin throughput of 22 million pounds. It molds ABS, PP, TPE, nylon and PC.

Lakeside has product lines that require secondary operations that ultrasonically weld, heat stake, or otherwise assemble components. This on-line assembly is done with fully automated assembly machines. The company has a tooling department that is up-to-date on the latest technology in robotics, pneumatics and hydraulics.

The company also has a product design function that allows it to work with its customers as a full-service supplier.

Lakeside produces a variety of functional black plastic products, including an interior garnish package for the Chevrolet Camaro.

Lakeside Plastics operates three locations in Southwestern Ontario, Canada. All three are located in the town of Oldcastle, just minutes from Windsor. Among the benefits of this area is its easy access to the Canada-U.S. border, which is less than 15 minutes away.

**Grand Traverse Plastics Corp.**

Founded in 1981, Grand Traverse Plastics Corp. is a Michigan custom injection molding company that specializes in the manufacturing and assembly of automotive plastic parts.

The company has 53 employees at its 71,600-square-foot manufacturing space. It also has a 23,200-square-foot warehouse. It has 17 robotically service presses ranging from 230 tons to 1,100 tons.

The company has experience with a wide variety of plastic resins. Its products and services include custom injection molded components, shoot & ship injection molded components and custom plastic injection molded assemblies.

Grand Traverse serves auto OEMs as well as Tier 1 Integrators, Tier 2 Automotive Suppliers and the automotive aftermarket.

The company produces engine acoustic covers, wiring channels, underhood fill tubes, interior and exterior trim and brackets and supports.

The company says its manufacturing processes yields quality performance, while its full-service engineering and R&D capability allow it to manage a customer’s program from quotation to production.

GTP also supports simultaneous engineering, value analysis and value engineering and provides local support for all program management activity.
Inteva Products LLC

Inteva Products is a customer-driven global supplier of engineered components and systems. It serves original equipment vehicle manufacturers in the automotive, commercial, defense, marine and industrial industries, as well as products for the consumer market.

Inteva has manufacturing and engineering proximity to the world’s leading global and regional OEMs.

Headquartered in Troy, Mich., Inteva employs more than 11,500 workers in 18 countries. It ranked 19th in Plastics News’ 2015 ranking of injection molders, with sales of $335 million.

The company molds ABS, PP, PVC, TPE, nylon, PC and thermosets.

Inteva has operations in the United States, Canada and Mexico. In the U.S., Inteva operates sites in Alabama, Michigan, Missouri, Ohio and Texas. It also has a manufacturing plant and technical center in Brazil.

As part of its business strategy, Inteva in 2015 expanded its global presence with the opening of two new manufacturing plants in Oradea, Romania and Wuhan, China; as well as the relocation of its Wuppertal Technical Center to a new larger facility in Solingen, Germany.

The facility in Oradea, Romania is Inteva’s second manufacturing facility in Romania. The site manufactures roof system components.

The plant in Wuhan, China has the potential to expand as growth continues in the region. The facility manufactures roof systems.

The company was created in 2008 when financier Ira Rennert and his Renco Group Inc. bought the interiors and closures business unit of Delphi Corp. Delphi itself had spun off from GM.

The investment included massive manufacturing operations, including the onetime Inland Adrian GM plant in Adrian, Mich., which molded parts shipped for use throughout the automaker.
ADAC Automotive Inc.

ADAC Automotive is a supplier to automakers worldwide. Formed as ADAC Plastics in Grand Rapids, Mich., in 1975, the company changed its name to ADAC Automotive Inc. in 2006.

The company offers integrated solutions for every stage of the development process — from initial concept design and prototyping to product validation.

According to Plastics News’ 2015 ranking of injection molders, the company had estimated sales of $235 million in 2014, up $12 million from the previous year. It has 1,100 injection molding employees. It has 54 injection molding presses and four plants. Annual throughput was 14.5 million pounds.

The company performs thermoplastic injection molding; insert molding and gas-assisted injection molding using ABS, nylon, polypropylene, polycarbonate, acetal, acrylic and post-consumer resin.

As part of its business strategy, ADAC in May 2015 announced its acquisition of an international automotive supplier through its Vehicle Access Systems Technology LLC (VAST) alliance.


The new company will be renamed Minda-VAST Access Systems and will remain a subsidiary of both New Delhi, India-based Minda Corp. Ltd. and Spark Minda, Ashok Minda Group. The terms of the deal were not disclosed.

By becoming a partner with Minda, ADAC and VAST will gain access to strategic markets in India and the surrounding regions.

ADAC has been a member of the Vehicle Access Systems Technology Alliance since 2006. It is a three-member supplier group intended to provide greater sourcing efficiency to automakers worldwide.

Alliance members also formed joint venture, Vehicle Access Systems Technology LLC, to support sales in Asia and Latin America and operate manufacturing facilities in China and Brazil.

In April 2015, ADAC announced that Peter Hungerford had been appointed as the company’s chief operating officer.
Plastic Omnium serves the automotive end market from 103 plants in 28 countries.

According to Plastics News’ 2015 injection molders ranking, the company had injection-molding related sales of $360 million in 2014. It has more than 1,100 employees in North America. Globally, the company has about 21,000 employees and operates 14 research and development centers.

Since its inception, the firm has diversified its operations, increased its manufacturing and commercial presence outside France, expanded its offering for public authorities and developed its two core businesses, while stepping up investment programs to develop products and services.

Since 2000, Plastic Omnium has nearly tripled its revenue while consolidating its positions in its Environment and Automotive businesses. The company’s growth has been driven by targeted acquisitions that expand the company’s offerings and extend its customer portfolio.

Plastic Omnium provides both fascia and fuel tanks for BMW and has two facilities in South Carolina alone.

In 2013, it opened its new plant a few miles south of Detroit in New Boston, Mich., capable of making 1.5 million fuel tanks per year, which will help it meet demands of what it termed a “clearly rebounding” North American auto industry.

In its annual report, Plastic Omnium said it had not only built on its European auto base in North America, but it also has successfully improved ties with Asian and North American companies.

In 2012, the firm moved both the exteriors and fuel tank systems research and development operations into the same location, which allowed the two divisions to work more closely with automakers who are working to meet requirements for both improved fuel economy and decreased evaporative emissions.

Its exteriors unit provides complete exterior systems -- including composite tailgates -- in Europe, which reduce weight and complexity, improving fuel performance and making assembly easier for its customers.

That new fuel tank in New Boston, meanwhile, represents another part of that outreach to U.S.-based automakers. Inergy agreed to take over a massive plant in nearby Milan, Mich., which was once part of Ford Motor Co. and brought with it a book of business with Ford -- but the purchase deal also allowed it to phase out production on outdated equipment in Milan in favor of upgraded machines in New Boston.

In a consolidation of the French automotive sector, Faurecia SA is selling its automotive exteriors business to Cie. Plastic Omnium SA in a transaction valued at $732.4 million. The companies signed a memorandum of understanding Dec. 14, 2015.

The business to be sold, which includes bumpers and front end modules, had 2014 sales of $2.2 billion, according to a news release. About 90 percent of the business is located in Europe.

The acquisition would nudge Plastic Omnium to above $8.81 billion in sales, placing it among the 25 largest automotive suppliers worldwide. Its greater reach will also enhance its ability to support larger contracts that are resulting from the globalization of vehicle platforms.
OEM Profiles

General Motors Co.

Founded in 1908 by William C. Durant, General Motors is one of the world’s largest auto-makers by vehicle unit sales. The company does business in about 157 countries.

GM in 2009 emerged from a government-backed Chapter 11 reorganization in which the company shed the Pontiac and Saturn brands. In 2010, the company made an initial public offering that was one of the world’s five largest public offerings to date. GM returned to profitability in 2011.

From electric and mini-cars to heavy-duty full-size trucks, monocab and convertibles, General Motors’ brands offer a range of vehicles in more than 120 countries around the world.

Along with its strategic partners, GM produces cars and trucks through the following brands: Chevrolet, Buick, GMC, Cadillac, Baojun, Holden, Isuzu, Jiefang, Opel, Vauxhall and Wuling.

The company also has significant equity stakes in major joint ventures in China including SAIC-GM, SAIC-GM-Wuling, FAW-GM and GM Korea.

In the United States, GM has 12 manufacturing plants in Arlington, Texas; Bowling Green, Ky.; Detroit-Hamtramck, Mich.; Kansas City, Kan.; Flint, Mich.; Fort Wayne, Ind.; Delta Township, Mich.; Lansing, Mich.; Lordstown, Ohio; Orion Township; Spring Hill, Tenn.; and Wentzville, Mo.

GM also has facilities in Canada, Mexico and China as well as additional locations worldwide.

GM employs approximately 50,000 hourly workers in the United States. Overall, GM employs 80,000 people in the U.S. and 212,000 people globally.

The automaker posted total November U.S. sales of 229,296 vehicles, an increase of 1.5 percent compared with November 2014.

Through the first 11 months of 2015, GM sold 2,792,136 vehicles, topping its same-period 2014 sales mark of 2,660,525, according to Automotive News, a sister publication of Plastics News.

GM has been at the forefront of developing new technologies in its vehicles. These efforts also include a focus on autonomous driving, electric vehicles and hydrogen fuel cells. All of these efforts will have wide-ranging implications on plastics suppliers going forward.

In December 2015, GM announced plans to invest $44 million in the Bowling Green Assembly plant to support increased capacity in its Performance Build Center, adding 36 new jobs. Construction and tool re-arrangement is planned to start in January 2016.

In April 2015, lightweighting was at the forefront when GM announced plans to invest $5.4 billion in its U.S. facilities, including money which will help the company build vehicles out of lightweight materials.

GM also has been actively pursuing options to create lighter-weight vehicles, including the lightweight body of the new Cadillac CT6 luxury sedan, the most complex ever made by the automaker. It uses 11 materials and is held together by aluminum welding, rivets, screws and adhesives.

Mark Reuss, GM’s global product development boss, has said the bodies of the next-
generation trucks will be “mixed materials” -- the same language GM uses to describe the CT6.

GM is being tight-lipped about what most of the $5.4 billion over three years would buy, but it did provide some insight into where $783.5 million would go at three Michigan facilities — including applications for lightweight, strong substances like aluminum.

As part of the automaker’s operating strategy, GM President Dan Ammann said the company has taken steps in recent years to boost its U.S. parts and accessory sales.

The company is rolling out a real-time pricing system for original-equipment GM collision parts, for example, an effort to take market share from aftermarket parts makers.

The initiatives are part of a broader plan by GM to find growth in areas beyond new-vehicle sales.

“We are operating in a slower-growth world,” Ammann said. “We must therefore be focused on growing sources of profitability that are more independent of the traditional earnings cycle.”

The company also has been proactive in its development of electric and hybrid vehicles, and in 2015 it forged a broad partnership with LG Corp. for the development of the Chevrolet Bolt electric vehicle, sourcing everything from battery cells and electric motors to the infotainment system from the Korean company.

As part of its business strategy, GM continues to refresh its vehicles to make cars and trucks that people want to buy.

The automaker’s product-launch cadence is a critical component of growing its margins, not only in North America but around the world, into 2016 and beyond. The launches are coming in core passenger cars, including the Opel Corsa and Astra in Europe, the Chevrolet Cruze and Malibu in the United States, and similar products in China.

GM also will refresh all of its crossovers in the United States and they will introduce new models, starting with the XT5, the new Cadillac that will replace the SRX in 2016.

In December 2015, GM announced it will debut a new Buick SUV in 2016, and that vehicle will be made in China.

The 2017 Buick Envision is a premium five-passenger crossover SUV that is expected to compete with models like the Acura RDX and Audi Q5. It’s built on a new GM architecture that is shared with some other recent models, including the 2015 Chevrolet Volt.

The Envision was introduced in China in late 2014, and it has been a strong seller, with just over 127,000 sold through November 2015.

In 2015, GM faced recall woes and an intense federal investigation after it hid a deadly safety defect.

The known financial toll to General Motors for hiding the safety defect now exceeds $2.3 billion, or about $900 per recalled car, on top of whatever GM lost selling them in the first place. It will undoubtedly keep rising for years as the remaining legal issues play out.

The financial toll includes up to $625 million for victim compensation, more than $200 million to fix the cars and $575 million to settle many, but not all, of the pending lawsuits.

“People were hurt and people died in our cars,” GM CEO Mary Barra told employees in September 2015 as she outlined a $900 million settlement with the U.S. Justice Department. “We accept the penalties being announced today because that’s what it means to be held accountable.”
OE5 Profiles

Fiat Chrysler Automobiles

With the formal creation of Fiat Chrysler Automobiles (FCA) in 2014 and its listing on the New York and Milan stock exchanges, a new group was born. FCA carries on the tradition of two historic automakers: Fiat founded in 1899 and Chrysler founded in 1925.

