

CUSTOMERS AND PRODUCTS

We produce high-quality, smart, safe vehicles. And we go further to make them better – for customers, the planet, and everyone on it.

What Our People Say

“My goal is simple: to make our vehicles with as many renewable materials as possible. My team and I look for bio- and plant-based waste streams and literally turn it into car parts. After decades of research, we’ve accomplished some pretty remarkable innovations. But the road to a more sustainable vehicle hasn’t always been easy.”

Debbie Mielewski

Senior Technical Leader in Materials Sustainability, Ford

REDUCING VEHICLE CO₂ EMISSIONS

We acknowledge that climate change is real and that we share the responsibility for reducing greenhouse gas (GHG) emissions in our products. We are committed to making more efficient, lower-impact vehicles and technologies accessible at scale, to make people’s lives better.

HOW WE’RE DRIVING CHANGE

A Smart Approach to CO₂ Reduction

We recognize that there’s no single way to improve fuel efficiency and/or vehicle CO₂ emissions. That’s why we take a portfolio approach across the three areas of vehicles, fuels and customers:



Smarter Vehicle Choices

Offering affordable, accessible lower-carbon options:

- Electrified vehicles
- New engine/transmission technologies
- Electrical system improvements
- Aerodynamic improvements
- Weight reductions
- Advanced powertrain options



Smarter Fuel Choices

Evaluating, developing and introducing vehicles that use lower-carbon fuels:

- Electricity
- Biofuels
- Compressed natural gas (CNG)
- Liquefied petroleum gas (LPG)



Smarter Driving Choices

- Giving customers the choice of which vehicles and fuels to purchase and how those vehicles will be driven and maintained
- Promoting “eco-driving” through training, information and vehicle technology to help customers minimize fuel consumption and emissions

In this section

- [Reducing Vehicle CO₂ Emissions](#)
- [Using Sustainable Materials](#)
- [Product Quality and Customer Satisfaction](#)
- [Improving Vehicle Safety](#)

OUR PERFORMANCE

Lower Emissions Across Our Portfolio

Our approach to improving fuel efficiency and cutting vehicle emissions spans new powertrain technology, electrified vehicles and lower-carbon fuels.

- **40** new electrified vehicles to be launched by 2022
- Our combined fleet fuel economy has **improved by 9%** compared to 2009
- **\$11 billion** investment in electrified vehicle development, some of which was deferred from traditional internal combustion engine (ICE) investment

OUR PLAN FOR REDUCING VEHICLE EMISSIONS

Our science-based global strategy aims to reduce the greenhouse gas (GHG) emissions from our vehicles (as well as our operational processes). Encompassing our Sustainable Technologies and Alternative Fuels Plan, the strategy seeks to deliver high-quality products that meet consumer demand while also responding to the risks presented by climate change.

A Long-Term Approach to Cutting CO₂ Emissions

In collaboration with policy-makers around the world, we continue to reduce vehicle emissions in line with regional “glide paths.” These trajectories define the industry-wide emissions reductions needed to stabilize the changing climate.

Related Page:

[› Addressing Non-CO₂ Emissions](#)

Our industry faces major challenges in this area right now. As well as regulatory uncertainty in the United States, there’s a general switch among customers from cars to trucks and SUVs. In addition, as U.S. fuel prices have been low in recent years, the public prioritization of fuel efficiency has changed. Customers’ expectations and priorities are evolving, turning toward other attributes in their vehicles, such as performance, connectivity and infotainment. This has made it more challenging to get their buy-in for more efficient yet more expensive fuel economy-related technologies.

Nonetheless, we have followed an ambitious plan to improve fuel economy and reduce CO₂ emissions across our product portfolio over the past decade and remain committed to emissions reductions and electrification over the long term.

How We’re Doing

- Ford’s U.S. corporate average fuel economy (combined car and truck) is **29.6¹** miles per gallon
- Ford’s U.S. CO₂ tailpipe emissions (per vehicle, combined car and truck) is **360²** grams per mile
- Ford’s Europe CO₂ tailpipe emissions (per passenger vehicle) is **121 grams per kilometer**

Global Technology Migration Path

Now (<2021)



Policy and Mobility

- First Ford car sharing
- First Ford bike sharing
- First Chariot cities



Internal Combustion Engine (ICE)

- EcoBoost engines widely available
- Diesel engine/after-treatment technology to reduce emissions



Electrification

- Start-Stop systems introduced
- Hybrids/Plug-In Hybrids available in nearly 40% of nameplates
- Focus BEV: 115-mile EV (electric vehicle) range



Alternative Fuels

- Develop SI (spark ignition) and CI (compression ignition) technologies compatible with low-carbon/renewable fuels
- Flex Fuel Vehicles
- CNG-prepared engines available where demand exists



Energy Management, Electrical Architecture and Efficiency

- Electric power steering widely available
- Global migration of battery management systems ongoing
- Aerodynamic improvements



Transmission and Driveline

- 8- and 10-speed variants expand to replace 6-speed automatic transmissions



Weight Reduction

- Significant weight reduction programs using conventional materials

Near (2021-2024)

- Existing technologies at high volume
- Reduce weight
- Expand electrification



Policy and Mobility

- Initiate cross-sector GHG mitigation discussions
- Progress cross-industry and government discussions to increase minimum octane rating
- Introduction of autonomous vehicle (AV) technologies
- Introduction of commercial vehicle (CV) advanced technologies
- Introduction of smart mobility technologies
- Extend sharing and shuttle offerings in regions
- Extended FordPass functionalities including parking finder, etc.
- Intermodal platforms



Internal Combustion Engine (ICE)

- Advanced technologies to further improve gasoline engine/EcoBoost powertrain efficiency and performance
- Expand and optimize gasoline engine/EcoBoost technologies in conjunction with electrified and alternative fuel applications and improved fuel properties
- Further develop diesel technology to enhance capability and affordability in key vehicle segments
- Innovation to meet future local air quality vehicle tailpipe emission standards



Electrification

- Expand electrified driveline and transmission technologies
- More efficient hybrid-specific engines
- Start-Stop widely available
- Hybrids/Plug-In Hybrids available in nearly 50% of nameplates
- BEV: ~300-mile EV range



Alternative Fuels

- Vehicle and powertrain capability to leverage renewable fuels
- Expand product capability for renewable fuels



Energy Management, Electrical Architecture and Efficiency

- Additional aerodynamic improvements
- Develop intelligent energy management technologies, e.g., waste heat recovery



Transmission and Driveline

- Advanced conventional driveline technologies widely available
- Further develop electrified transmission and driveline technologies across all platforms and powertrain configurations



Weight Reduction

- Significant weight reduction programs using conventional and advanced materials

Far (2025+)

- Electrification and alternative fuels at high volume



Policy and Mobility

- Improve sustainability by integrating vehicle technologies, low-carbon/renewable fuels and Smart Mobility solutions
- Engage in cross-sector GHG mitigation projects
- City of Tomorrow solutions



Internal Combustion Engine (ICE)

- Continue optimizing engine technologies for electrified applications
- Identify and incorporate advanced technologies that are compatible and synergistic with low-carbon/renewable fuels

Strategy and Governance

Customers and Products

Operations

People and Society

Performance and Data



Electrification

- Next-generation Hybrid, Plug-in Hybrid and BEV technologies (lighter, smaller, reduced cost, improved functionality)
- BEV models with 300+ EV range available in a growing number of segments
- Continued expansion of all-electric vehicles across portfolio



Alternative Fuels

- Evolve technologies in response to progress in low-carbon/renewable fuels



Transmission and Driveline

- Expand functionality of transmission and driveline technologies in support of next-generation electrified and autonomous vehicles



Weight Reduction

- Development of advanced lightweight material models progresses

Related Pages:

- > [Climate Change Strategy](#)
- > [Alternative Fuels and Powertrains](#)
- > [Operations](#)

1. Includes FFV credits. Does not include A/C or Off-Cycle credits.

The decline in combined car and truck fuel economy of 1% YOY is primarily due to customers purchasing larger cars and more trucks and reduced CAFE FFV credits. Despite the decrease in combined car and truck CAFE, on an individual basis, [our vehicles continue to make fuel economy improvements](#) and our combined fleet fuel economy has improved by 9% compared to 2009.

2. Includes FFV credits. Does not include A/C or Off-Cycle credits.

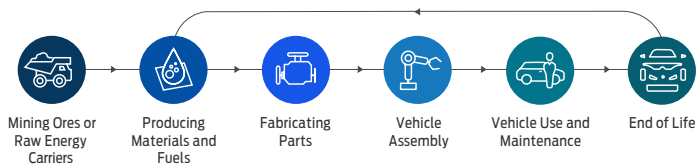
TAKING A LIFE CYCLE APPROACH

We want to understand all the impacts our products and services have, so that we can manage them more effectively. To do this, we need to look at them holistically, over their entire life cycle. This wider view means we are better able to reduce our environmental footprint, through the materials and energy we use to make our vehicles, and the emissions generated by using them.