It was in December 2014 that Chrysler Group LLC announced it had renamed itself FCA US LLC to better align with its global parent, Fiat Chrysler Automobiles NV.

Despite the change, the Chrysler name isn’t going anywhere. The company even plans to grow the Chrysler-brand lineup to six vehicles by 2018. The change also has not impacted the firm’s Auburn Hills, Mich., headquarters or business operations.

The company has had several owners and names. Chrysler Group, the most recent name, had only been around for five years. It formed in 2009 after Italian automaker Fiat SpA took a minority stake in the post-bankrupt automaker.

Before then, it was known as Chrysler LLC (2007-09) under majority owner Cerberus Capital Management, a private equity firm; Daimler Chrysler AG (1998-2007) as part of a tie-up with Daimler-Benz AG; and Chrysler Corp. (1925-98).

The Chrysler arm was first organized as Chrysler Corp. in 1925. FCA’s core brands are Chrysler, Jeep, Dodge, Ram, SRT, Fiat and Mopar vehicles and products. The North American company is headquartered in Auburn Hills, Mich.

Chrysler acquired the Jeep brand as part of the purchase of American Motors Corp. in 1987. Chrysler then established the Jeep/Eagle division, along with the Eagle brand that was discontinued a decade later as part of the DaimlerChrysler merger. In 2001, the Plymouth brand was discontinued.

Currently, Dodge is the full line automobile brand, with the Chrysler brand marketing upscale cars. The Jeep brand focuses on SUVs, while the Ram brand offers small commercial vans and a variety of pick-up trucks.

On June 10, 2009, Chrysler LLC emerged from a government backed Chapter 11 reorganization as Chrysler Group LLC, in alliance with Italian automaker Fiat.

Through the month of November, FCA had sold 2,038,951 vehicles in 2015, up from 1,910,843 it sold during the same period in 2014. November 2015 also represented FCA’s 68th consecutive month of year-over-year sales gains. Sales records for the month also were posted in Mexico and Canada.

FCA has more than 200,000 employees worldwide. About half of its employees are located in the United States, Canada and Mexico.

In the U.S., the company has plants in Belvidere, Ill.; Sterling Heights, Mich.; Toledo, Ohio; and Warren, Mich. It has two plants in Detroit. There are two lines at the Toledo plant. It also has two plants in Canada and three in Mexico.

FCA US has 12 assembly facilities, seven engine plants, three transmission plants as well as 10 plants that handle stamping, casting, machining, axle and tool and die production. FCA’s trademarked MOPAR automobile parts and service division carries almost 300,000 parts, options and accessories for vehicle customization.

FCA Canada Inc. is based in Windsor, Ontario, and celebrates its 90th anniversary in 2015. FCA Canada Inc. is a wholly owned subsidiary of FCA US LLC, a member of the Fiat Chrysler Automobiles N.V. family of companies. In addition to its assembly facilities, which

The 2016 Dodge Challenger SRT8 Hellcat Interior includes plastic content. Photo courtesy of FCA
Fiat’s new Spider more than a badge exercise

The task seemed doable: Take the most popular Fiat ever sold in the U.S. and re-create it for the 21st century.

The reality, it turned out, was a little more complicated than typing “Miata” into Google Translate and choosing “Italian.”

It has been a risk for FCA’s designers and engineers. It started as an engineering package from Mazda that underpins its fourth-generation MX-5 Miata convertible. Fiat then wrapped a unique body around it and bolted in its own turbocharged powertrain underneath the scalloped hood. The 2017 model goes on sale in the summer of 2016.

A two-seat roadster may be an unlikely route for a Fiat brand struggling to find its footing in the U.S. But the chance to revive a bit of the brand’s heritage proved tough to resist.

"Of all the things in all the markets that I could go into when I’m launching a brand in the U.S., this probably isn’t necessarily one of the first ones on your list,” Bob Broderdorf, director of the Fiat brand in North America, told Automotive News at the 2015 auto show. “But when a partnership like this comes along, and you realize, ‘I could make a 124 Spider out of this,’ how can you not do that?”

Despite the car’s Japanese bones, Fiat designers were keen to tie the model to the history of the previous 124 Spider -- which amassed 170,000 sales in the U.S. between 1968 and 1985.

Some of the styling process involved his team working with Mazda in Japan -- where the 124 will be built alongside the Miata. The collaboration was made easier by the combination of Italian flexibility and Japanese work ethic.

produce the Chrysler Town & Country, Dodge Grand Caravan (Windsor), Chrysler 300, Dodge Charger and Dodge Challenger (Brampton), FCA Canada has three regional business centers and a training and testing facility.

Headquartered in Santa Fe, FCA Mexico is a member of the Fiat Chrysler Automobiles N.V. (FCF) family of companies. FCA Mexico manufactures and sells vehicles under the Alfa Romeo, Chrysler, Dodge, Fiat, Jeep, Mopar, Ram, SRT and Mitsubishi brands. FCA operates two training and testing facilities in the region.

For FCA, 2015 was a year of highs and lows.

In July, FCA agreed to pay a $70 million fine, accept three years of additional oversight by an independent monitor and buy back thousands of vehicles as part of a consent agreement to settle a U.S. government probe into 23 recalls since 2009.

Part of the penalty is related to issues with rear-mounted plastic fuel tanks on Jeep Liberty and Grand Cherokee SUVs, which have been linked to several deadly fires.

The $70 million cash fine was part of a potential $105 million civil penalty, the largest ever imposed by the National Highway Traffic Safety Administration, and part of a sweeping settlement to spur an overhaul of the automaker’s safety and recall practices, according to the U.S. Department of Transportation.

FCA also agreed to spend another $20 million to meet performance requirements laid out by the consent agreement. The automaker may have to pay another $15 million if the monitor discovers additional violations of U.S. auto safety laws, or if Fiat Chrysler violates terms set by the consent order, the department said.

As part of its business strategy, FCA has outlined its key objectives as it overhauls its product lineup over the next several years: Offer more fuel-efficient transmissions and further exploit the popularity of Jeep.

Those two goals will intersect on the redesigned Jeep Wrangler debuting in 2017. The Wrangler’s current five-speed automatic transmission will be replaced by an eight-speed automatic. The eight-speed -- which is used on most of FCA’s other rear-wheel-drive based vehicles -- delivers at least a 9 percent efficiency gain over the five-speed, according to FCA financial filings.

Added fuel efficiency also will be crucial for the redesign and re-engineering of several front-wheel-drive based vehicles, and this is expected to include lightweighting efforts and an increased use of plastics where possible.

The redesigned Dodge Journey and Chrysler Town & Country, and the re-engineered Dodge Dart, will shift from the six-speed automatic to FCA’s nine-speed. The redesigned Jeep Compass also will get the nine-speed.

The Chrysler brand will have the biggest expansion in terms of number of models in coming years. But Jeep will see more significant lineup changes.

The Jeep brand will lose the Patriot, but it will gain the Grand Wagoneer, a large, three-row SUV. And if FCA chooses to expand Wrangler production capacity in Toledo, Ohio, as expected, there likely will be a Wrangler-based pickup.

In December 2015, FCA announced plans to launch two new crossovers in the United States. The company is launching a new seven-seater crossover aimed at the Ford Explorer and the Toyota Highlander in 2017. It is likely to be produced on the same platform as the new Town & Country. The automaker has not revealed the name of the vehicle, but it will be bigger than a Dodge Durango, and it will be available with a petrol-electric plug-in hybrid drivetrain.

FCA is also launching a smaller five-seater model to compete with the Ford Edge and the Hyundai Santa Fe. It is scheduled to arrive as a 2019 model, indicating it will make its official debut at a major auto show in 2018.
Founded by Henry Ford and incorporated June 16, 1903, Ford Motor Co. is a multinational automaker headquartered in Dearborn, Mich.

The company sells automobiles and commercial vehicles under the Ford brand and most luxury cars under the Lincoln brand. Ford also owns Brazilian SUV manufacturer Troller and Australian performance car manufacturer FPV. Ford owns a 2.1 percent stake in Mazda of Japan, an 8 percent stake in Aston Martin of the United Kingdom and a 49 percent stake in Jiangling of China. Ford is controlled by the Ford family, although they have minority ownership.

Over the years, Ford has been shedding its ownership stake in Mazda. It purchased 25 percent of the Japanese automaker in 1979 and increased its stake to 33.4 percent in 1996. But the automaker began cutting ties in 2008, and began shedding its stake in Mazda.

Ford has about 197,000 employees and 67 plants worldwide. In the United States, Ford has production and assembly plants in Chicago, Ill.; Dearborn, Mich.; Detroit, Mich.; Flat Rock, Mich.; Kansas City, Mo.; Louisville, Ky. (two plants); Wayne, Mich.; and Avon Lake, Ohio. Ford has two plants in Canada, including a contract plant in Markham, Ontario for the Ford GT. It has three plants in Mexico, including a joint venture with International.

The company provides financial services through Ford Motor Credit Co.

Ford has manufacturing operations worldwide, including in the United States, Canada, Mexico, China, the United Kingdom, Germany, Turkey, Brazil, Argentina, Australia and South Africa. Ford also has a cooperative agreement with Russian automaker GAZ.

Ford sold 2,365,476 vehicles through the first 11 months of 2015, up from 2,251,946 vehicles sold during the same period in 2014.

In 2014, the company introduced 23 new vehicles globally. Ford saw the largest percentage point gain in U.S. market share among automakers in 2013.

Lightweighting is a key part of Ford’s operating strategy as the company continues to pursue the development and use of cutting-edge materials – including high-strength steels, lightweight metals such as aluminum and magnesium, and composite materials – to reduce the weight of its vehicles and improve their fuel economy without compromising safety or performance. For example, in 2014 it introduced an all-new F-150 that makes extensive use of high-strength steels and aluminum.

Ford also has been looking for other ways to reduce the weight of vehicles, and automotive glass is a relatively cheap material and its potential for lightweighting largely unexplored.

Suppliers such as Corning have had a hard time selling their innovations to the industry, but have recently enjoyed some success with Ford. The OEM has announced it will roll out Corning’s Gorilla Glass technology with the 2017 Ford GT, production of which begins in late 2016. The hybrid material achieves weight savings of 32 percent compared with regular glass, and will be used in the supercar’s windshield and rear engine cover.

In December 2015, Ford announced it will invest an additional $4.5 billion in electrified vehicle solutions by 2020 as well as changing how the company develops vehicle experiences for customers – all to make people’s lives better by changing the way the world moves.

Ford plans to add 13 new electrified vehicles to its portfolio by 2020, when more than 40 percent of the company’s global nameplates will come in electrified versions. This repre-
Ford execs see electric vehicles as a good bet

Ford Motor Co. is making a big investment to develop more than a dozen vehicles that it knows few consumers want to buy right now.

Ford is betting that by 2020, when it plans to offer 40 percent of its global lineup in hybrid or plug-in versions, they won’t have to battle gasoline prices below $2 a gallon.

And, CEO Mark Fields says, Ford sees longer term consumer demand moving toward electrified drive.

“In this business, you have to project where you see consumer demand going forward,” Fields said in a recent interview. “Our view ongoing is still that the price of a barrel of oil is going to go up over time, so it’s really important for us to anticipate that.”

Ford is dedicating significant resources toward plug-ins and hybrids. Ford has sold about 65,000 electrified vehicles this year through November and is the leader in plug-in hybrid sales.

Fields said the automaker would introduce 13 hybrid or electric cars by 2020, in addition to the six it offers today.

Ford will offer an updated version of its Focus Electric in late 2016, but that is not one of the 13 upcoming vehicles. The Focus will be capable of traveling 100 miles on a full charge.

“In this business, you have to project where you see consumer demand going forward. Our view ongoing is still that the price of a barrel of oil is going to go up over time, so it’s really important for us to anticipate that.”

— Mark Fields, Ford CEO

sent Ford’s largest-ever electrified vehicle investment in a five-year period.

Ford also announced that it was expanding its electrified vehicles research and development program in Europe and Asia to accelerate work on battery technology around the world. Kevin Layden, the director of Ford’s electrification programs, said battery costs are “coming down faster than anyone’s predicted.”

In December 2015, Ford and Google announced they are in talks to have the automaker build Google’s next-generation autonomous cars under contract, Automotive News has learned. Although few details about the project are known, a source with knowledge of the project says both parties have been negotiating on a contract manufacturing deal “for a long time.”

In November 2015, Ford announced it will begin testing its autonomous vehicles at Mcity, a simulated facility at the University of Michigan, to speed up research of advanced sensing technologies.

Ford, which has been testing autonomous vehicles for more than 10 years, will be the first automaker to test them at the 32-acre facility that opened in July, it said in a statement. Ford will use Mcity to expand testing of its Fusion Hybrid Autonomous Research vehicle.

Ford also is investing in upgrades to its research and development center in Michigan with projects that will bring its aging research and engineering campus out of the 1960s.

The decade-long project, estimated to cost $1 billion, could be among a multitude of Ford investments in Michigan totaling upward of $3 billion.

Modern facilities are becoming more important in attracting top engineering and design talent as technology companies such as Google Inc. and Apple Inc. enter the automotive space. But even in comparison with its more traditional competitors, Ford’s hodgepodge of offices and labs has been looking neglected.

Ford’s 1.9 million-square-foot campus, a confusing collection of inefficiently used buildings that force employees and suppliers to ride shuttle buses or search for parking, looks even shabbier in contrast to gleaming tech centers erected around Detroit by Toyota Motor Corp., Hyundai-Kia Automotive and other transplant automakers more recently. Toyota broke ground just last week on a $126 million expansion of its Michigan tech center near Ann Arbor, Mich., which opened in 2008.

Ford has done some modest remodeling over the years to address safety issues but overwhelmingly devoted its resources to plant upgrades and other projects with a more direct effect on the company’s bottom line. Ford and state officials say the automaker has invested $3.1 billion in Michigan since 2009, nearly all of that in manufacturing operations. If it increases that investment to $6.2 billion by 2025, it can obtain a total of $2.3 billion in tax credits.

Under Mark Fields, who became CEO in 2014, Ford has been trying to establish itself as a leading innovator, even though it has engineers working to develop self-driving cars in buildings designed before anyone even owned a computer.

In January 2015, Ford opened a research center in Palo Alto, Calif., with an open floor plan, large windows and beanbag chairs -- an atmosphere very different from what the 13,000 employees on the Dearborn campus experience.
Honda America

Honda Motor Co. Ltd. is a Japanese public multinational corporation primarily known as a manufacturer of automobiles and motorcycles. The company opened its first U.S. plant in 1979 and has evolved into a company that directly employs nearly 25,000 Americans.

Honda was the first Japanese automobile manufacturer to release a dedicated luxury brand, Acura, in 1986.

Honda-brand automobile models include the Accord, Civic, CR-V, Element, FCX Clarity, Fit, Insight, Odyssey, Pilot and Ridgeline. Acura-brand models are the RL, TL, Tlx, ILX, MDX, RDX and ZDX. Honda claims several firsts for a Japanese carmaker in the United States. The company was the first to create a subsidiary to market and sell its vehicles in the country, and the first to manufacture automobiles in North America.

Honda first introduced passenger cars to the North American market in 1970. The Honda Civic, introduced in 1973, became popular in the U.S., leading a significant expansion of Honda into the U.S. market.

The subsidiary of Honda Motor coordinates the operations in North America that manufacture, market, and distribute Accord, Civic, and Acura cars, as well as Gold Wing, Shadow, and Valkyrie motorcycles. Of the 15 models made, Honda North America’s best-selling cars include the Odyssey minivan and the CR-V SUV.

Honda North America also markets hybrid versions of several of its sedans. New launches have included the Crosstour and Acura ZDX. Honda also makes jet and marine engines and power equipment. North America is Honda Motor’s largest market, representing 45 percent of the OEM’s sales.

Honda operates 14 major R&D centers in the U.S. with the capacity to fully design, develop and engineer many of the Honda and Acura products produced in North America.

Based on its longstanding commitment to “build products close to the customer,” Honda operates 18 major manufacturing facilities in North America. Using domestic and globally sourced parts, these plants produce a wide range of Honda and Acura automobiles, automobile engines and transmissions.

Through the first 11 months of 2015, Honda had sold 1,435,658 vehicles, according to Automotive News data.

The OEM also has purchased $35 billion in products from U.S. suppliers in 2014 and a total of 557 suppliers in 34 states provide parts and materials to Honda production facilities.

As part of its business strategy, American Honda is investing $25 million to renovate the Honda Proving Center of California (HPCC) in the Mojave Desert near Cantil, Calif. The proving center, which was in operation from 1990 through 2010, is scheduled to reopen in April 2016.

The 4,255-acre warm weather testing facility features a 7.5-mile high speed oval track and a 4.5-mile winding road course that will be completely refurbished. The renovations also will include the addition of some new vehicle test road enhancements to the property.

“As we continue to accelerate our growth in the U.S. market with a competitive lineup of cars and trucks designed and developed in the U.S., we are reinvesting in HPCC to create a world-class test facility,” said John Mendel, executive vice president of the Automobile Division of American Honda Motor, Co. Inc. “Some of our most iconic vehicles proved their mettle at HPCC and we are happy to continue that tradition at this high-performance testing ground.”
In October 2015, Honda started production of its 10th-generation Honda Civic sedan, which hit dealerships in November.

According to the automaker, the all-new 10th-generation Honda Civic sedan is the most ambitious remake of Civic in the model’s 43-year history. Civic is Honda’s best-selling model all-time on a global basis, with cumulative U.S. sales of Civic since its 1973 debut totaling more than 10.2 million cars. Civic also is the most popular compact car with individual U.S. car buyers for nine consecutive years.

The company also is making investments in its facilities, as demonstrated by work at its Indiana facility where HMIN has invested nearly $97 million during the last three years in the Greensburg facility to adopt new manufacturing processes and technologies to enhance the quality and delivery of its Indiana-built vehicles.

Also in 2015, Honda started production at its new $71.4 million state-of-the-art automated engine assembly facility in Lincoln, Ala. The new facility will supply V-6 engines for the Honda Odyssey minivans, Pilot sport utility vehicles and Acura MDX luxury SUVs made in Lincoln.

In May 2015, Ohio State University and Honda celebrated the grand opening of the new Simulation Innovation and Modeling Center (SIMCenter) by inviting other potential industry partners to collaborate at the facility designed to advance product performance and manufacturing processes through computer-aided simulation.

Located in Smith Laboratory and part of the College of Engineering, the SIMCenter was launched as a result of a $5 million gift from Honda R&D Americas, Inc., and began operating late in 2014.

Honda’s growth strategy in North America is keyed to aligning its product portfolio and related production around the needs of our customers and growth segments in the marketplace. This includes the fortification of our light truck line-up with the recent introduction of a refreshed version of America’s best-selling SUV, the CR-V, as well as the all-new 2016 HR-V, a new 2016 Pilot, and the next generation Ridgeline truck, coming to market in 2016.

The strategy also includes strengthening the company’s leading lineup of passenger cars with the introduction this fall of an all-new Civic lineup that will include more variants than ever before, including a new five-door model.

In order to fulfill this customer-focused strategy, Mendel said the automaker is making several changes to the lineup of vehicles it builds in its auto plants in Ohio.

Effective with the 2016 model year, Honda will discontinue production of the Honda Crosstour at the East Liberty Plant in Ohio, and transfer production of the Accord Hybrid from the Marysville Auto Plant to the Sayama Plant in Japan.

The crossover segment has evolved and Mendel said the company believes the all-new 2016 Honda HR-V will create new value for crossover shoppers and play a more significant role as a gateway model for the Honda brand to drive light truck sales growth.

This move will allow the East Liberty Plant to focus on meeting demand for the CR-V and a refreshed 2016 Acura RDX.

The transfer of the Accord Hybrid from the Marysville Auto Plant (MAP) to Honda’s Sayama Plant in Japan, will better optimize our global production capabilities, enabling MAP to focus on its significant role in producing popular models including the Honda Accord Sedan and Coupe and the Acura TLX and ILX performance sedans. ILX production began at MAP in February 2015.

Honda will continue to evolve its customer-focused product strategy in North America by leveraging the flexibility of its production operations in the region.
OEM Profiles

Toyota North America Inc.

Toyota Motor Corp., one of the world’s top automakers, is a Japanese multinational OEM headquartered in Toyota, Aichi, Japan.

The company was founded by Kiichiro Toyoda in 1937 as a spinoff from Toyota Industries to create automobiles. The company employs more than 325,000 worldwide. According to its website, the company has 39,000 employees in North America.

Toyota features the Toyota, Lexus and Scion brands.

Toyota conducts its business worldwide with 50 overseas manufacturing companies in 27 countries and regions. Toyota’s vehicles are sold in more than 160 countries and regions.

The company has factories in most parts of the world, manufacturing or assembling vehicles for local markets. Toyota has manufacturing or assembly plants in Japan, Australia, India, Sri Lanka, Canada, Indonesia, Poland, South Africa, Turkey, Colombia, the United Kingdom, the United States, France, Brazil, Portugal, and more recently, Argentina, Czech Republic, Mexico, Malaysia, Thailand, Pakistan, Egypt, China, Vietnam, Venezuela, the Philippines, and Russia.

Toyota Motor Sales U.S.A. Inc., established in 1957, is Toyota’s U.S. sales and marketing arm, overseeing sales and other operations in 49 states.

Over the past 50 years, the company has built more than 25 million cars and trucks in North America. According to Automotive News data, Toyota has assembly plants in Blue Springs, Miss.; Georgetown, Ky.; Princeton, Ind.; and San Antonio, Texas.

The company’s 1,800 North American dealerships (1,500 in the U.S.) sold more than 2.67 million cars and trucks (more than 2.35 million in the U.S.) in 2014 — and about 80 percent of all Toyota vehicles sold over the past 20 years are still on the road today.

The Toyota Motor North America headquarters is located in Torrance, California and it operates as a holding company in North America.

Toyota Canada Inc. has been in production in Canada since 1983. The company has two plants in Canada and two plants in Mexico.

TMS regional offices coordinate Toyota and Scion vehicle sales, parts and service for dealers in ten regional areas, with two additional regions being served by private distributors. Of the nearly 1,500 Toyota dealers located throughout the U.S., about 1,000 are authorized to sell Scion vehicles.

The Lexus Division directs sales and operations for 231 Lexus dealers located throughout the U.S. through four area offices.

Toyota reported sales of 2,260,963 through the first 11 months of 2015, up from sales of 2,158,714 during the same period the previous year.

The company manufactures nine models in the U.S. including the Camry, Sienna, Sequoia, Highlander, Venza, Avalon, Tacoma, Tundra and Corolla.

Toyota Motor Engineering & Manufacturing North America is headquartered in Erlanger, Ky., with major operations in Arizona, California and Michigan. It is responsible for the company’s engineering design and development, R&D and manufacturing activities in the U.S., Mexico and Canada.

Established in 2006, TEMA represents a current investment of $1.2 billion. It employs 3,150.

Toyota by the numbers

4: U.S. assembly plants
4: Canada, Mexico plants
39,000: U.S. employees

The 2016 Toyota Camry hybrid sedan.
Photo courtesy of Toyota
As part of its strategy in North America, Toyota announced plans in September to jump into the subcompact crossover segment next year with a new model it’s tentatively calling the C-HR.

The production version will debut in early March at the Geneva auto show, Toyota said. The vehicle would be smaller than the Toyota RAV4 compact crossover, and line up squarely against recent entrants such as the Honda HR-V, Mazda CX-3, Chevrolet Trax and Jeep Renegade.

The proportions and aggressive profile echo those of Nissan’s Juke, which has been a hit in Europe. The shape is aimed at buyers who don’t carry lots of luggage or people, said Hiro Koba, chief engineer for the C-HR project.

“They don’t have a lot of stuff, so that’s why I focused on the styling, while a little bit sacrificing interior space, rear seat and luggage space,” Koba said.

In the United States, subcompact cross-over sales continued to roll during the first 11 months of 2015, and were up more than 80 percent over 2014. Consumers are flocking to these vehicles, which promise virtually the same fuel economy as subcompact cars but offer a higher ride position and more cargo room.

For the 2016 model year, Toyota has revised the design of one of its best-selling vehicles. The automaker is giving its biggest car, the Avalon sedan, a light freshening for the 2016 model year. A few styling and equipment improvements have been made to 2016 Avalon models, which debuted in the fall of 2015.

As part of its business strategy, Toyota agreed to a “long-term partnership” with Mazda Motor Corp. that will deepen the Japanese automakers’ collaboration on products, manufacturing and technologies as carmakers race to spread spiraling development costs amid ever-stricter emissions standards.

Under the agreement announced May 13, 2015, the carmakers will form a joint committee to evaluate “how best to utilize each company’s respective strengths.”

The agreement builds upon technical exchanges that date back years between the world’s biggest automaker and one of Japan’s smallest, export-dependent Mazda. Toyota North America also is on the move ... literally.

In June 2015, the automaker unveiled architectural renderings of its future North American headquarters in Plano, Texas.