Assessing Total Life Cycle Impacts

We use a growing range of analytical tools to identify and measure the potential environmental impacts of our products or services over the entire lifetime of our vehicles. This spans the mining of the ores and metals used in their manufacture, through production, distribution and use, to their end-of-life disposal.

Our Product Life Cycle



Greenhouse Gas Emissions in the Vehicle Life Cycle

Greenhouse gases (GHGs) emitted by our vehicles during use are largely determined by factors such as the number of vehicles on the road to the way they are driven. Unlike [facility GHG emissions](#), where we can track energy and other data accurately, we estimate emissions from the use phase by utilizing both sophisticated modeling and actual vehicle testing.

2017 GHG Emissions From Ford Operations and Use of Sold Products

	<i>Million metric tons</i>
Ford Facilities	3.1
Per Vehicle	0.47
Use of Sold Products	161

To date, much of our work to improve the life cycle performance of our products has focused on their tailpipe – or tank-to-wheels (TTW) – emissions. However, we continue to study the well-to-wheels (WTW) impacts, which account for the effects of both the production and consumption of the fuels our products use. Estimates of WTW emissions vary with the specifics of the vehicle, engine and fuel type.

When comparing vehicles, diesels generally have lower lifetime GHG emissions than their gasoline-powered equivalents. In vehicles with alternative powertrains (i.e., electrified), overall CO₂ emissions are dependent on the carbon intensity of the fuel production process. The emission benefits of lower-carbon options such as [BEVs and PHEVs](#) are maximized when the electricity used is generated from renewable sources such as wind or solar power.

While the GHG impacts from fuel production are part of the total vehicle life cycle, they are not within our control and need to be addressed separately. To find ways to reduce GHG emissions during this stage of the life cycle, collaboration with other stakeholders such as fuel producers, infrastructure developers and government is essential.

Related Page:

- > [Alternative Fuels and Powertrains](#)

Water Use in the Vehicle Life Cycle

To assess the water footprint of our vehicles, we have estimated whole life cycle use for a model year 2012 Ford Focus: the internal combustion engine vehicle (ICEV) and the battery electric vehicle (BEV).

Ford Focus 2012 – Estimated Life Cycle Water Use

	<i>Life Cycle Water Withdrawal (Water Withdrawn From a Source) – Estimated U.S. Average (m³)</i>	<i>Life Cycle Water Consumption (Water Permanently Lost From a Source) – Estimated U.S. Average (m³)</i>
Ford Focus 2012 ICEV	530	130
Ford Focus 2012 BEV	3,770	170

There is a notable increase in the water withdrawal associated with the use phase of the BEV; this reflects the amount of water needed for electricity generation and, in particular, the cooling in coal, nuclear and natural gas power plants. In comparison, much less water is needed to produce petroleum fuels.

This highlights the importance of reducing the water consumption associated with fuel production, as well as increasing vehicle energy efficiency.

As well as assessing the water footprint of our vehicles, we're working on a change in how [we use and recycle water](#).

Applying Our Findings

We use our life cycle assessment (LCA) knowledge in research and development using, for example, our Product Sustainability Index (PSI) in Europe. This tool assesses various factors, from global-warming and air-quality potential to the use of sustainable materials, external noise, safety and ownership costs. Through the PSI, we have been able to demonstrate improved environmental, social and/or economic performance over the life cycle of several European models.

Related Page:

- > [Data: Vehicle Fuel Economy and CO₂ Emissions](#)

We also use LCA when assessing the environmental and cost impacts of different materials. We are currently studying the energy and GHG emissions associated with the production of carbon fiber automotive parts, and comparing these impacts to any fuel savings they can provide.

Driving the Science of Sustainability

We believe that addressing climate change requires a multi-sector approach, in which the cost-effectiveness of approaches to reduce CO₂ will be critical.

We are conducting research that compares the cost-effectiveness of actions to achieve emission reduction targets in sectors facing high abatement costs (such as transport) with those in other sectors (such as the energy sector, with respect to fuel production). Our researchers have also contributed to a cradle-to-grave LCA that explores the costs and GHG emissions of current and future technology for light-duty vehicles.

Related Pages:

- > [Improving Fuel Economy](#)
- > [Addressing Non-CO₂ Emissions](#)

IMPROVING FUEL ECONOMY

We use a variety of approaches to improve the fuel economy of our gasoline- and diesel-powered vehicles, guided by our Sustainable Technologies and Alternative Fuels Plan. Improving fuel economy goes hand-in-hand with our work on [electrification](#).

Advances in Engine and Transmission Technologies

Gasoline Engines

Thanks to turbocharging and direct fuel injection, our range of EcoBoost® engines are the standard bearers of our efforts to deliver significant fuel-efficiency gains and reduced CO₂ emissions in gasoline-powered vehicles. This award-winning fuel-saving technology has been used in 8 million engines worldwide.

We are investigating and developing new technologies to improve performance, fuel economy and emissions for multiple powertrain options, such as advanced boosting, reduced friction, and advanced fuel injection and ignition. We also continue to assess the role of [low-carbon renewable fuels](#) on CO₂ reduction and how they may influence future designs.

Additionally, as electrification/hybridization expands to a broader spectrum of segments and markets, we are further developing engines optimized for the various hybrid powertrain configurations and customer requirements.

Reflecting some of the progress we've made in gasoline engine production, the 2.0-liter inline four-cylinder gasoline direct injection engine with Auto Start-Stop in the 2018 Transit Connect Cargo Van is E85-compatible and connected to an 8-speed automatic transmission.

Advanced Transmissions and Drivelines

Along with our new EcoBoost® engines, the 10-speed automatic transmission used in our new Ford Expedition and Lincoln Navigator improves powertrain efficiency and vehicle performance/drivability. Ideal for hauling heavy payloads and towing trailers, we first incorporated it into the 2017 F-150 4x2 and 4x4 models.

We continue to develop our front- and rear-wheel-drive transmissions to increase efficiency and improve vehicle performance while enabling quick, smooth shifts. We are also developing driveline technologies to reduce parasitic losses while enhancing function and drivability, including low-friction all-wheel-drive systems.

Diesel Engines

Diesel engines continue to be a popular option in specific markets and segments, due to their excellent drivability, CO₂ emissions and fuel consumption characteristics, especially under heavy load operation. Modern diesel engines can achieve 20-30 percent better fuel economy than comparable gasoline engines. They also emit 10-20 percent less CO₂ on a [well-to-wheels \(WTW\)](#) basis.

In North America, for example, we're offering two new advanced diesel engines: the 1.5-liter EcoBlue® engine in our 2019 Transit Connect and the 3.0-liter Power Stroke - the first diesel engine for an F-150. Both of these demonstrate the fuel efficiency and power performance that progressive diesel engines can provide.

As our plans develop further, we are maintaining a special focus on sustainable fuels, and already our advanced diesel engines are compatible with [biodiesel](#).

Related Page:

- > [Alternative Fuels and Powertrains](#)

Case study

Improving Air Quality Through European Scrappage Scheme

In August 2017, we launched a car and van scrappage scheme aimed at reducing vehicle emissions and improving air quality in several European markets, including the U.K. and Germany. It enables owners to trade in their old vehicles for new, affordable Ford cars and commercial vehicles with EcoBoost petrol and EcoBlue diesel models; these meet the Euro 6 standard, the toughest vehicle emissions yet.

We then extended the scheme into the first quarter of 2018, which has now seen more than 10,500 vehicles scrapped and replaced with cleaner, more fuel-efficient vehicles.

We've scrapped more than 10,500 vehicles and replaced them with cleaner, more fuel-efficient vehicles.

Reducing Vehicle Weight

We are adopting advanced lightweight materials to help reduce fuel consumption wherever practicable. For example, when we switched to an aluminum body on the 2015 F-150, we were looking to lead the way toward making aluminum the industry standard for automakers.

Related Page:

- > [Data: Vehicle Fuel Economy and CO₂ Emissions](#)

We put our largest vehicles on a strict diet, and aluminum was the right choice: the switch helped the F-150 drop almost 700 pounds! According to an annual life cycle study by the Automotive Science Group, the F-150 leads the full-size light-duty truck competition in all environmental and economic performance areas. This significant weight reduction led to improved fuel economy and provided increased payload and towing capability, which are important attributes for the truck customer.

The F-series logged its 41st consecutive year as the nation's best-selling pickup in 2017, and will be the first full-size pickup to crack the 30-mpg barrier with a diesel engine.