“Bringing our team members together at this striking and inspiring new campus in Plano will help Toyota become a more cohesive, collaborative and innovative company so we can serve our customers better,” said Jim Lentz, CEO of Toyota’s North America Region.

Also in June, Toyota officially broke ground on the expansion of the Toyota Technical Center (TTC) in Michigan.

Lentz said the expansion of the Michigan campus is a key element of Toyota’s ongoing unification of its North American operations. “Investments here in Michigan will intensify Toyota’s engineering, product development and procurement capabilities.”

Toyota is investing $126 million in the project, which includes construction of two new buildings in York Township. The landscape will add a new prototype facility for vehicle development and a Supplier Center which will allow Toyota to forge even stronger alliances with its supplier partners.

Toyota in November 2015 made a commitment to its Canadian manufacturing operation when it announced plans to produce RAV4 vehicles in its Cambridge North Assembly plant starting in 2019.

With Lexus RX in Cambridge, and Toyota RAV4 in Woodstock and Cambridge, Toyota Motor Manufacturing Canada (TMMC) will become a North American hub for sport utility vehicles. The company also announced that it will be adding hybrid RAV4 production.
OEM Profiles

Kia Motors America Inc.

Based in Seoul, South Korea, Kia Motors is that country’s second-largest automobile manufacturer. The company is partly owned by the Hyundai Motor Group.

South Korea’s oldest car company, Kia was founded on June 9, 1944, as a manufacturer of steel tubing and bicycle parts by hand.

Kia later built motorcycles (starting in 1957), trucks (1962) and cars (1974). The company opened its first integrated automotive assembly plant in 1973, the Sohari Plant. Kia built the small Brisa range of cars until 1981. Production halted when South Korea’s new military dictator Chun Doo-hwan enforced industry consolidation. As a result, Kia turned its focus entirely on light trucks.

Kia rejoined the auto industry in 1986 in a partnership with Ford. The company produced several Mazda-derived vehicles, including the Ford Festiva and Ford Aspire. In 1992 Kia Motors America was incorporated in the United States.

Kia declared bankruptcy in 1997 amid a financial crisis in Asia. In 1998 Hyundai Motor Co. acquired 51 percent of the company, outbidding Ford, which had owned an interest in Kia Motors since 1986.

As a result of subsequent divestments, Hyundai today owns less than 50 percent of Kia.

Kia Motors America is the American sales, marketing and distribution arm of Kia Motors Corp. KMA offers a complete line of vehicles through more than 755 dealers throughout the United States.

In November 2009, Kia started production at the first U.S. Kia Motors plant, Kia Motors Manufacturing Georgia in West Point, Ga. More than 3,000 are employed at the plant. The company also manufactures vehicles for sale in the United States at its Hwasung and Sohari plants in South Korea.

In 2014, Kia’s U.S. sales fell 4 percent to 535,179 units.

Kia is pursuing a strategy it believes will put it on the same level as competitors such as Toyota and VW.

In late 2014, Kia announced it would sell a $60,000, 5.0-liter V-8 BMW-fighting flagship packed with safety and luxury features.

Doubters said the leap upmarket was premature for a budget brand that long traded on cheap prices and equally cheap quality.

Company executives note that the top-shelf K900 sedan, which hit showrooms in March, is key to a grand plan to transform Kia into a mainstream brand on par with Volkswagen or Toyota by 2018.

In 2018, “If we can reach mainstream and then, in another five years, we should be a leader in the market,” Lee Soon-nam, Kia’s overseas marketing chief, said.

Kia’s audacious four-year goal of shedding its down-market image reflects an internal obsession with going mainstream. Kia executives want to exit the shadow of big corporate sibling Hyundai. Meanwhile, they are increasingly under pressure from luxury rivals dipping into compact segments.
“Premium brands are downsizing,” Lee said, citing the Mercedes-Benz B class, Audi A1 and BMW 1 series. “They are taking our territory. That’s why we need some strategy.”

Kia’s counterattack will be to “penetrate the luxury market,” Lee said. “We do not call it the premium market. The luxury market, for example the BMW 5, the BMW 7 market.”

The automaker also is giving some attention to its existing lineup. It has given its Sportage a sleeker look and a more upscale interior.

The new crossover will have Kia’s “most refined, highest-quality cabin to date,” and a “bold, progressive design,” Kia said.

The fourth-generation Sportage will debut in 2016.

Kia’s image remains connected to value. In April, for example, it won Kelley Blue Book’s Brand Image Award for “Best Brand Value.”

Cho Sang-un, general manager for overseas product marketing, said the company’s 4 percent decline in U.S. sales in 2014 reflected supply bottlenecks, not problems with brand perception.

For example, Kia still has to import part of its U.S. supply of Optimas from South Korea. But Korean output has to be rationed for all global markets, meaning the United States can’t always get enough.

“We couldn’t get enough supply. In the case of the Optima and Sportage, we still need more volume,” Cho said.

Officials noted that Kia won’t rush to add capacity in North America or elsewhere. It added 300,000 units in 2015 by opening a third plant in China. But other new output likely will come through streamlining existing operations.

When it comes time for a new factory, Lee suggested China would be first in line. China is expected to be Kia’s fastest growing market through 2016, he said, and it was expected to surpass the United States in 2015 as the brand’s biggest.

In April 2015, Kia North America CEO Byung Mo Ahn stepped down. He was replaced by Jang Won Sohn, who now has the challenge of continuing to increase Kia’s sales and market share and closing the gap with Honda, Nissan and Toyota. ■

Jan Won Sohn become Kia North America CEO in April. His focus is on continuing to grow Kia’s sales.

Photo courtesy of Kia
Established in 1967, Hyundai Motor Co. has grown into the Hyundai Motor Group, with more than two dozen auto-related subsidiaries and affiliates. Hyundai has seven manufacturing bases outside of South Korea including Brazil, China, the Czech Republic, India, Russia, Turkey and the U.S.

Hyundai employs more than 80,000 worldwide and offers a full line-up of products including small to large passenger vehicles, SUVs and commercial vehicles which are sold in 193 countries.

Hyundai entered the U.S. auto market on Feb. 20, 1986 with a single model, the Hyundai Excel. The company operates eight research centers in Korea along with four international centers.

In North America, Hyundai operates one of the world’s most technologically advanced manufacturing facilities, located in Montgomery, Ala., in addition to a state-of-the-art engineering and technology center in Michigan, an R&D center and testing grounds in California, and port facilities in Georgia, Pennsylvania, Oregon and California. Hyundai vehicles are sold and serviced by more than 800 dealerships nationwide.

More than half the cars Hyundai sells in the U.S. are made in the U.S. It has a technologically sophisticated manufacturing facility in Montgomery, Ala., engineering facilities in Michigan, plus design, research, and testing grounds in California. All of which provide around 5,000 jobs for American automotive workers.

In 2016, Hyundai officials are taking a conservative approach to the global auto market. The outlook for the global auto market is “not bright” next year, Hyundai Motor Group Chairman Chung Mong-koo said, indicating 2016 will be another challenging year for the world’s fifth-largest automaker.

Speaking recently to the heads of the automaker’s overseas units, Chung said growth this year was constrained by a weak global economy, the economic slowdown in the world’s second-largest auto market China and a decline in emerging market demand. Hyundai Motor Co., which combined with affiliate Kia Motors Corp., is the world’s fifth-largest car-maker, posted its seventh-straight decline in quarterly profit in October. As part of its global strategy, Chung said the company must build on the launch of new eco-friendly vehicles and the rollout of its high-end Genesis brand.

During the third quarter of 2015, Hyundai reported quarterly profit fell 23 percent after a slump in China deliveries overshadowed gains in SUV sales in the U.S., Europe and South Korea.

Like Kia, Hyundai is diving deeper into luxury by carving out a separate premium brand for its Genesis marque. Company officials said the company will flesh out the new global Genesis luxury brand with six new models through 2020.

According to the company, Genesis will be a stand-alone marque that operates alongside its Hyundai-brand sibling. Genesis cars will initially go on sale in the North American, Korean, Chinese and Middle Eastern markets.

Like many automakers, Hyundai is finding success in the crossover market, and the company unveiled a newly designed Tucson in 2015. In May 2015, Hyundai said it would boost output of its Tucson SUV by adding production at a South Korean assembly line that had been producing sedans in order to meet demand from markets, including the United States.

Hyundai also is considering adding a compact pickup to its U.S. lineup. No decision on whether to build the truck has been made.
Nissan Motor Co., Ltd., Japan’s second-largest automotive company, is headquartered in Yokohama, Japan, and is part of the Renault-Nissan Alliance. It was a core member of the Nissan Group, but has become more independent after its restructuring under CEO Carlos Ghosn.

Nissan has produced an extensive range of mainstream cars and trucks, initially for domestic consumption but exported around the world since the 1950s.

Until 1982, Nissan automobiles in most export markets were sold under the Datsun brand. Since 1989, Nissan has sold its luxury models in North America under the Infiniti brand. The company resurrected the Datsun brand in 2014 in some overseas markets.

Nissan has production facilities in 18 countries. In North America, it has plants in Smyrna, Tenn.; Decherd, Tenn.; Canton, Miss.; Aguascalientes, Mexico; and Cuernavaca, Mexico. It has more than 247,500 employees globally.

Nissan Mexicana, S.A. de C.V. was established in 1961 as an importer and distributor of Datsun vehicles. In 1966, it began producing vehicles, including the Sentra for North America, and became the first Japanese-owned automobile production facility in North America. Today, with annual vehicle production capacity of more than 300,000, the Mexican plants also produce engines and other parts for global distribution. NMEX employs about 8,000 people at its four manufacturing and distribution facilities. An additional 446 jobs are located in NMEX’s main office in Mexico City.

In Canada, Nissan Canada Inc. markets and distributes Nissan and Infiniti vehicles to Canadian dealerships. Nissan Canada directly employs more than 200 people at four regional offices and generates an additional 3,331 jobs at 148 Nissan and 22 Infiniti dealerships nationwide.

As part of the Renault-Nissan Alliance, French automaker Renault owns a 43.4 percent controlling stake in Nissan, but over the years, the Japanese company has dwarfed its French partner in magnitude. Nissan generates two-thirds of the sales and profits in the alliance. It pulled Renault through Europe’s lean years and subsidizes Renault’s business in the low-margin trench warfare that is the European volume car market.

Ghosn said in the wake of a dispute with the French government over the balance of power in their car-making partnership, Renault SA and Nissan Motor Co. will step up integration without moving toward a full merger.

According to Ghosn, Renault and Nissan will unveil new operational synergies next year, following up on previous efforts to integrate purchasing, manufacturing, engineering and other functions.

A company spokesman said in November it was not planning to issue new shares to “water down” Renault’s stake in Nissan.

As part of its business strategy, Nissan in November 2015 unveiled its restyled 2016 Sentra at the Los Angeles Auto Show. The restyling gives the Sentra the same family looks as Nissan’s Maxima large sedan and Murano midsize crossover.

Nissan’s crossover models continued to push the brand to new heights in November 2015, with sales of 95,389 cars and trucks topping a record for the month.
A 3.9 percent gain over November 2014 came largely from big demand for the Rogue compact crossover, which outsold Nissan’s perennial volume leader, the Altima sedan, for the third consecutive month.

The Rogue’s November sales increased 50 percent from a year earlier to 22,565. Sales of the Altima dipped 9.9 percent to 20,564. The carmaker rolled out a significantly freshened Altima late in the month, and both retail inventories and fleet orders were temporarily diminished, says Dan Mohnke, Nissan vice president for U.S. sales & marketing operations.

Nissan sales totaled 1,345,618 units through the first 11 months of 2015, up from 1,269,577 vehicles during the same period in 2014.

Rising crossover demand also lifted the luxury Infiniti brand to its 11th consecutive month of year-over-year sales increases, says Randy Parker, vice president of Infiniti Americas.

As part of its global strategy, Nissan Motor Co.’s reborn Datsun brand is considering additional global markets for its low-cost cars.

The brand launched just 18 months ago, entering four countries in 2014 -- India, Indonesia, Russia and South Africa. It is now studying the possibility of expanding into Southeast Asia, Latin America and more African markets, says Vincent Cobee, global head of Datsun.

The venture chalked up about 114,000 sales, opened 420 dealerships and launched three factories in three countries.

Datsun, a name associated with small sports cars and pickups in the United States in the 1970s, now represents Nissan’s effort to garner a share of what Cobee calls the “rising middle class” in emerging world markets.

In November 2015, Nissan teamed with Bentley Motors Limited, Emerald Automotive to work with the U.K.-based Lightweighting Excellence Program (LX) in order to achieve vehicle weight reduction.

Nissan officials said that significant lightening of the weight of a passenger vehicle by replacing an existing metallic body structure with lightweight carbon composite is a future requirement.

One of the most difficult candidate parts for manufacturing in carbon composites could be a structural floor component which Nissan is offering the LX program for development. The first run of prototypes will be produced in early 2016 as proof of concept, showing high volume manufacturing methodology and processes ready for future full-scale production.

On Sept. 14, 2015, Nissan North America celebrated the production of its 3-millionth vehicle at the Canton Vehicle Assembly Plant located in Canton, Miss. The company expected to produce close to 1 million vehicles in the U.S. in 2015. Nissan also has invested more than $10.1 billion in its U.S. operations.

John Martin, senior vice president, Manufacturing, Purchasing and Supply Chain Management for Nissan, said the company has a target to grow its U.S. market share from just over 8 percent in 2015 to 10 percent in the near future.

“The strength of our workforce in Tennessee and Mississippi enhances our ability to expand production in the Americas, driving Nissan’s success in the U.S. and around the world,” he said.
Volkswagen Group of America Inc. is the North American operational headquarters, and subsidiary of the Volkswagen Group of automobile companies of Germany.

The company is responsible for five marques: Audi, Bentley, Bugatti, Lamborghini and Volkswagen cars. In July 2012, Volkswagen AG took over Porsche.

Founded in 1955, Volkswagen of America Inc. is headquartered in Herndon, Va. Volkswagen’s operations in the United States include research and development, parts and vehicle processing, parts distribution centers, sales, marketing and service offices, financial service centers, and its state-of-the-art manufacturing facility in Chattanooga, Tenn. It also has plants in Puebla, Mexico, which produces the Beetle, Jetta, Golf and Tiguan, and San Jose Chiapa, Mexico, where the Audi Q5 is produced.

Volkswagen is one of the world’s largest producers of passenger cars and Europe’s largest automaker. Volkswagen sells the Beetle, Beetle Convertible, Eos, Golf, Golf R, GTI, Jetta, Jetta SportWagen, Passat, CC, Tiguan, Touareg and Routan vehicles through approximately 600 independent U.S. dealers.

Volkswagen sold 550,904 units through the first 11 months of 2015, up slightly from the 542,682 units during the same period in 2014.

In 2015, Volkswagen was embroiled in controversy.

The automaker said in September 2015 it expects it will need at least several months to get to the bottom of the rigging of emissions tests on its diesel vehicles, which has turned into the biggest business crisis in its 78-year history.

VW has admitted cheating in diesel emissions tests on around 11 million diesel vehicles. The scandal sent the company’s stock sharply lower and forced out long-time CEO Martin Winterkorn, who has been replaced by Porsche boss Matthias Mueller.

The automaker’s legal problems deepened in December, as the European Union’s anti-fraud office said it had opened an investigation into whether the carmaker had misused hundreds of millions of euros in low-interest loans provided by a publicly financed development bank.

Prosecutors in Stuttgart, Germany, said in December that they had begun an investigation into whether employees at Bosch, a major Volkswagen supplier, had played a role in programming vehicles to cheat on emissions tests.

Despite the troubles, the automaker remains aggressive in its growth strategy.

In December, it announced it will stop making its top-of-the-line Phaeton sedan by the end of March. The sedan was a darling of former Chairman Ferdinand Piech that failed to establish a presence in luxury cars in more than a decade.

The company’s familiar glass-walled plant in Dresden, Germany, that assembles the Phaeton will be renovated to potentially broaden out the production to other Volkswagen models, with the project taking about a year, according to Carsten Krebs, a VW spokesman.

The automaker also has focused on restyling some of its popular vehicles to continue its push to overtake Toyota as the world’s largest automaker.

Volkswagen’s updates for the 2016 Passat midsize sedan include fresh front and rear styling, a revised instrument panel and center console, a sporty new trim line and a new infotainment and connectivity system.

Assembled in Mexico, the 2016 Beetle is a popular model in the U.S. Photo courtesy of VW.
Mueller also has his eyes on the future and has gone outside the automaker’s walls for help.

Thomas Sedran, a former General Motors executive, has been hired as VW’s chief strategist.

Sedran must figure out where the embattled automaker and its 12 brands need to be in 2025 and create a road map to get there. The main task is to come up with a plan to improve the positioning of the VW, Skoda and Seat volume brands.

But amid the haze surrounding VW’s future structure, Sedran will have to come up with a plan for how to prevent the group’s key volume brands from competing with one another. He’ll also have to come up with a plan to sharpen their images and determine what new business models in the digital age can be created.

Audi has been a steady brand in the VW stable in recent years, though it showed unspectacular growth in November.

Audi sold just 1 percent more vehicles in November than a year ago as the brand’s Chinese sales fell sharply and growth slowed in the U.S.

The slowdown in the Chinese market and the phase-out for the first-generation Q7 in the United States hurt sales, Audi’s sales and marketing chief Dietmar Voggenreiter said in the statement. “The sustained high demand for Audi models in Europe and our good global order situation continue to provide momentum for the months ahead,” he said.

Audi’s sales in China dropped 5.8 percent to 49,519. U.S. sales rose just 0.4 percent to 16,700. The brand’s volume grew 6 percent to 62,300 in a European market rebounding from economic woes, including an 8.6 percent rise in its German domestic market.

Audi said sales were up 3.4 percent in the first eleven months to 1.65 million.

Audi also is working on its electric vehicle program. In August it said it will develop batteries for electrically powered SUVs that can run more than 311 miles per charge. Audi said it will get cell modules for the batteries from LG Chem and Samsung SDI.

Porsche AG is headquartered in Stuttgart, and is owned by Volkswagen AG. Porsche’s current lineup includes the 911, Boxster, Cayman, Panamera, Cayenne, Macan, and the 918.

Established in 1984, Porsche Cars North America, Inc. is the exclusive U.S. importer of Porsche vehicles.

In 2016, Porsche will launch the latest versions of the Boxster and Cayman, now renamed to 718 Boxster and 718 Cayman.
Bayerische Motoren Werke AG (English: Bavarian Motor Works) is a German automobile, motorcycle and engine manufacturing company founded in 1917. BMW is headquartered in Munich, Bavaria, Germany. It also owns and produces the Mini marque, and is the parent company of Rolls-Royce Motor Cars.

BMW of North America LLC, along with its subsidiaries, markets and sells motor vehicles, such as motorcycles, motor and passenger cars and light trucks. In addition, it offers vehicle financing and leasing services. The American company was founded in 1975 and is headquartered in Woodcliff Lake, N.J.

BMW of North America operates as a subsidiary of Bayerische Motoren Werke AG.

BMW North America has a production facility in Spartanburg, S.C., where it produces X3 and X6 models for export worldwide. The plant does not assemble all BMW models sold in the United States.

Sales of BMW brand vehicles increased 5.6 percent to 167,853 in November 2015 and by 5.8 percent to 1.72 million in the first 11 months, according to Automotive News.

November was also a record month for Mini though sales inched up less than 1 percent to 29,271 last month. Year-to-date volume rose 13.8 percent to 302,091.

Europe deliveries were up 9.7 percent year-to-date to 902,223 with sales in the Americas up 5.3 percent to 447,445.

Asia region volume rose 4.5 percent to 621,671.

“The steady sales growth we’ve shown throughout the year so far reflects the great new products we currently have on the market,” said Ian Robertson, BMW’s sales and marketing head. “We are seeing a very positive customer response to a wide range of products, resulting in sustained sales momentum.”

The automaker has been actively pursuing lightweighting options for its vehicles. During the summer of 2015, engineers and designers in Munich worked together to create new lightweight parts that could be fitted to future cars in order to shed some weight.

A 5 Series GT prototype was fitted with a carbon fiber roof, similar to the one found in the new M3 and M4 sportscars, an indication that future models could feature a similar setup.

BMW says its engineers are always testing lightweight solutions for every day life in order to collect data and make educated decisions in the future.

In 2015, BMW also debuted the new 340i and the flagship 7 Series.

As part of its business strategy, BMW continues to make inroads in the compact market with its 1 series. It is produced in four different body styles.

In November 2015, BMW unveiled a compact sedan concept at China’s Guangzhou auto show that previews a small sedan expected to be badged as a 1 series in that market.

The concept envisions a four-door positioned below the 3 series that could be developed on an existing platform and aimed at the budding market of young, wealthy Chinese. It draws heavily on BMW’s modern design language, with BMW assuring showgoers that there’s enough interior space for two rear-seat passengers to ride comfortably.
About the only technical tidbits that BMW has announced are the flush door handles that are activated with a touch. The concept also has LED headlights and 20-inch wheels.

The automaker has been spotted testing mules of a compact sedan with the same general dimensions, suggesting that a production version may not be far off, at least for China. BMW also continues the focus on small with its redesigned X1 compact crossover, the smallest people carrier BMW will export to the United States, according to Peter Henrich, vice president of product management for compacts.

The second-generation all-wheel-drive X1 went on sale in the United States in late October. A front-wheel-drive version will not be offered in the U.S.

Henrich confirmed that BMW is considering a compact 1-series sedan primarily for the U.S. to compete with the Audi A3. The previous 1-series coupe and convertible, renamed the 2 series, are the smallest BMW cars sold in the United States. The redesigned 1-series hatchback is sold in other markets.

The 2016 X1 has not gained length; in fact it is a half-inch shorter than the predecessor. But the height has increased by 2.5 inches. With the new group compact architecture, the engine moved to a transverse position, and “you gain a lot of interior room,” Henrich said.

As for a possible 1-series sedan, Henrich said: “We have to find the balance between the customer demand and profitability on a worldwide level.”

As part of its North American strategy, BMW has a $13.4 million, 414,534-square-foot warehouse adjacent to the Greer Inland Port in South Carolina that used for staging vehicle assembly kits for export.

These parts and components are packaged in Spartanburg and then exported to countries where local manufacturers can assemble them. BMW currently operates such automobile plants in Thailand, Malaysia, Russia, Egypt, Indonesia, and India, plus a motorcycle assembly factory in Brazil.

BMW also continues to see growth in its Mini brand.

In 2016, Mini is banking that its redesigned convertible -- with a BMW architecture and engines and a host of new premium options -- will push the model up and away from volume competitors.

Mini said pricing for the four-seat soft-top convertible will be announced in January. It goes on sale in the U.S. in March.

It is one of Mini’s five so-called superhero, or core, models. Mini’s strategy with its new generation of cars is to focus on volume models rather than expand into more niches. The convertible will be offered as a base Cooper or high-performance Cooper S model. Mini also recently took the wraps off a newly designed Clubman wagon.

The four-door Clubman unveiled here sheds a quirky door design and grows 12 inches in length -- pushing the wagon into the compact segment. It’s the first time Mini will compete with compact cars such as the Mercedes-Benz CLA and Audi A3.

Mini will roll out one new model annually for the next few years, said Schwarzenbauer. The Clubman goes on sale in January. A redesigned Countryman is expected by 2017. BMW’s Rolls Royce during the first quarter of 2015 announced plans to build an SUV. The automaker did not specify a launch date for the new SUV.

Luxury off-roaders are becoming a new battleground for premium carmakers, with Bentley and Jaguar already announcing plans for SUVS. It now leaves Ferrari as the only major luxury automaker without an SUV.
Mercedes-Benz USA

Tracings its roots to the late 19th century, Mercedes-Benz is a global division of the German manufacturer Daimler AG. The brand is used for luxury automobiles, buses, coaches and trucks.

The company also owns major stakes in Japanese truck maker Mitsubishi Fuso Truck and Bus Corp.

Headquartered in Stuttgart, Baden-Württemberg, Germany, the Mercedes-Benz name first appeared in 1926 under Daimler-Benz but traces its origins to Daimler’s 1901 Mercedes and to Karl Benz’s 1886 Benz Patent Motorwagen, widely regarded as the first automobile.

Mercedes-Benz carries a full range of passenger, light commercial and heavy commercial equipment. Vehicles are manufactured in multiple countries worldwide. The smart marque of city cars and Maybach luxury cars are also produced by Daimler AG.

Although Mercedes-Benz USA was founded in 1965, importation of Mercedes-Benz vehicles actually began in 1952 under Max Hoffman, who was a driving force behind the car that cemented the identity of Mercedes-Benz in America: the iconic 300SL Gullwing.

By 1957, Mercedes-Benz was in a position to expand its reach in the United States and entered into a distribution agreement with Studebaker-Packard Corp. Eight years later, the company struck out on its own, forming Mercedes-Benz USA.

The automaker sold 341,543 units through the first 11 months of 2015, an increase over the 328,319 units moved during the same period last year.