Building on this success, we also reduced vehicle body weight by 200 pounds on the 2018 Lincoln Navigator, 300 pounds on the 2018 Ford Expedition and 350 pounds on the 2017 Ford Super Duty by switching to aluminum. We will maintain this fresh approach to materials in new vehicles as we continue to drive innovation and improve mobility.

“Aluminum for us is about more than weight: it handles better, brakes faster, hauls more, tows more. We were able to put that weight savings into more capability for the customer. We thought it was the perfect material for what customers do with their vehicles.”

Brian Bell

Marketing Manager, Ford Motor Company

Related Pages:

- > [Our Plan for Reducing Vehicle Emissions](#)
- > [Addressing Non-CO₂ Emissions](#)

ALTERNATIVE FUELS AND POWERTRAINS

Our plan to develop sustainable technologies and alternative fuels includes researching and developing alternative powertrains and fuel options across all our vehicles, delivering on our promise to give customers the power of choice.

En Route to Lower-Carbon Fuels

As part of our strategy to support global [climate stabilization goals](#) and a more sustainable portfolio, we have developed a roadmap for migrating our vehicle technologies toward the use of lower-carbon fuel options. We offer a range of powertrain and fuel options that are designed to reduce vehicle CO₂ emissions and improve fuel efficiency.

Our plan to progress sustainable technologies and alternative fuels includes researching and developing alternative powertrains and fuel options across all our vehicles, delivering on our promise to give customers the power of choice.

Related Page:

- > [Data: Vehicle Fuel Economy and CO₂ Emissions](#)

Global Fuels Migration Path

Now (<2021)



Gasoline and Diesel

- Growth of fossil fuel continues with developments in extraction technologies



Electricity (HEV, PHEV, BEV)

- Electricity grids start to transition to low-CO₂ future
- Implementation of renewable energy, including solar and wind



Renewable Biofuels

- Gasoline/diesel fuel quality improvements



CNG and LPG

- CNG and LPG available in limited markets

Near (2021–2024)



Gasoline and Diesel

- Gasoline/diesel fuel quality improvements



Electricity (HEV, PHEV, BEV)

- Electricity grids continue to transition to low-CO₂ future
- Fleet programs confirm grid/infrastructure readiness for plug-in HEVs and BEVs
- Grid/infrastructure and standardization support expansion of plug-in HEVs and BEVs



Renewable Biofuels

- Renewable fuel capacity expands in select markets
- Second generation biomass-based fuel production technology matures



CNG and LPG

- CNG expands in commercial fleets
- Availability increases with demand and production capacity

Far (2025+)



Gasoline and Diesel

- Further gasoline/diesel fuel quality improvements to support advanced vehicle technologies



Electricity (HEV, PHEV, BEV)

- Clean electricity further enhances the benefit of plug-in HEVs and BEVs



Renewable Biofuels

- Renewable fuel capacity expands in all markets
- Greater contribution by second generation biomass-based fuels



CNG and LPG

- CNG from alternative/renewable sources
- Increasing fraction of liquid renewable hydrocarbons in fuel portfolio

Electric Vehicles

We plan to spend \$11 billion by 2022 to build a model lineup of 40 hybrid vehicles, including 16 fully electric models. As well as this, we're aiming to develop a high-performance electric utility vehicle by 2020.

Thinking Big About Electrified Vehicles

Leading in electrification, [autonomy and connectivity](#) is a vital component of our plan for the future. We have already committed a plan that includes an investment of \$11 billion to put 40 hybrid and fully electric vehicles on the road by 2022. Our extended electric vehicle strategy aligns with increasing calls for cleaner, more efficient vehicles, and we remain focused on delivering affordable electric vehicles at scale.

We want to stay ahead of the curve in terms of electric innovation. Global demand for new, cleaner transportation is rising. China, India, France and the U.K. have all already announced plans to phase out vehicles powered solely by combustion engines and fossil fuels between 2030 and 2040. And we want to help them stay on track toward that goal.

Related Page:

- > [Our Plan for Reducing Vehicle Emissions](#)

In May 2018, we moved our electric vehicle and autonomous vehicle teams into a refurbished former factory in Detroit's historic Corktown neighborhood. The new environment will accelerate our push into electrification and strengthen development of self-driving cars, while identifying and solving challenges for these vehicles in an urban environment.

We already have nearly two decades of experience in electrification – developing vehicles that run on a battery-powered electric motor or a combination of electric and gasoline powertrains, along with the supporting infrastructure. We are committed to significantly increasing investments in electric vehicles.

In March 2018, we announced an extension of our partnership with the Mahindra Group to co-develop a small electric vehicle and a number of SUVs. Using our expertise, global reach and connectivity technologies, the vehicles will build on Mahindra's existing portfolio of commercial electric vehicles.

In China, Ford is exploring a possible joint venture with Anhui Zotye Automobile Co. to produce an electric passenger vehicle, representing our commitment to new energy vehicles in the sector's fastest-growing market in the world.

"We're all in on this and we're taking our mainstream vehicles, our most iconic vehicles, and we're electrifying them. If we want to be successful with electrification, we have to do it with vehicles that are already popular."

Bill Ford
Chairman, Ford Motor Company

Hybrid Electric Vehicles (HEVs)



Power Sources

- Internal combustion engine (ICE), electric motor with a battery system



Benefits

- When using the electric motor and battery system only (e.g., low speeds, short distances), no gasoline is used
- Can run on battery power, on ICE power, or both
- Regenerative braking system captures energy to recharge the battery



Models

- Hybrid versions of high-volume product platforms, including: Ford C MAX, Ford Fusion, Ford Mondeo, Lincoln MKZ, Ford Police Responder Hybrid Sedan

Plug-in Hybrid Electric Vehicles (PHEVs)



Power Sources

- Internal combustion engine (ICE), electric motor with a high-voltage electric battery



Benefits

- Battery can be charged from a household or public electric outlet
- When battery is depleted, vehicle functions as a standard HEV
- Accrues charge through regenerative braking
- Tailpipe emissions can reach zero when running on battery power



Models

- Fusion Energi, Ford C MAX Energi, Mondeo Energi, Police Special Service Plug-in Hybrid Sedan

Battery Electric Vehicles (BEVs)



Power Sources

- High-voltage electric motor, powered by a lithium-ion battery pack



Benefits

- Lack of tailpipe CO₂ and other emissions during use



Models

- Focus Electric

Case study

Delivering More E-Vans for Deutsche Post DHL

We're partnering with Deutsche Post DHL Group to produce electric delivery vans (e-vans). In 2017, almost 150 e-vans – manufactured in Aachen, Germany – were used to support the group's urban parcel delivery service in Germany, and we plan to build 2,500 more by the end of 2018.

Our most recent model, the StreetScooter WORK XL, is based on our Ford Transit chassis fitted with a battery-electric drivetrain. Its battery has a range of up to 200 km, and an average charging time of just three hours. Each WORK XL could save around 5 metric tons of CO₂ emissions and 1,900 liters of diesel fuel annually. So when all 2,500 planned vehicles are in service, this could avoid 12,500 metric tons of CO₂ and save 4.75 million liters of fuel every year.

In addition to the WORK XL, more than 3,000 StreetScooter WORK and WORK L electric vehicles, plus about 10,500 pedelecs, are currently in service, making Deutsche Post DHL the largest e-fleet operator in Germany.

"This joint project will be Europe's largest manufacturer of emission-free, medium-sized e-vans, and it doesn't come a moment too soon. Buses, cars and delivery vans play vital roles in our daily lives, but we have to find a way to make them cleaner. This project is a great step along this path."

Steven Armstrong
Group Vice President and President, Europe, Middle East & Africa, Ford Motor Company

Vehicles Powered by Alternative Fuels

Renewable Biofuel Vehicles



Fuel

- Ethanol**, currently made from fermented corn sugars or sugar cane, is usually blended with gasoline (e.g., E10 or E85); ethanol from non-food feedstocks is technically feasible
- Biodiesel**, made from soy, canola, rapeseed, corn or palm oil, or animal fats, and mixed with fossil diesel (e.g., B7, B20)



Benefits

- Biofuels made from renewable resources may reduce CO₂ emissions
- Next-generation biofuels made from plant cellulose use stems and leaves, reducing competition for food crops



Models

- E85 FFV: Focus, Escape, Explorer, Taurus, F-150, Transit Connect, Transit
- B20: F-150, F-250/F-350 Super Duty, Transit

CNG and LPG Vehicles



Fuel

- Compressed natural gas (CNG)
- Liquefied petroleum gas (LPG)



Benefits

- Lower CO₂ and life cycle GHG emissions than gasoline or diesel vehicles
- Lower non-CO₂ emissions

Strategy and Governance

Customers and Products

Operations

People and Society

Performance and Data



Models

- Wide range of commercial vehicles: F-150, F-250, F-350, Transit, Transit Connect, F-X50 cutaway, F-X50 chassis cab

Hydrogen Fuel Cell Vehicles (FCVs)



Fuel

- Hydrogen fuel cell system – converts stored hydrogen to electricity



Benefits

- Zero-emission electric-drive vehicles
- Only water and low-temperature heat are by-products

CO₂ Savings vs. Gasoline (E10) in the U.S.

Powertrain/Fuel	Tank-to-wheels ⁵ CO ₂ emissions	Well-to-wheels ⁶ CO ₂ emissions
HEV	28%	28%
PHEV ^{1,7}	45%	37%
BEV (grid-average electricity)	100%	56%
BEV (renewable electricity)	100%	100%
E85 ²	2%	27%
CNG	25%	19%
LPG	11%	13%
FCV ³	100%	41%
Diesel	15%	14%
B7 (Europe) ⁴	15%	17%
B20 (U.S.) ⁴	15%	24%

At What Life Cycle Stage Are Most GHG Emissions Released?



In gasoline- and diesel-powered vehicles (including hybrids)... it is during the vehicle's use



In plug-in hybrids,⁸ battery- and hydrogen-powered vehicles... it is during production of the fuel (electricity or hydrogen)

What's Next in Alternative Fuels and Powertrains?

Our PHEV Ford Transit Custom van is the centerpiece of a multimillion-dollar project to improve air quality in London and Valencia. A 12-month trial was launched last year in London, and the project is now being extended to the Spanish city of Valencia. Featuring a fleet of vans running solely on electric power, it will explore how PHEVs can contribute to cleaner air targets and enhanced productivity.

Related Page:

> [Data: Vehicle Fuel Economy and CO₂ Emissions](#)

Ford is a founding partner – along with BMW Group, Daimler AG, and Volkswagen Group with Audi and Porsche – of IONITY, a pan-European joint venture to develop the continent's most efficient fast-charging network for electric vehicles. Together, we plan to build 400 fast-charging stations in key European locations by 2020. Our aim is to make long-range travel easy for electric vehicles.

With respect to Hydrogen Fuel Cell Vehicles, Ford continues to research fuel cell technology with the goal of making the technology affordable and closing technical gaps associated with durability and operation in cold climates.

Related Pages:

> [Improving Fuel Economy](#)

> [Scaling Up Electrification](#)

1. Average grid electricity mix (GREET 2017).
2. Ethanol from corn.
3. Hydrogen from steam methane reforming of NG at central plant.
4. Biodiesel from rapeseed (RME).
5. [2015 US Vehicle efficiency from Elgowainy, A. et al. \(2016\) Argonne National Lab report number ANL/ESD-16/7.](#)
6. [Well-to-tank from GREET 2015.](#)
7. PHEV has c.20 km all-electric range.
8. Plug-in hybrids that travel long distances or use renewable electricity can incur more GHG emissions from vehicle use than fuel production.

ADDRESSING NON-CO₂ EMISSIONS

We are working hard to reduce emissions of criteria and non-CO₂ pollutants in our research, product development and operations. We do this in accordance with vehicle emissions standards around the world, as they become increasingly stringent.

Fuel-combusting vehicles release smog-forming vehicle criteria emissions that get trapped close to the ground and create a haze that can affect people's health. These emissions are the result of the incomplete combustion of fuels, impurities in fuels and the high-temperature oxidation of atmospheric nitrogen during the fuel combustion process. Criteria pollutants associated with smog include hydrocarbons, nitrogen oxides (NO_x), carbon monoxide and particulate matter. In many areas of the developed world, air quality has improved in recent decades due to the implementation and enforcement of emissions standards for motor vehicles as well as for stationary sources.

We comply with criteria emission standards in all regions, including the new Tier 3/LEV III standards in the United States and the Real Driving Emissions standard in Europe.

Related Page:

> [Our Plan for Reducing Vehicle Emissions](#)

Regional Criteria Emissions Standards

Salient Issue

Air Quality

During our first formal human rights saliency assessment, we identified air quality as one of our nine most important issues – those at risk of the most severe negative impact through Ford's activities and business relationships.

Going forward, we're taking steps to develop action plans to manage and remediate these issues, and to expand our reporting on them.

> [Find out more about our human rights saliency assessment](#)



United States

✓ **Already Compliant or Surpassing**

- Environmental Protection Agency (EPA) Tier 2 regulations
 - California's Low Emission Vehicle II (LEV II) program
- **Becoming Compliant as Phased In**
- EPA Tier 3 standards
 - California's LEV III standards, closely aligned with the EPA's Tier 3 program



Europe

✓ **Already Compliant or Surpassing**

- Euro 6 tailpipe emissions standards Phase I
- **Becoming Compliant as Phased In**
- Euro 6 Phase II
 - Euro 6d Real Driving Emissions (RDE) standards
 - Worldwide Harmonized Light

Strategy and Governance

Customers and Products

Operations

People and Society

Performance and Data



China

➔ **Becoming Compliant as Phased In**

- National stage-6 emission standards



Other Regions

✔ **Already Compliant or Surpassing**

- **India:** Current regulations based on Euro 4 and Euro 5 standards
- **Brazil and Argentina:** Standards based on Euro 5
- **Middle East:** Standards based on Euro 2, Euro 3 diesel, and Euro 4

➔ **Becoming Compliant as Phased In**

- India's Bharat Stage VI (BS VI) standards

Beyond the Tailpipe

With the decrease in vehicle tailpipe emissions, other emissions are assuming a greater proportional importance. Through our Restricted Substance Management Standard, we have:

- Prohibited GHGs such as perfluorocarbons (PFCs) and sulfur hexafluoride (SF6)
- Replaced all chlorofluorocarbon (CFC) refrigerants with hydrofluorocarbons (HFCs), which do not contribute to ozone depletion and have significantly lower global warming impacts

Globally, we continue to lower non-CO₂ GHG emissions. For example, in the U.S., we have replaced HFC-134a with HFC-1234yf – a compound with a lower global warming potential – in many passenger cars across our portfolio. The lack of servicing infrastructure and substantially higher costs limit the use of HFC-1234yf in other markets, but we remain committed to further reducing non-CO₂ emissions.

We are exploring current and likely future particulate matter emissions associated with brake and tire wear and from different vehicle technologies. We have completed an initial analysis and will discuss our findings in a future report.

Related Page:

> [Data: Non CO₂ Tailpipe Emissions](#)

USING SUSTAINABLE MATERIALS

The materials used in a vehicle is a key aspect of its sustainability, across all life cycle stages. We aspire to use materials with equivalent or superior performance but that have a smaller environmental footprint. This includes lower greenhouse gas (GHG) emissions and energy use, less waste and a move away from plastics made from fossil fuels.

HOW WE'RE DRIVING CHANGE

Creating New and Smarter Materials

Guided by our global materials strategy, we continue to be a leader in the research, development and integration of more plant-based, renewable and recycled content in our vehicles.

We aspire to use materials that have been obtained by sustainable means, with lower social and environmental impacts, and equivalent or superior performance to existing materials. Our ongoing research on closed-loop recycling and second-life use of components is supplemented by partnerships with other industries and the farming community to utilize their by-products.

Taking a holistic view of the materials used in our vehicles, the aspects we consider include its origin (whether virgin, renewable or recycled), the methods used to source and process it, the emissions generated throughout its life cycle, any health impacts associated with its use, and how it is disposed of at the end of its useful life.

Today, we're proud to be exploring new materials using everything from tree cellulose to tomato skin and dandelion roots. We are also striving to use fewer materials and encouraging local sources to reduce their carbon footprint.

What's in a Typical Vehicle?

Up to **40,000** parts... **1,000** different materials... **10,000** chemical substances...



The Sustainable Materials in Our Vehicles

Renewable and recycled: we're developing a set of sustainable materials from resources as diverse as soybeans grown on the farm and post-consumer plastic bottles. Scroll to see all the different materials we are using.

RECYCLED AND RECYCLABLE MATERIALS



Recycled Rubber

Made with material from post-consumer tires, recycled rubber is used in underbody covers in a range of Ford vehicles.



Recycled Aluminum

Made in the closed-loop recycling systems at some Ford factories, recycled and recyclable aluminum goes into the body frames of four series of North American Ford trucks.



Recycled Plastic Bottles

Diverted from landfill and processed at Ford factories, recycled plastic bottles are used to make floor carpeting and wheel liners in the Ford Transit and C-Max vehicles, as well as the REPREEVE fabric used in the F-150.



Recycled Cotton

Made with the scrap cuttings from the making of T-shirts and denim jeans, the interior padding and sound insulation in most Ford vehicles contain recycled cotton.