At the company’s plant in Tuscaloosa, Ala., everything is under one roof... from body, paint, and assembly shops to administration and shipping. This unity helps to emphasize the importance of teamwork and to foster team member communication and facilitate the consistent, incomparable quality inherent in the assembly of all Mercedes-Benz vehicles.

Each model is built “just-in-time,” a manufacturing method based on the idea that stockpiling large amounts of inventory is not only inefficient but unnecessary. In fact, in the assembly shop, the target is to have only two hours worth of inventory stocked (approximately three hours in the body shop) at any given time for the production line.

When additional inventory is needed, the facility’s automated system places an order for replenishment and it’s delivered almost immediately.

The manufacturing process for both models begins in the body shop where the components that comprise the metal body are welded together. Then, from the ultra-clean paint shop, the painted body finishes its journey in Assembly where it becomes a new Mercedes-Benz M, R, or GL-Class ready for shipping.

To make this process possible, the MBUSA Energy Center provides and monitors the power required to produce the vehicles. Team members in the Energy Center work around the clock in three shifts to make sure that they have all the electricity, natural gas, compressed air, and various waters used in the manufacturing process. The energy required at full production is approximately 42 million watts — or roughly similar to the typical energy needs of 8,400 single-family homes.

With technology increasing in the company’s product and the increasing complexity of
the vehicles produced, there is more automation in the company's plants. The Tuscaloosa plant now has approximately 1,300 robots in the plant, of those, approximately 1,150 are in the Body Shop compared to the 60 robots in the previous Body Shop - which helps ensure repeatability and consistency.

The plant also utilizes a perceptron laser measurement device, a highly accurate procedure utilizing laser sensors to ensure that the dimensions on every body meet the Mercedes-Benz standard of excellence. The perceptron has cameras located on the robot that measure selected dimensional spots.

For 2016, Mercedes-Benz has freshened and renamed its largest SUV to give it more power, a new nine-speed transmission and styling changes. Company executives hope those changes will keep it atop its segment during the last half of its life cycle.

The 2017 GLS, which replaces the outgoing GL, has more power, greater fuel efficiency, a new nine-speed transmission, and upgraded suspension and design changes for both the interior and exterior.

Mercedes-Benz is still mulling a pickup for the U.S., and has lengthened the timetable for a decision.
Steve Cannon, CEO of Mercedes-Benz USA, says a decision will come by mid-2016. It had been expected by the end of 2015.

The midsize pickup, a joint effort between parent company Daimler AG and Nissan, is being developed for other parts of the world. A decision for the U.S. would come before design freeze, Cannon said. That would allow U.S. product planners to have some influence on the pickup if U.S. sales get the green light.

The main question for Cannon is whether Mercedes can add value to the segment. The pickup would have to be pitched as a lifestyle vehicle, not a work truck.

In January 2015, Mercedes-Benz announced it would be hitting the road ... literally.

Daimler AG is moving down south, uprooting Mercedes-Benz USA's headquarters from its longtime perch in New Jersey with plans to relocate it to an Atlanta suburb.

Daimler executives turned down a significant incentive package from New Jersey to keep its U.S. headquarters in Montvale, where it had been running operations since 1972.

Now the second-largest luxury car brand in the U.S. behind BMW AG, Mercedes is joining several other auto makers to have moved operations and corporate headquarters to the South to take advantage of low union membership in right-to-work states, low corporate taxes and easy access to well-maintained highways, rail lines, ports and airports.

Daimler AG manufactures the Smart, which also is marketed in Canada, Mexico, Brazil and Argentina. The Smart microcar will continue to be a niche product in the U.S. with annual sales of about 10,000.

The redesigned ForTwo two-door car goes on sale in November. The 106.1-inch length stays the same.

The ForTwo has a turbocharged, three-cylinder 898cc engine with 89 horsepower mated to either a five-speed manual or a new six-speed dual-clutch transmission.

The brand also is pushing technology as one advantage to win more buyers.

Annette Winkler, head of Smart, wants to pair the microcar with the smartphone.

Smart is making that vision a reality with its new Cross Connect app, which was released to the public in November. The ForTwo will be freshened in 2018. A plug-in electric version goes on sale in 2017.

Daimler AG manufactures microcars through its Smart branch, which is headquartered in Böblingen, Germany, and has its main factory in Hambach, France. Photo courtesy of Mercedes-Benz
Subaru of America Inc.

Subaru of America was established in 1968 in Philadelphia by Malcolm Bricklin and Harvey Lamm to market Subaru automobiles in the United States.

Subaru of America Inc., today is based in Cherry Hill, N.J., is the U.S.-based distributor of Subaru’s brand vehicles, a subsidiary of Fuji Heavy Industries of Japan. The company markets and distributes Subaru Symmetrical All-Wheel Drive vehicles, parts and accessories through a network with approximately 600 dealers throughout the United States.

Subaru has one assembly plant, located in Lafayette, Ind. It has two lines, where it produces the Legacy and Impreza, according to Automotive News data. The plant also produces the Toyota Camry, with that production slated to end in the fall of 2016. The company employs 4,000 at the Lafayette plant.

All Subaru products are manufactured in zero-landfill production plants and Subaru of Indiana Automotive Inc. is the only U.S. automobile production plant to be designated a backyard wildlife habitat by the National Wildlife Federation.

Subaru of America in November 2015 reported 46,070 vehicle sales for the month, a 2 percent increase over November 2014 sales of 45,273. The company also reported year-to-date sales of 526,401 vehicles, a 14 percent gain over the same period in 2014.

On Dec. 9, 2015, Subaru of America broke ground on its new headquarters in Camden, N.J., promising to create 100 jobs in exchange for a $118 million state grant to build its new home.

The Japanese automaker, whose sales have been on fire for the past several years, will be moving about 600 employees housed in its cramped headquarters in Cherry Hill, N.J., and several other locations.

Subaru has been one of the fastest growing brands in the U.S. It expects to sell 565,000 cars in the United States this year and could have sold more if it had the supply, company executives have said.

Subaru has been in New Jersey since 1969 and took the state aid package to remain close to its current headquarters in Cherry Hill. The state financial package was similar to one Mercedes-Benz rejected when it moved to Atlanta this year and shed hundreds of its New Jersey staff in an effort to cut costs.

The new headquarters will be completed in 2017.

In November 2015, Subaru announced plans to build a new three-row crossover vehicle in the United States beginning in 2018. It will be bigger than the outgoing Tribeca crossover it is replacing, the company said.

The new vehicle will be produced at the Subaru assembly plant in Lafayette.

Subaru hasn’t announced the name, but it won’t be Tribeca. Instead, the crossover will likely carry a name “synonymous with outdoor adventure” in the vein of the Outback, Forester and Crosstrek crossovers, Subaru said.
In 2016, Subaru will add production of the redesigned Impreza compact to its factory in Lafayette, where annual production capacity will grow to 400,000 by the end of 2016 from 290,000 today.

 Suppliers can expect refreshed legacy in 2018, a refreshed Forester in 2017 and changes to the Outback in 2018.

 At the end of 2015, the automaker debuted its HyperBlue special edition of the 700 WRX STI. The car offers minor performance improvements, a blue exterior and an upgraded interior.

 The WRX/WRX STI sedans were redesigned last year, so no major changes are expected for a few years. According to reports, a hatchback is possible in 2018.

 The redesigned four- and five-door compact will be slightly larger and offer more upscale and high-tech options.

 In September 2015, Subaru announced plans to invest $140 million to expand annual production capacity by 100,000 vehicles at its sole U.S. plant.

 The Lafayette plant, one of the automaker’s three plants worldwide, will gain 1,204 jobs by 2017.

 As part of the company’s business strategy, it is taking a conservative approach to its growth.

 Yasuyuki Yoshinaga, president of Subaru-maker Fuji Heavy Industries, says there is such a thing as too big. He wants to cap annual sales at slightly more than 1 million vehicles to preserve the brand’s niche appeal.

 Yoshinaga said that Subaru has settled on a maximum annual production capacity of 1.03 million vehicles. That can be pushed 6.8 percent higher to 1.1 million with overtime. No new factories are in the works.

 “We are at an important turning point,” Yoshinaga said. “Many companies try to be bigger or sell more vehicles. If Subaru does the same thing, we will lose our characteristics.” Subaru will position its first plug-in hybrid -- due in the 2018 model year -- mainly as a zero-emissions compliance play.

 Subaru doesn’t plan to sell it in Japan, even though hybrid vehicles account for 18 percent of Japan’s light-vehicle market. Subaru will offer the plug-in hybrid only in markets where required by regulations, Yoshinaga said. He declined to disclose which of Subaru’s current models will get the hybrid drivetrain.

 A weak yen and strong dollar has given Subaru a boost, but the company still has workers at a massive factory in Indiana where it pays in dollars. Mostly, it’s moving the needle with product. In an SUV-crazed country, half of its models -- the Forester, Outback and Crosstrek -- fall into precisely the class of vehicles customers want.

 “This extraordinary success has been built on a foundation of the right product, the right positioning and most of all, a strong retail network,” Thomas Doll, Subaru of America president, said. — Yasuyuki Yoshinaga, president of Subaru-maker Fuji Heavy Industries
APPENDIX
Fiat S.p.A. completed the acquisition of Chrysler Group LLC on Jan. 21, 2014; the companies were merged under holding group Fiat Chrysler Automobiles on Oct. 12, 2014.

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>530,060</td>
<td>581,875</td>
<td>100.0%</td>
<td>9.8%</td>
<td>788,159</td>
<td>720,108</td>
<td>100.0%</td>
<td>9.4%</td>
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**Made in North America**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Rover</td>
<td>51,863</td>
<td>3,907</td>
<td>0.1%</td>
<td>0.7%</td>
<td>32 -</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Scion</td>
<td>51,863</td>
<td>3,907</td>
<td>0.1%</td>
<td>0.7%</td>
<td>32 -</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total N.A.</td>
<td>145,728</td>
<td>173,865</td>
<td>27.5%</td>
<td>29.6%</td>
<td>445,070</td>
<td>407,790</td>
<td>56.5%</td>
<td>56.6%</td>
</tr>
</tbody>
</table>

**Total U.S.**

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Total North America</td>
<td>231,440</td>
<td>243,610</td>
<td>43.7%</td>
<td>41.9%</td>
<td>256,175</td>
<td>237,787</td>
<td>32.5%</td>
<td>30.3%</td>
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</table>

**Total U.S.**

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</tr>
</thead>
<tbody>
<tr>
<td>Total U.S.</td>
<td>74,621</td>
<td>69,782</td>
<td>14.0%</td>
<td>12.0%</td>
<td>31,593</td>
<td>28,826</td>
<td>4.0%</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

**Total North America**

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>General Motors</td>
<td>63,731</td>
<td>77,369</td>
<td>12.0%</td>
<td>13.3%</td>
<td>169,955</td>
<td>148,449</td>
<td>21.0%</td>
<td>20.6%</td>
</tr>
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<td>Ford Motor Co.</td>
<td>48,831</td>
<td>55,186</td>
<td>9.2%</td>
<td>11.5%</td>
<td>138,058</td>
<td>131,148</td>
<td>17.5%</td>
<td>18.2%</td>
</tr>
<tr>
<td>American Honda Motor Co.</td>
<td>58,888</td>
<td>62,385</td>
<td>11.1%</td>
<td>10.7%</td>
<td>56,553</td>
<td>59,429</td>
<td>7.2%</td>
<td>8.3%</td>
</tr>
<tr>
<td>Hyundai-Kia Automotive</td>
<td>74,021</td>
<td>69,782</td>
<td>14.0%</td>
<td>12.0%</td>
<td>31,593</td>
<td>28,826</td>
<td>4.0%</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

**Total U.S.**

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</tr>
</thead>
<tbody>
<tr>
<td>Toyota Motor Sales</td>
<td>91,761</td>
<td>95,932</td>
<td>17.3%</td>
<td>16.5%</td>
<td>249,763</td>
<td>237,894</td>
<td>37.5%</td>
<td>38.7%</td>
</tr>
<tr>
<td>Toyota Motor Sales</td>
<td>91,761</td>
<td>95,932</td>
<td>17.3%</td>
<td>16.5%</td>
<td>249,763</td>
<td>237,894</td>
<td>37.5%</td>
<td>38.7%</td>
</tr>
<tr>
<td>BMW Group</td>
<td>23,244</td>
<td>24,742</td>
<td>4.4%</td>
<td>4.2%</td>
<td>45,253</td>
<td>53,490</td>
<td>3.0%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Jaguar Land Rover N.A.</td>
<td>1,065</td>
<td>1,052</td>
<td>0.2%</td>
<td>0.2%</td>
<td>8,593</td>
<td>8,584</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