Post-Industrial and Post-Consumer Recycled Materials

Maintaining appearance as well as performance, post-industrial and post-consumer recycled PET from water and soda bottles can be found in seat fabrics in 12 Ford vehicles. These materials would otherwise be slated for landfill.

BIO-BASED RENEWABLE MATERIALS



Nylon

Castor bean oil is used for the nylon fuel lines for most vehicles, and instrument panel soft touch foams on three vehicle lines. Post-consumer nylon carpeting is used in cylinder head covers on the Ford Escape, Fusion, Mustang and F-150.

Strategy and
GovernanceCustomers
and Products

Operations

People and
SocietyPerformance
and Data**Soy**

Soy-based polyurethane foam is used in seat backs, cushions and head restraints in every North American-built Ford vehicle, while exterior mirror gaskets incorporate both recycled tires and soybean oil.

**Rice Hulls**

Rice hulls, a by-product of U.S.-grown rice grain, are used to reinforce plastic in the Ford F-150's electrical harnesses.

**Coconut Fibers**

Fibers taken from coconut husks reinforce the plastic trunk liners of a number of Ford vehicles.

**Cellulose-Reinforced Plastic**

Using fibers from sustainably grown trees, cellulose-reinforced plastic has been used to replace fiberglass in the armrests of the Lincoln MKX.

**Wheat Straw-Reinforced Plastic**

Wheat straw, a waste by-product of wheat, is used to reinforce the plastic in the Ford Flex's storage bins.

**Kenaf/Hibiscus**

Molded plastic door parts in the Ford Escape incorporate kenaf, a species of hibiscus and a close relative to hemp

OUR PERFORMANCE**Materials with Lower Life Cycle Impacts**

We are using more recycled, renewable and recyclable materials, and working to eliminate substances of concern.

- **300** of our vehicle parts are derived from renewable materials
- **37,000** new F-Series truck bodies' worth of high-grade aluminum scraps are recycled every month
- **228 million pounds** of CO₂ has been saved from entering the atmosphere since we started using soybean-based foam
- **Raw Materials Observatory** launched by the Drive Sustainability partnership, a group of 10 global auto manufacturers including Ford

RECYCLED MATERIALS

Using materials with recycled content diverts consumer and industrial waste from landfill, reduces the depletion of valuable natural resources, and can reduce both energy consumption and costs. However, they must deliver the same quality, appearance and performance as virgin materials.

Closed-Loop Recycling

In some cases, we recycle the materials from our auto parts back into the same use, a process known as "closed-loop recycling." The aluminum scraps from the stamping of window openings are turned into body panels that can comprise 40 percent of the original metal used.

Related Page:

> [What's in a Vehicle?](#)

To achieve the level of purity required for auto bodies, we have invested \$60 million in equipment at three of our U.S. plants. This enables us to recycle 5 million pounds of high-strength, military-grade aluminum scrap every week. That's enough to build more than 37,000 new F-Series truck bodies a month.

All of our vehicles contain a minimum of 25 percent post-industrial PET content, as well as recycled post-consumer carpeting.

What's Next?

Looking further ahead, we are exploring other waste streams, including shredded banknotes and recycled ocean plastics. An estimated 14 million pounds of plastic are dumped into our oceans every year. We've been finding uses for this mixed plastic stream in some of our fabrics, which will be critical to helping the planet and ocean wildlife.

We are also:

- Transforming post-consumer HDPE laundry detergent containers and milk bottles into blow-molded automotive components, including some HDPE ducts that were made from detergent bottles in the aftermath of 2017's Hurricane Harvey in Houston
- Exploring how post-consumer drinks bottles can be used to make energy-absorbent materials
- Working in a non-competitive environment to explore using industrial waste products in our production

Related Page:

> [Waste Reduction](#)

RENEWABLE MATERIALS

We continue to use durable, plant-based materials because they provide many environmental, economic and performance benefits. These include lower greenhouse gas (GHG) emissions; vehicle weight reduction and improved fuel economy; reduced manufacturing energy use; and a reduced dependence on petroleum-based plastics. They also help divert waste from landfill and generate new revenue opportunities for the agricultural sector.

Soy Was Just the Start

Around 8 percent of all petroleum oil goes into plastic and, once used, half of that is dumped into landfills; the rest often ends up in our oceans or is burned. Relatively little is recycled.

Our research scientists in the U.S., Germany, China and Brazil have been exploring ways to replace petroleum-based plastics with more sustainable materials since 2000. It's been over a decade since Ford first used soybean-based foam, and since 2011 it's been a key material in the seat cushions, seat backs and headrests of every vehicle we build in North America. To date, after more than 18.5 million vehicles and half a trillion soybeans, we've saved more than 228 million pounds of CO₂ from entering the atmosphere – that's the equivalent carbon footprint of 4 million trees in a year.

We've also been researching cellulose from trees in its nano form, and have found some very interesting properties. When added to plastics, nanocrystalline cellulose produces excellent sound damping. In foams, it's found to significantly increase the mechanical properties of the material. We look forward to using these findings in our products soon.

Using the Whole Farm

Our renewable materials program has expanded to include a wide range of foams, plastics and composites derived from renewable resources (see our [What's in a Vehicle? graphic](#)). We currently feature eight sustainable materials in our production vehicles: soy, wheat, rice, castor, kenaf (hibiscus), tree cellulose, jute and coconut. And as we continue to experiment, the list of renewable resources we are researching reads like an entire farm – tomato skin, bamboo ([a remarkably versatile material](#)), agave fiber (working with Jose Cuervo® in Mexico), dandelion roots and even algae. We're also exploring innovative uses of carbon itself and are first in the industry to develop foams and plastics using captured CO₂.

Around 300 vehicle parts are derived from renewable materials, many of which were pioneered by Ford. These materials reduce the weight of vehicle parts such as seat cushions, storage bins and door panels, meet all of our strict durability and performance requirements; and provide agricultural suppliers with new revenue streams.

More than 30,000 soybeans are typically used in a Ford vehicle for seat backs and cushions.

Case study

Bamboo: The Next Carbon Fiber?

It can grow a meter in a day, it's compostable and has the tensile strength of steel. And in recent years, we've been working with suppliers to evaluate the viability of using bamboo in vehicle interiors. Some surfaces inside our vehicles could be made from a combination of bamboo and plastic, making them particularly strong.

Our team at the Nanjing Research and Engineering Centre has found that bamboo performs better than many other synthetic and natural fibers across a range of materials tests. It has also been heated to more than 212 degrees Fahrenheit to ensure it can maintain its integrity.

The benefits of bamboo have long been recognized, from its tensile strength – known to rival or even better some types of metal – to its speed of growth, reaching maturity in two to five years.

“Bamboo is amazing. It's strong, flexible, totally renewable, and plentiful in China and many other parts of Asia.”

Janet Yin

Materials Engineering Supervisor, Nanjing Research & Engineering Centre, Ford Motor Company

Our Research Partnerships

We continue to research renewable materials and their potential applications at our research centers around the world, and through partnerships with both suppliers and non-automotive partners.

For example, along with Coca-Cola, Nike and Procter & Gamble, we co-founded the plant-based PET Technology Collaborative (PTC), a strategic working group focused on accelerating the development and use of 100 percent plant-based PET materials and fibers. Collaborations with these companies to further our sustainability efforts include:

- The first automotive use of Coca-Cola's PlantBottle plastic, used in the seat fabric, trim, carpets and headliner in a demonstration Focus battery electric vehicle (BEV)
- Partnering with Procter & Gamble to use biomimicry, inspired by nature's solutions, to solve some of the most challenging material issues facing our industries

As part of WWF's [Bioplastic Feedstock Alliance \(BFA\)](#), we are working to support the responsible development of plastics made from plant material. And we were excited about recent laboratory success in generating polyurethane foams that meet general durability and performance requirements, which utilize CO₂ as a feedstock.

A key question posed by the growing demand for electrified vehicles is whether there is enough lithium to meet the future demand for electric vehicle traction batteries. Working with researchers from the University of Michigan, we addressed this issue by first compiling data on global lithium-containing deposits and then comparing the world's lithium resources with the range of likely future lithium demand this century for non-battery usages, portable electronics and electric vehicle batteries. We concluded that global lithium resources can support even a rapid and widespread demand for electric vehicles until at least the end of this century.

Related Page:

> [Waste Reduction](#)

ELIMINATING SUBSTANCES OF CONCERN

We use a range of systems to monitor and manage the materials we use in our vehicles. These help us ensure our products meet all relevant local and global regulations, and phase out substances of concern where economically and technically feasible.

Phasing Out Restricted Substances

We were one of the first automotive companies to start eliminating a number of chemicals¹ being monitored by governments around the world, including the EU, U.S., Canada, Japan and China.

We have a phase-out requirement for all EU REACH-restricted substances that have reached or are approaching their sunset dates – the dates after which a substance of concern cannot be used in the EU without authorization from the European Chemicals Agency (ECHA).

We also advise relevant governmental agencies about ongoing developments in global substance restrictions such as the [Stockholm Convention](#).

We have made notable progress in:

- Phasing out **hex chrome** (hexavalent chromium), a potential carcinogenic corrosion coating used on nuts, bolts and brackets
- Replacing **lead** wheel weights throughout our global operations with steel alternatives
- Eliminating **mercury** from all components
- Offering brake pads that contain less **copper**, because copper degrades on use and can end up in the water cycle through urban drainage systems

Driving Collective Action

Taking a strong role in our efforts to eliminate less desirable chemicals, we lead or chair several industrial association working groups, including:

- The U.S. Council for Automotive Research's North America Automotive Substances of Concern Committee
- The Automotive Industry Action Group's Chemical Management and Reporting Group
- The Global Automotive Declarable Substance List (GADSL) Steering Group
- ACEA's (EU car manufacturer association) working group on Materials and Substances

Rare Earth Elements

Small quantities of the 17 so-called “rare earth elements” (REEs) are used in internal combustion engines, while neodymium and dysprosium are used in magnets in motors and generators. Cerium is used in vehicle exhaust control systems, and small amounts of other REEs are used in a variety of vehicle components. Our hybrid electric, plug-in hybrid and battery electric vehicles (HEVs, PHEVs and BEVs) also contain REEs.

REEs are hard to extract, both economically and sustainably, and we're actively engaged in reducing their use, particularly in our electric vehicles.

Related Page:

> [Responsible Sourcing of Raw Materials](#)

Promoting Occupant Health

Air Quality

- Due to environmental factors (moisture, temperature, etc.), vibration or abrasion, nanoscale materials may pose risks to human health and the environment – not just through exposure during manufacturing and processing but across their entire life cycle
- Our guidelines direct safe and responsible research involving nanotechnology, and require environmental considerations to be incorporated into our technical innovations and product development
- We have specifications for the air quality in our vehicles

Strategy and Governance

Customers and Products

Operations

People and Society

Performance and Data

Allergens

- Our engineers test the materials that come into direct contact with passengers for any allergen impacts
- Many of our vehicles also feature high-performance filters that keep out allergenic pollens
- The Allergy Alert® app enables drivers to check pollen levels and other health-risk conditions with simple voice commands

In-Car Health and Wellness

- We are exploring how wearable devices, including smart watches and fitness bands, can be used to assess driver stress by measuring heart rate, perspiration and skin temperature
- Working with medical companies and auto insurers, we're exploring whether monitoring driver wellness could reduce insurance premiums
- We are collaborating with the Henry Ford Health System on a health and wellness app challenge
- Partnerships with the University of California Berkeley, Peking University and Tsinghua University are seeking to better understand the sources of emissions near roads and how to quantify them

Related Page:

> [Reducing End-of-Life Impacts](#)

Monitoring and Managing Materials

- **Restricted Substance Management Standard (RSMS):** The RSMS designates the substances to be restricted or eliminated from our operations and vehicles
- **International Material Data System (IMDS):** This web-based tool, sponsored by around 40 original equipment manufacturers (OEMs), is used by more than 100,000 automotive supplier companies to track, review and report the materials and substances in vehicle components
- **Global Materials Management (GMM):** Our materials and substances tracking and reporting tool
- **Global Material Approval Process (GMAP):** System for reviewing and approving the production and non-production materials used in our plants and facilities
- **Materials and Toxicology System (MATS):** Our internal database for managing specifications, Material Safety Data Sheets and Approved Source List, and for generating compliance reports

REDUCING END-OF-LIFE IMPACTS

Automobiles are some of the most highly recycled consumer products in the world. Most of the materials they contain can be recovered at the end of their useful lives.

In theory, end-of-life vehicles are at least 95 percent recoverable, but the cost in energy and labor to recover the final fractions toward 100 percent can be extensive. Nonetheless, we try to achieve the highest level of economically and environmentally viable recovery through the careful selection of materials, and by sharing information about the materials our vehicles contain with dismantlers.

Take-Back Schemes

Across Europe, Ford offers car owners a cost-free take-back network with take-back points that are able to fulfill Ford's waste-quality standards. The recycling network is set by each European market and licensed by the appropriate national environment agency.

As part of this process, Ford's Environmental Quality Office and End-of-Life teams perform a structured duty-of-care audit process, visiting take-back points to ensure our vehicles are treated responsibly at

the end of their useful life, and keeping the latest end-of-life network information available on Ford National EU web portals.

Related Page:

> [Our Dealers](#)

Alternative End-of-Life Treatments

None of our current components contain mercury but to address end-of-life issues associated with mercury in older vehicles, we were instrumental in getting the U.S. Environmental Protection Agency to work with state authorities, dismantlers, steelmakers and environmental groups to recycle mercury switches. With more than 10,000 participants in the scheme, 7 metric tons of mercury were recovered by the end of 2017.

We also support treatment technologies that make the recycling of end-of-life vehicles more economically and ecologically viable, and co-sponsored a life cycle assessment that showed the environmental benefits of diverting plastic, foam and other nonmetallic materials from landfill and using it for energy recovery.

Recycling During Servicing

At our U.S. dealership service centers, we recycle, reuse and reprocess the parts removed during servicing, such as headlights, bumpers and windshield-wiper motors. Dealers are charged for new parts, but are reimbursed if they are recycled through our Core Recovery Program. Parts that can be remanufactured are cleaned, machined and tested before being used in new vehicles; otherwise, they are used to make new parts. The scheme forms part of our voluntary Go Green Dealer Sustainability Program, to which around half of our U.S. Ford and Lincoln Mercury dealers belong.

Related Page:

> [Waste Reduction](#)

PRODUCT QUALITY AND CUSTOMER SATISFACTION

Our customers expect high-quality products and exceptional experiences. We strive to understand what they are seeking, and continuously improve the quality of our vehicles to meet their needs and expectations, time after time.

HOW WE'RE DRIVING CHANGE

Managing Product Development

Quality is at the heart of everything we do, and it drives ongoing improvements across all functions while delivering high-quality vehicles that our customers want and value.

We use our global Quality Operating System to ensure that our vehicles meet or exceed competitive and performance targets, as well as customer expectations, at every stage of their development and manufacture.

And once a vehicle concept is finalized and approved, it is brought to market using our Global Product Development System. This combines the best production methods from across our global operations, and provides common efficiency and quality metrics.

Monitoring Quality and Satisfaction

We use a combination of internal and external measurements to assess how we are doing and where we can improve product quality. Our primary source of information, the Global Quality Research System, tracks customer satisfaction and "Things Gone Wrong" (TGW). It is conducted throughout the year by the consulting firm Ipsos RDA Group.

Strategy and
GovernanceCustomers
and Products

Operations

People and
SocietyPerformance
and Data

We track warranty claims and costs internally, and also subscribe to J.D. Power and Associates' annual Initial Quality Study, Vehicle Dependability Study, and Automotive Performance, Execution and Layout (APEAL) Study.

ENHANCING THE USER EXPERIENCE

At Ford, product development always starts with the customer. We look to understand who they are, how they live and what they value in a vehicle. Then, we identify and implement the technologies that will meet their evolving needs and expectations.

Focused on the Customer

We start thinking about people's lives and experiences years before a new model or service becomes available. Observing customers in their environments and daily lives, as well as imagining our future world, shapes our awareness of the mobility needs of people all over the world. We then use human-centered design to help us create insights and develop new experiences that meet their needs and exceed their expectations.

Our culture of collaboration and continuous improvement means that we can address satisfaction concerns quickly and effectively, and learn from every quality issue.

Related Page:

> [Data: Product Quality and Customer Satisfaction](#)

Making Self-Driving Technology Work for People

We recently started a series of experimental pilots in different cities to help us understand how autonomous vehicles can contribute to people's daily mobility needs, and what the human element is in a future of automated technology.

Most recently, we tested [autonomous delivery services in Miami](#) for their ability to provide desirable and compelling user experiences.

We're also working closely with Postmates and Dominos on a self-driving delivery vehicle in both Ann Arbor, Michigan and Miami. Our goal is to optimize goods delivery services while staying attuned to the diverse needs of people in contexts like urban centers. While it's important to streamline the process of delivery, we find people are really passionate about defining how new technologies will shape our world. And that's what excites us.

With a hyper-collaborative start-up style working model, the Ford-Postmates-Dominos team first envisioned future scenarios and then prototyped experimental vehicles based on core user needs and design-thinking methodologies. Joint teams of researchers, designers and techies then set out to really engage everyday people in making the experience both fun and easy.