**U.S. car and light-truck sales by make – Nov. 2015 (Ranked by total sales)**

Source: Automotive News Data Center.
<table>
<thead>
<tr>
<th>Make</th>
<th>2015</th>
<th>2016</th>
<th>Share 2016</th>
<th>Share 2015</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford</td>
<td>705,728</td>
<td>705,551</td>
<td>10.1%</td>
<td>10.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Chevrolet</td>
<td>706,945</td>
<td>812,464</td>
<td>10.2%</td>
<td>11.5%</td>
<td>-13.2%</td>
</tr>
<tr>
<td>Toyota</td>
<td>984,317</td>
<td>999,242</td>
<td>14.2%</td>
<td>14.1%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Honda</td>
<td>684,300</td>
<td>726,251</td>
<td>9.9%</td>
<td>10.3%</td>
<td>-3.6%</td>
</tr>
<tr>
<td>Nissan</td>
<td>681,526</td>
<td>687,791</td>
<td>9.8%</td>
<td>9.7%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Jeep</td>
<td>534,306</td>
<td>519,507</td>
<td>7.7%</td>
<td>7.3%</td>
<td>-5.7%</td>
</tr>
<tr>
<td>Kia</td>
<td>386,086</td>
<td>390,598</td>
<td>5.6%</td>
<td>5.5%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>Subaru</td>
<td>150,794</td>
<td>158,753</td>
<td>2.2%</td>
<td>1.8%</td>
<td>17.2%</td>
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<tr>
<td>GMC</td>
<td>288,000</td>
<td>279,645</td>
<td>3.9%</td>
<td>3.8%</td>
<td>-2.8%</td>
</tr>
<tr>
<td>Dodge</td>
<td>230,166</td>
<td>261,248</td>
<td>3.3%</td>
<td>3.7%</td>
<td>-11.9%</td>
</tr>
<tr>
<td>Ram</td>
<td>-21</td>
<td>241,504</td>
<td>3.4%</td>
<td>3.0%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Mercedes-Benz</td>
<td>187,444</td>
<td>191,003</td>
<td>2.7%</td>
<td>2.7%</td>
<td>-2.1%</td>
</tr>
<tr>
<td>Volkswagen</td>
<td>290,290</td>
<td>302,448</td>
<td>4.1%</td>
<td>4.3%</td>
<td>-4.6%</td>
</tr>
<tr>
<td>BMW</td>
<td>209,298</td>
<td>200,706</td>
<td>3.0%</td>
<td>2.8%</td>
<td>4.3%</td>
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<tr>
<td>Chrysler</td>
<td>229,587</td>
<td>210,352</td>
<td>3.2%</td>
<td>2.8%</td>
<td>14.2%</td>
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<tr>
<td>Mazda</td>
<td>199,915</td>
<td>161,990</td>
<td>2.3%</td>
<td>2.3%</td>
<td>-16.5%</td>
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<tr>
<td>Buick</td>
<td>85,151</td>
<td>107,899</td>
<td>1.5%</td>
<td>1.5%</td>
<td>-21.1%</td>
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<tr>
<td>Audi</td>
<td>103,758</td>
<td>101,278</td>
<td>1.5%</td>
<td>1.4%</td>
<td>4.9%</td>
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<tr>
<td>Acura</td>
<td>62,302</td>
<td>51,497</td>
<td>0.7%</td>
<td>0.7%</td>
<td>-21.2%</td>
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<tr>
<td>Cadillac</td>
<td>61,397</td>
<td>79,139</td>
<td>0.9%</td>
<td>0.9%</td>
<td>-22.4%</td>
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<tr>
<td>Infiniti</td>
<td>59,892</td>
<td>50,910</td>
<td>0.9%</td>
<td>0.8%</td>
<td>-15.7%</td>
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<td>Lincoln</td>
<td>34,100</td>
<td>38,636</td>
<td>0.5%</td>
<td>0.5%</td>
<td>-11.7%</td>
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<tr>
<td>Mitsubishi</td>
<td>36,726</td>
<td>30,827</td>
<td>0.5%</td>
<td>0.4%</td>
<td>19.1%</td>
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<tr>
<td>Land Rover</td>
<td>-12</td>
<td>62,141</td>
<td>45,711</td>
<td>0.7%</td>
<td>35.5%</td>
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<tr>
<td>Volvo</td>
<td>28,440</td>
<td>30,385</td>
<td>0.4%</td>
<td>0.4%</td>
<td>6.6%</td>
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<tr>
<td>Mini</td>
<td>38,967</td>
<td>28,783</td>
<td>0.4%</td>
<td>0.3%</td>
<td>-35.3%</td>
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<td>Scion</td>
<td>50,654</td>
<td>54,192</td>
<td>0.7%</td>
<td>0.8%</td>
<td>-6.5%</td>
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<td>Porsche</td>
<td>20,424</td>
<td>22,284</td>
<td>0.3%</td>
<td>0.3%</td>
<td>-8.2%</td>
</tr>
<tr>
<td>Fiat</td>
<td>23,583</td>
<td>31,406</td>
<td>0.4%</td>
<td>0.4%</td>
<td>-24.9%</td>
</tr>
<tr>
<td>Tesla*</td>
<td>18,700</td>
<td>16,500</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.0%</td>
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<tr>
<td>Jaguar</td>
<td>13,289</td>
<td>14,999</td>
<td>0.2%</td>
<td>0.2%</td>
<td>-5.8%</td>
</tr>
<tr>
<td>Maserati</td>
<td>10,624</td>
<td>11,531</td>
<td>0.2%</td>
<td>0.2%</td>
<td>8.7%</td>
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<td>Smart</td>
<td>6,811</td>
<td>9,489</td>
<td>0.1%</td>
<td>0.1%</td>
<td>-28.1%</td>
</tr>
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<td>Bentley</td>
<td>2,105</td>
<td>2,591</td>
<td>0.0%</td>
<td>0.0%</td>
<td>-18.8%</td>
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<td>Ferrari†</td>
<td>1,947</td>
<td>1,304</td>
<td>0.0%</td>
<td>0.0%</td>
<td>54.3%</td>
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<td>Rolls-Royce®</td>
<td>1,045</td>
<td>1,198</td>
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<td>0.0%</td>
<td>14.2%</td>
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<td>Aston Martin®</td>
<td>935</td>
<td>916</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.1%</td>
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<tr>
<td>Lamborghini®</td>
<td>693</td>
<td>674</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.8%</td>
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<tr>
<td>Alfa Romeo</td>
<td>608</td>
<td>24</td>
<td>0.0%</td>
<td>0.0%</td>
<td>-96.0%</td>
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<tr>
<td>Lotus*</td>
<td>543</td>
<td>140</td>
<td>0.0%</td>
<td>0.0%</td>
<td>-73.8%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>6,934,694</td>
<td>7,088,388</td>
<td>100.0%</td>
<td>100.0%</td>
<td>-2.2%</td>
</tr>
</tbody>
</table>

* Estimate  †Includes Detroit 3 domestic brands and Tesla  ‡Includes Japanese brands sold in the U.S.  §Reflects brands sold in the U.S.
AM GENERAL

T Mishawaka, Ind. – Mobility Ventures MV-1 (gas/cng), Mercedes-Benz R class

BMW

T Spartanburg, S.C. – BMW X3, X4, X5, X6, X7 (late 2018)
? San Luis Potosi, Mexico. – BMW (2019)

FCA NA

UNITED STATES

C Belvidere, Ill. – Chrysler 100 (2nd half 2016), Dodge Dart; Jeep Compass, Patriot (ends mid-2016)
C Conner Avenue (Detroit) – Dodge Viper (ends 2017)
T Jefferson Avenue (Detroit) – Dodge Durango; Jeep Grand Cherokee, Grand Wagoneer (1st qtr 2019)
C Sterling Heights, Mich. – Chrysler 200, Mid-sized Chrysler CUV (2018)
T Toledo (Ohio) Assembly– (1 plant, 2 lines) –
Toledo North – Jeep Cherokee
Toledo Supplier Park – Jeep Wrangler, Wrangler Unlimited 4dr
T Warren (Mich) Truck – Ram 1500

CANADA

C Brampton, Ontario – Chrysler 300/300C; Dodge Charger, Challenger Barcuda (convertible) (2018)
T Windsor, Ontario – 5th generation ends Dec. 2015 (year end) –
Chrysler Town & Country (Voyager in Mexico Mkt), Full-sized Chrysler CUV (2017); Dodge Grand Caravan; Ram commercial van (ended Feb. 2015), Lancia Voyager (ended Feb. 2015)
1st qtr 2016: Town & Country (6th gen.), Caravan (5th gen. continues)

MEXICO

T Saltillo – (2 separate plants) –
Truck – Dodge Ram 1500, Ram Mega Cab, Ram 2500/3500, Ram 3500 Chassis Cab,
DX Chassis Cab (Mexico Market), Ram 4500/5500 Chassis Cab, Van – Ram ProMaster
B Toluca – Dodge Journey (redesigned 2016, moving to SHAP?); Fiat 500, Freemont (Journey in Europe)

FORD

UNITED STATES

B Chicago – Ford Explorer (10th gen.), Taurus; Lincoln MKS (ends 3 qtr. 2016)
T Dearborn, Mich. – Ford F-150 (aluminum body)
T Detroit (Mich.) Chassis Plant – Ford F-series chassis
C Flat Rock, Mich. – (former AutoAlliance) –
Ford Mustang, Fusion (gas engine, ends 2019), Lincoln Continental (April 2016)
T Kansas City, Mo. – (1 plant, 2 lines) –
SUV – Ford Transit
Truck – Ford F-150 (aluminum body): Super Cab, Super Crew Cab, King Crew Cab
T Kentucky Truck (Louisville) – F-series Super Duty (F-250 - F-550), Expedition; Lincoln Navigator
T Louisville, Ky. – Ford Escape (2nd gen.), Lincoln MKC
C Michigan Assembly (Wayne, Mich.) – Ford C-Max, Focus (both end 2018)
T Ohio Assembly (Avon Lake) – Ford E series chassis, F650/F750 (moved from Blue Diamond JV with Intl)

Note: C= car plant; T= Truck plant.; B=car and truck same line

CANADA

T Multimatic Motorsports – Markham, Ontario – contract plant
Ford GT (1st half 2016)
T Oakville, Ontario – Ford Edge, Flex; Lincoln MKX, MKT

MEXICO

T Blue Diamond (JV w/ International) – Escobedo –
Ford F650, F750 (ended April 2015, transferred to Avon Lake, Ohio)
C Cuautitlan – Ford Fiesta
C Hermosillo – Ford Fusion, Lincoln MKZ

GENERAL MOTORS

UNITED STATES

T Arlington, Texas – Cadillac Escalade, Escalade ESV; Chevrolet Tahoe, Suburban; GMC Yukon XL, Yukon (all truck’s hybrid versions also)
C Bowling Green, Ky. – Chevrolet Corvette Stingray
C Detroit-Hamtramck, Mich. – Buick LaCrosse (mid-2016, moves from Fairfax); Cadillac CT6 (early 2016), ELR; Chevrolet Volt, Impala (overflow), Malibu (overflow); Opel Ampera
C Fairfax (Kansas City, Kan.) – Buick LaCrosse (ends mid-2016); Chevrolet Malibu
T Flint, Mich. – Chevrolet Silverado, GMC Sierra (HD crew cab, LD reg cab)
T Fort Wayne, Ind. – Chevrolet Silverado, GMC Sierra (Hybrid for both)
T Lansing (Mich.) Delta (Delta Township) – Buick Enclave, Chevrolet Traverse, GMC Acadia (ends mid-2016)
C Lansing (Mich.) Grand River – Cadillac CTS, ATS; Chevrolet Camaro (6th gen)
C Lordstown, Ohio – Chevrolet Cruze
C Orion Township, Mich. – Chevrolet Sonic, Bolt (4th qtr 2016), Buick Verano
T Spring Hill, Tenn. – Chevrolet Equinox (overflow) (ends ?), Cadillac XT5 (1st qtr. 2016), GMC Acadia (mid-2016)
T Wentzville, Mo. – Chevrolet Colorado, Express; GMC Canyon, Savana

CANADA

T Ingersoll, Ontario (CAMI) –
Chevrolet Equinox, Equinox Sport; GMC Terrain
B Oshawa Car, Ontario – (1 plant, 2 lines) –
Consolidated – (1 shift, closes 2017, depends on demand) –
Chevrolet Equinox, Impala Limited (9th gen., fleet only)
Flex – Buick Regal; Cadillac XTS; Chevrolet Camaro (ends Nov. 2015, 5th gen.), Impala (10th gen.)