Those who opted into the testing could track the delivery vehicle as it headed out with their order, and they received text updates, instructions on what to do and a notification when their order had arrived. At the test vehicle, they used an intuitive keypad to open the container and take their order. Using voice technology, compelling user interfaces and some design intuition, the resulting experience has shown to be delightful to the user and has taught us about the human experience of living among future technologies.

Related Page:

> [Product Quality and Customer Satisfaction](#)

DATA PRIVACY AND SECURITY

The information that customers provide enables us to deliver great products and a personalized experience. We are committed to respecting customer privacy and using the information they share responsibly.

Responsible Data Practices

Customers, employees and others care about the privacy and security of their data, and we take our responsibilities seriously. We commit to protect customers' privacy and handle their data securely and responsibly as we explore new ways to deliver innovative solutions.

Our companywide governance infrastructure drives a holistic approach to the privacy and security of the data that has been entrusted to us. This includes [policies and directives](#) that give confidence to those who share their personal information with us. These policies require transparency, responsible data handling and use, and choice where appropriate.

Related Page:

> [Ethics and Compliance](#)

We are also a founding member of the [Auto-ISAC](#) (Information Sharing and Analysis Center). Established by the 12 members of the Auto Alliance, Auto-ISAC gathers, analyzes and shares information designed to combat cyber-related threats and address vulnerabilities.

Harnessing the Power and Potential of Data

Investing in data science and analytics allows us to harness the potential of technology to deliver great products and services, especially through our emerging businesses of mobility, connectivity and autonomous vehicles.

A prime example is the Transportation Mobility Cloud, a new open platform designed to connect and coordinate smart transportation services. A fully integrated system will require the large-scale connection of data from a variety of sources, including public transport services, self-driving cars, cyclists and even traffic lights and parking locations. The Cloud, which we're building with new acquisition Autonomic, will process this data in real time, enabling a range of apps and services for vehicle connectivity, location-based services and route mapping.

Related Page:

> [Building the City of Tomorrow](#)

OUR DEALERS

Our dealers are the public face of Ford. They provide employment, tax support, leadership and customer service in our communities, and play a vital role in our success.

Our Dealer Network

At the end of 2017, we had 11,428 Ford and Lincoln dealerships around the world. We collaborate with our U.S. dealers through the Ford Trustmark Facility Assistance Program to create loyal advocates of our products and services, and work closely with our Lincoln dealers to improve the retail experience.

[Diversity and inclusiveness](#) are a part of our DNA. We work hard to encourage a strong minority presence, with many female- and minority-owned dealerships.

We develop our dealers through education and training, provide capital loans to minority dealers, and support them through our Ford Minority Dealers Association (Ford MDA) and the National Association of Minority Automobile Dealers.

Dialogue With Dealerships

Through our Ford and Lincoln Dealer Councils, dealers can share their concerns and opinions openly and productively. Details are published annually, along with Ford management input, for added transparency.

Dealer Council members also participate in Ford's National Dealer Advisory Panels, addressing a range of issues, including customer experience and satisfaction, new product development plans, dealer training, marketing and advertising.

Dealer satisfaction is measured through the [National Automobile Dealers Association \(NADA\)](#) biannual survey.

Our Salute to Dealers

Ford dealers do a lot more than sell cars: they go above and beyond to better their communities across the world, and through their commitment and hard work they enhance our brand. Our 18th annual Salute to Dealers award aims to recognize those dealers who did all they could to make a positive difference to those around them.

In 2017, Ford and Lincoln dealers contributed more than \$110 million and 50,000 hours to charitable causes and nonprofits. Of that, 17 percent went to firefighters and other first responders, 13 percent went to children's charities, another 13 percent went to educational programs and 10 percent went to veterans' causes.

We selected six winners from a field of more than 60 nominees, and donated \$10,000 each to a charity of their choice:

- **Charlie Diers**, Diers Ford Lincoln, Fremont, Nebraska, U.S.
- **Dan Hay**, Jim Burke Ford, Bakersfield, California, U.S.
- **Don Jenkins**, Jenkins and Wynne Ford Lincoln, Clarksville, Tennessee, U.S.
- **Siegfried Ernst**, Ernst+König GmbH, Freiburg im Breisgau, Baden-Württemberg, Germany
- **Al MacPhee**, MacPhee Ford, Dartmouth, Nova Scotia, Canada
- **Ivo Luiz Roveda**, Ford Center, Curitiba, Brazil

> [Learn about our winners' good work.](#)

Related Pages:

- > [Our Contribution to Society](#)
- > [Supplier Diversity](#)

IMPROVING VEHICLE SAFETY

Safety continues to be one of the highest priorities in the design of our vehicles, and quality is a critical aspect of customer safety – and therefore of our responsibilities and success as a company.

HOW WE'RE DRIVING CHANGE

Prioritizing Safety

We view automotive safety holistically; it encompasses all aspects of our business, from vehicle design and manufacturing to operator behavior and road infrastructure.

Our corporate safety policy, Policy Letter 7, outlines our commitment to designing and manufacturing vehicles that achieve high levels of safety over a wide range of real-world conditions. This helps us meet or exceed both applicable laws and regulations, and the needs and expectations of our customers.

Our processes, tools and facilities confirm that our vehicles align with our own stringent internal guidelines on safety design, as well as Ford-specified levels of performance for [Public Domain tests](#). We regularly re-evaluate and update these guidelines as appropriate.

Salient Issue

Product Safety and Quality

During our first formal human rights saliency assessment, we identified product safety and quality as one of our nine most important issues – those at risk of the most severe negative impact through Ford's activities and business relationships.

Going forward, we're taking steps to develop action plans to manage and remediate these issues, and to expand our reporting on them.

> [Find out more about our human rights saliency assessment](#)

OUR PERFORMANCE

Keeping Safety Our Top Priority

We are committed to building safe vehicles with additional driver assist technologies, and encouraging safer behavior behind the wheel through training and education programs.

- **60%** of Ford and Lincoln nameplates in the United States have a U.S. NCAP 5-star overall safety rating¹
- **69%** of Ford and Lincoln nameplates in Europe have a Euro NCAP 5-star overall safety rating²
- **36%** of Ford and Lincoln nameplates in China have a China NCAP 5-star overall safety rating³
- **40,000 young and new drivers across 41 countries** participated in our Ford Driving Skills for Life program in 2017

1. As of June 2018

2. As of June 2018

3. As of June 2018

VEHICLE SAFETY PERFORMANCE

Ford continues to receive high marks and accolades for vehicle safety in a number of the industry's key public and private crash-testing programs.

We conduct engineering analyses, computer simulations, and component, sub-system and full-vehicle crash tests to evaluate the performance of our vehicles and components at a number of sites in the United States and Europe:

Crash-Test Facilities

Function

Observe and evaluate the performance of our vehicles' and systems' crash testing.

Locations

- Dearborn, Michigan
- Merkenich, Germany
- Dunton, U.K.

Motion-Based Driving Simulator VIRTTEX (Virtual Test Track Experiment)

Function

Research human behavior with advanced driver assist features, human-machine interfaces, and factors such as drowsy or distracted driving.

Locations

- Dearborn, Michigan

Research and Innovation Centers

Function

Explore and develop new and advanced technologies in the areas of passive safety, driver assistance, connectivity, mobility and autonomous vehicles.

Locations

- Dearborn, Michigan
- Palo Alto, California
- Aachen, Germany

Global Safety Ratings

Public Domain programs for rating vehicle safety performance vary around the world. They are performed by a range of consumer advocacy groups, organizations such as New Car Assessment Programs (NCAPs), auto clubs, motoring magazines and insurance-sponsored organizations. Each has its own testing protocols and/or evaluation criteria.

Related Page:

> [Data: Vehicle Safety](#)

Because of the different assessment schemes and the fact that NCAPs around the world are continually being updated, it is increasingly difficult to consistently achieve the highest ratings across all regions. This is a dilemma for global automotive companies like Ford because a particular star rating in one region's NCAP does not necessarily mean that the vehicle will have the same rating if tested in a different NCAP.