MEXICO

B Ramos Arizpe– (1 plant, 2 lines) –
Line #1 – Cadillac SRX (ends late 2015); Chevrolet Sonic Equinox (2017, overflow moves from Spring Hill), GMC Terrain (2017, overflow)
Line #2 – Chevrolet Captiva Sport (Mex Mkt, Can. fleet)
B San Luis Potosi – Chevrolet Aveo (for Mex, & Latin Amer. mdk), Trax
T Silao – Chevrolet Silverado/Cheyenne crew cab; GMC Sierra crew cab

Buick Cascada, built in Poland, (on sale1Q 2016)

Buick Envision, late 2015, sister to Equinox (China/US Sales ?)

HONDA

UNITED STATES

B East Liberty, Ohio – Acura RDX; Honda CR-V, Crosstour (ended Aug 2015)
C Greensburg, Ind. – Honda Civic
T Lincoln, Ala.: – (1 plant, 2 lines) –
Line 1: Honda Odyssey, Pilot
Line 2: Honda Odyssey, MDX, Ridgeline (2016)

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## North America car and truck assembly plants – as of 11-17-15

### CANADA

**Hyundai - Kia**
- C, Montgomery, Ala. – Hyundai Elantra, Sonata
- B, West Point, Ga. – Hyundai Santa Fe, Kia Optima, Sorento
- B, Monterrey, Nuevo Léon, Mexico – Kia Rio (1st half 2016), Forte (2018+)

**Mazda**
- C, Salamanca, Guanajuato – Mazda Mazda2, Mazda3, Toyota Yaris, Scion iA

**Mercedes-Benz**
- T, Ladson, S.C. – Mercedes/Freightliner Sprinter
- T, Vance, Ala. – Mercedes-Benz C class, GLA Coupe (like an X6), GLC, GLK SUV (formerly M class, changed name July 2015), R class (for China only, ended July 2015, moved to AM General)

**Subaru**
- B, Lafayette, Ind. – (1 plant, 2 lines)
  - Line 1 – Subaru Legacy, Outback, Impreza (4th qtr. 2016)
  - Line 2 – Toyota Camry (ends Fall 2016)

**Tesla**
- C, Fremont, Calif. – Tesla Model S electric car, Model X, Model III (2017)
  (Former site of NUMMI which closed in March 2010)

**Toyota**
- C, Blue Springs, Miss. – Toyota Corolla
- C, Georgetown, Ky. – One plant, two lines
  - Line 1: Toyota Avalon (gas and hybrid), Camry (gas only)
  - Line 2: Toyota Camry (gas and hybrid), Venza (ends 4th qtr 2015); Lexus ES 350
- T, Princeton, Ind. – One plant, two lines
  - East: Toyota Sienna, Highlander (gas and hybrid)
  - West: Toyota Sequoia, Highlander (gas and hybrid)
- T, San Antonio – Toyota Tacoma, Tundra

**Volkswagen**
- C, Chattanooga, Tenn. – Volkswagen Passat, CUV (late 2016)

**Volvo**
- C, Ridgeville, S.C. – Volvo S60 platform (late 2018), capacity 100,000
  Note: actual city where plant is located is unincorporated as of May 11, 2015, Ridgeville is the nearest actual city

### Mexico

**Hyundai - Kia**
- C, Celaya, Guanajuato – Honda Fit, HR-V
- C, El Salto, Jalisco – Honda CR-V

**Mitsubishi**
- B, Normal, Ill. – Plant closes November 2015 – Mitsubishi Outlander Sport

**Mercedes-Benz**
- T, Aguascalientes – (3 separate plants)
  - #1 – Nissan March/Micra, Sentra, Versa (2nd gen.), Versa Note
  - #2 – Nissan Sentra
  - #3 – COMPAS – 60/60 JV with Daimler (Mercedes) – Infiniti Q30 (2017), QX30 (2017), Mercedes CLA (2013) (capacity 230,000)
- B, Guanajuato – (1 plant, 2 lines)
  - Line 1 – Nissan Tsuru, Tida
  - Line 2 – Nissan pickup (some Frontiers), NV200 taxi and cargo, Chevrolet City Express (NV rebadged)

**Nissan**
- B, Canton, Miss. – (1 plant, 2 lines)
  - Line 1 – Nissan Altima
  - Line 2 – Nissan Armada, Frontier, Murano
  - NV (commercial and passenger van), Titan, Xterra

**Volkswagen**
- C, Puebla, Mexico – Volkswagen Beetle (2nd gen.), Jetta (6th gen.), Golf (7th gen), Golf wagon (7th gen), Tiguan (late 2015, 2017 model)
- T, San Jose Chiapa, Mexico – Audi Q3 (2016)

### United States

**Subaru**
- B, Lafayette, Ind. – (1 plant, 2 lines)
  - Line 1 – Subaru Legacy, Outback, Impreza (4th qtr. 2016)
  - Line 2 – Toyota Camry (ends Fall 2016)

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**Volkswagen**
- C, Chattanooga, Tenn. – Volkswagen Passat, CUV (late 2016)

### Notes
- Elio, 3-wheeled car at old GM Shreveport, La., plant
- Wheego, Corona, Calif., Life production suspended in the US. Working on other models (as of Jan. 2016) but might start in China, check back late 2016.
Commercial vehicle production of the United States and worldwide from 1999 to 2014 (in units)

Source:
OICA
© Statista 2015

Additional Information:
Worldwide
Light vehicle assembly forecast for the leading manufacturing countries worldwide from 2012 to 2017 (in millions)

- **2012**: [Diagram showing number of vehicles produced in millions for each country]
- **2013**: [Diagram showing number of vehicles produced in millions for each country]
- **2014**: [Diagram showing number of vehicles produced in millions for each country]
- **2015**: [Diagram showing number of vehicles produced in millions for each country]
- **2016**: [Diagram showing number of vehicles produced in millions for each country]
- **2017**: [Diagram showing number of vehicles produced in millions for each country]

**Source:**
PwC
© Statista 2015

**Additional Information:**
Worldwide
Proportion of materials used in car production as of August 2014

- Regular steel: 39%
- High & medium strength steel: 14%
- Plastics & composites: 10%
- Aluminum: 9%
- Iron: 6%
- Rubber: 5%
- Other steel: 3%
- Other: 14%

Source: Statista 2015

Additional Information:
Worldwide: as of August 2014
Automobile production in China from November 2014 to November 2015 (in 1,000 units)

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**Source:**
CAAM
© Statista 2015

**Additional Information:**
China. CAAM. November 2014 to November 2015
Sales value of plastic auto part manufacture (NAICS 326192) in Mexico from 2009 to 2020 (in million U.S. dollars)

Sources:
Statista, INEGI © Statista 2015

Additional Information:
Mexico: 2009 to 2012
Mexicos projected car production from 2014 to 2018 (in 1,000 units)

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Sources:
PwC, Various sources © Statista 2015

Additional Information:
Mexico: As of Q2 2014
### Average Engineering & Other Plastics Content of North American Light Vehicles (pounds per vehicle)

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Source: American Chemistry Council

### Average Large Volume Plastics Content of North American Light Vehicles (pounds per vehicle)

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Source: American Chemistry Council
Average Plastics & Polymer Composites Use in Light Vehicles in 2014 (pounds/vehicle)

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Source: American Chemistry Council

Average Value of Chemistry Content of North American Light Vehicles ($/vehicle)

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<td>$1,727</td>
<td>$1,732</td>
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Source: American Chemistry Council
Automotive Plastics & Polymer Composites Direct Employment by State (2014)

Direct Employment

- Over 5,000
- 2,500 – 4,999
- 1,000 – 2,499
- 500 – 999
- 25 – 499
- <25

Note: Measures direct employment in NAICS industry group 3261 (Plastics Product Manufacturing), which comprises establishments primarily engaged in processing new or spent (i.e., recycled) plastics resins into intermediate or final products using such processes as compression molding; extrusion molding; injection molding; blow molding and casting.

Source: American Chemistry Council

Source: IHS
Global Forecast of Specialty Chemicals for Automotive Applications (Billions of U.S. Dollars in 2005 Dollars)
Suppliers to the 2015 Chrysler 200

SUPPLIERS WANTED: If you are a supplier and have questions or want your information considered for our car cutaways, contact Supplier Business at: automotivenews@supplierbusiness.com

Source: SupplierBusiness
Suppliers to the 2016 Mercedes-Benz GLE Coupe

SUPPLIERS WANTED: If you are a supplier and have questions or want your information considered for our car cutaways, contact Supplier Business at: automotivenews@supplierbusiness.com

Source: SupplierBusiness
Suppliers to the 2016 Cadillac CT6

SUPPLIERS WANTED: If you are a supplier and have questions or want your information considered for our car cutaways, contact Supplier Business at: automotivenews@supplierbusiness.com

Source: SupplierBusiness
Suppliers to the 2016 Nissan Maxima

SUPPLIERS WANTED: If you are a supplier and have questions or want your information considered for our car cutaways, contact Supplier Business at: automotiveNews@supplierbusiness.com

Source: SupplierBusiness
Suppliers to the 2015 Ford Edge

CRANKSHAFT SEALS
KSPG
ENGINE TAPPETS
INA
CYLINDER BLOCK
[2.7L V-6 COMPAKTED]
GRAPHITE (IRON)
Tupy/SinterCast
CYLINDER BLOCK
Nemak
PISTONS
[2.0L and 3.5L]
KSPG
ADJUSTABLE HOOD HEIGHT BUMPER STOP
Pass
SHIELDING SYSTEMS (ENGINE)
ElringKlinger
EXHAUST MANIFOLDS
[3.5L V-6]
Wescast
HEADLAMPS
[HALOGEN AND XENON]
 Valeo
BODY STAMPING AND ASSEMBLY
Magna
HYDRO ENGINE MOUNT
Trelleborg/Vibracoustic
ROCKER ONE-WAY CLUTCH
Keystone Powdered Metal
ENGINEERED FASTENER
EFC
TRANSMISSION BEARING
INA, FAG
VALVE BODIES
[TRANSITION]
Metaladyne
STEERING SHAFT
ThyssenKrupp
ELECTRICAL POWER STEERING
Brose
ELECTRICAL POWER STEERING COMPONENTS
Norma
STEERING WHEEL CONTROLS
Method Electronics
ELECTRICAL STEERING COLUMN
LOCK U-Shin
FLOOR CONSOLE IAC
DOOR CONSOLE IAC
PASSIVE SIDE IMPACT BEAMS
Leggett & Platt
DOOR FRAME IMPACT BEAMS
Gestamp
FRONT REAR BEAM ASSEMBLY
Shape
POWER LUMBAR
Leggett & Platt
POWER TRANSFER UNITS
GKN Driveline
MOLDED TUNNEL INSULATOR
Janesville Acoustics
DOOR LOCK LATCH CABLES
WR Controls
REAR SEAT OUTBOARD Guelph Tool
BACK WINDSHIELD A/C Automotive
LUGGAGE COVER
[TIGHTLY RETRACTABLE]
BOS
REAR LAMP LED
Magneti Marelli
SUSPENSION COIL SPRING
Nasco
WHEEL ARCH LINERS
[ACOUSTICAL]
Hematite Manufacturing
ACCUSEAL EXHAUST CLAMP
Norma
EXHAUST TIP
[STAINLESS STEEL]
Valor
EXHAUST INSULATION
Bay Fabrication
BRAKE HOSE ASSEMBLY
Hitachi Cable America
ALUMINUM WHEEL
[WHICH PREMIUM PAINTED]
Superior Industries
STABILIZER BAR
New Mather Metals
SUSPENSION LINKS
Martineas
FLOOR CONSOLE
IAC
CAO Ducts
Diesel engine, CAC tubes (from turbo to intercooler & back to intake).
CAC = cold air charge.
Magneride (BW Group) Suspension
Torca AccuLock
AccuLock exhaust clamp
EGR
exhaust gas recirculation
Accella for Seats
leather simulation / decorative material
AIRMATIC - AIR SUPPLY UNIT
WABCO
air systems: electronically controlled air suspension systems
BETASEAL
glass bonding systems used for structural bonding & sealing of stationary vehicle glass
BETAMATE
structural adhesives replace welds & mechanical fasteners, (around spot welds and fasteners)

SUPPLIERS WANTED: If you are a supplier and have questions or want your information considered for our car cutaways, contact Supplier Business at: automotivenews@supplierbusiness.com

Source: Supplier Business
Suppliers to the 2015 Ford Mustang

**Suppliers Wanted:** If you are a supplier and have questions or want your information considered for our car cutaways, contact Supplier Business at: automotiveevents@supplierbusiness.com

Source: SupplierBusiness
Graphic from DuPont detailing where its materials are used in electric and hybrid engines.
Both commodity and engineering polymers are playing an increasing role in automotive light weighting solutions.
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