Follow the links below for our latest ratings data:

Global Safety Public Domain Organizations

Global	Global NCAP
North America	IIHS
North America	U.S. NCAP (NHTSA)
Latin and South America	Latin NCAP
Europe	Euro NCAP
Russia	ARCAP (website not available in English)
China	CNACP (website not available in English)
Japan	JNCAP
Korea	KNCAP
South East Asia	ASEAN NCAP
Australia and New Zealand	ANCAP
India	BNVSAP (program still under development)

Our Vehicle Safety Highlights

U.S. NCAP

- For 2018 model year (as at June 2018), 10 Ford and four Lincoln nameplates have been rated with 5-Star Overall Vehicle Scores

Euro NCAP

- The all-new Ford Fiesta has been awarded a 5-star safety rating by Euro NCAP, meaning that 11 Ford models now have valid 5-star ratings
- Through 2017, Ford received seven Euro NCAP Advanced Awards for innovative technologies, more than any other original equipment manufacturer (OEM)
- Through 2017, Ford received five Best in Class awards from Euro NCAP
- Currently, Ford has the most (11) valid Euro NCAP 5-star ratings of all brands

C-NCAP

- As of June 2018, four Ford and one Lincoln nameplates have achieved a 5-star overall rating

We are also working on vehicles that communicate with each other and with the world around them, and share findings with colleagues who are working toward our vision of an [integrated transportation ecosystem](#).

Related Pages:

> [Product Quality and Customer Satisfaction](#)

> [Driver Assist Technologies](#)

DRIVER ASSIST TECHNOLOGIES

Sixty years after we set the standard with factory-installed safety belts, we still push the boundaries of safety innovation. We continue to develop new, innovative technologies to enhance vehicle safety and help customers stay safe on the road.

A World of Driver Assist Options

We have made a wide variety of driver assist technologies available to customers, to help them drive more safely, to alert them to a potential collision and to make routine tasks easier. Many of these driver assist features and semi-autonomous technologies use radar, sonar and cameras to sense and interpret the environment. We are now in the process of democratizing these technologies by offering them to our customers as standard equipment.

Ford Co-Pilot360 is the most advanced suite of standard driver assist technologies. It includes automatic emergency braking with pedestrian detection, blind spot monitor, a lane-keeping system, rear backup camera and auto high-beam lighting. No non-luxury competitor offers this as standard in North America.

Standard automatic emergency braking – called pre-collision assist with pedestrian detection – can help drivers avoid collisions with other vehicles or pedestrians who might accidentally cross in front of the vehicle's path. If a potential collision is detected, a warning flashes and an alert sounds, and if the driver's response is not sufficient, the system can automatically apply the brakes to help minimize a frontal collision. The technology addresses Ford research showing a growing trend of people worrying about hitting pedestrians, and will be standard on 91 percent of Ford vehicles in North America by 2020.

The blind spot information system, or BLIS, uses radar to identify a vehicle entering the blind spot and alerts the driver with an indicator light in the side-view mirror. Cross-traffic alert can warn drivers of traffic behind when slowly backing out of a parking spot or driveway.

The lane-keeping system has three functions. First, it can notify drivers through steering wheel vibration that they need to correct course when the system detects the vehicle drifting close to lane markings. Second, it provides steering torque to steer back toward the center of the lane. Third, a driver alert system continuously monitors driving patterns using a forward-looking camera and provides visual and audio warnings when the system estimates the driver's vigilance level to be less than that of an attentive driver.

Related Page:

> [Data: Vehicle Safety](#)

Our Latest Features

- **Ford Co-Pilot360** will roll out in key global markets starting this fall to help customers drive more safely and confidently amid rising congestion and distractions
- In North America, **automatic emergency braking** will be standard on new passenger cars, SUVs and trucks up to F-150 going forward. Ford is also offering premium driver assist technologies, including adaptive cruise control with stop and go and lane centering, evasive steering assist and post-collision braking in North America
- **Adaptive cruise control with Stop and Go** can maintain a set speed similar to regular cruise control, bring the vehicle to a complete stop when traffic slows and accelerate back to the preset speed when the traffic clears. Lane centering operates with adaptive cruise control Stop and Go and helps keep the vehicle centered in the lane by detecting the lane markings, using a forward-facing camera
- **Evasive steering assist** can help drivers avoid a collision with a slower or stopped vehicle by providing appropriate steering support when the collision cannot be avoided by braking alone. The driver needs to initiate the steering maneuver for the avoidance, since the feature does not control steering
- **Post-collision braking** applies the brakes following an impact to reduce the movement of the vehicle, mitigating the potential for secondary impacts with other traffic
- In 2019, Ford is introducing **reverse brake assist** with automatic emergency braking to help prevent drivers from hitting an object while backing up

Strategy and
GovernanceCustomers
and Products

Operations

People and
SocietyPerformance
and Data

- Our **2019 Ford Focus will have several Ford firsts** (in addition to other driver assist technologies): Post Collision Breaking, Pedestrian and Cyclist Detection, Cross Traffic Alert with Active Breaking, Evasive Steering Assist, and Adaptive Cruise Control with Lane Centering Assist

The Foundations of an Autonomous Future

As well as improving safety today, our driver assist technologies are the building blocks for our vision of tomorrow, with autonomous vehicles operating in a fully connected transport ecosystem.

We are currently testing fully autonomous vehicles in real-world conditions, as well as implementing key semi-autonomous technologies across our entire portfolio. As outlined below, we are also conducting research with a number of public, private and academic partners to progress toward a future in which autonomous, connected vehicles communicate with one another, and with the road infrastructure, to help avoid collisions and reduce congestion.

Related Page:

> [Smart Vehicles for a Smart World](#)

Our Safety Research Partnerships

Technical Challenges Surrounding Automated Driving

- Evaluating how autonomous vehicle (AV) technologies may affect real-world crash scenarios with the University of Michigan
- Working with Purdue University to assess occupant use and sensing technologies
- Projects with Virginia Tech to evaluate how driver assist features will affect the safety of the occupant in accident scenarios, and to assess positional issues for potential restraints and seating configurations in AVs
- One of 28 partners in Automated Driving Applications and Technologies (AdaptIVe), Europe's largest research project on automated driving, which finalized in June 2017. A series of other projects in this area has been established
- Participant in the Society of Automotive Engineers Automated Driving Systems (ADS) Crashworthiness Task Force Committee

Vehicle-to-Vehicle Safety Communication Systems

- Co-leading a group of eight automakers through the Crash Avoidance Metrics Partnership (CAMP) Vehicle Safety Communications 3 (VSC3) Consortium

Vehicle-to-Infrastructure Applications

- Leading a separate consortium, working with the Federal Highway Administration

Cyber Security

- Developing Automotive Cyber Security Best Practices alongside members of the Auto Alliance and Global Automakers, and in conjunction with the Auto-ISAC
- Maintaining the industry lead for cyber security activities at the United Nations level

Driver Distraction

- Through partnerships with universities and organizations such as the Auto Alliance, we invest a significant amount of time and resources researching driver distraction and analyzing data from large-scale naturalistic driving studies

OCCUPANT PROTECTION

Our advancements in vehicle safety involves the research and development of technologies that protect drivers, passengers and other road users in a variety of situations.

Safety Belts and Airbags

Many factors influence a [vehicle's crash performance](#) including its ability to absorb energy on impact and the use of safety equipment such as safety belts and airbags. We offer various occupant protection technologies, such as:

- Dual-stage front airbags that adjust deployment based on the severity of the crash; load-limiting safety belts to reduce force on an occupant's chest; pyrotechnic safety-belt pretensioners that tighten the belts in the event of crash; side airbags and curtains for side impact crashes; and Safety Canopy side curtains that deploy in both side impacts and rollover crashes
- Patented technologies for airbags in other locations inside the vehicle, such as knee airbags for front passengers
- Use of advanced and ultra-high-strength steels, aluminum, plastics and composites in vehicle structures to work in concert with occupant protection technologies to manage the energy imparted to occupants in a crash

Related Page:

> [Data: Vehicle Safety](#)

Precompetitive Projects and Partnerships

We collaborate with other automakers to enhance the safety of vehicle occupants, and often publish the results in peer-reviewed journals and scientific publications. We work alongside General Motors and Fiat Chrysler through the various working groups and committees of the U.S. Council for Automotive Research (USCAR), and join forces with other manufacturers through the Alliance of Automobile Manufacturers (Auto Alliance), the European Automobile Manufacturers Association (ACEA), the Society of Automotive Engineers (SAE) International, and the International Organization for Standardization (ISO).

Research into Occupant Protection

We have teamed up with universities in many areas through our Alliance partner universities¹ to conduct vehicle safety and occupant protection research.

- Using real-world crash data and developing computer models to estimate the effects of demographic trends (e.g., occupant age and weight) and vehicle characteristics (e.g., size and weight) on future vehicle safety
- Developing and using advanced human body computer models that reflect changing global demographics to investigate the specific needs of elderly and obese occupants, and to research possible countermeasures
- Working with industry to evaluate the biofidelity, repeatability, reproducibility and durability of next-generation anthropomorphic test devices (ATDs) – including a small-size female and two mid-size male ATDs for testing front and side impacts – so that they more closely simulate the responses of human occupants in crashes
- Ensuring emerging [alternative fuel technology systems](#) perform as intended during a vehicle crash
- With USCAR, we conducted a literature research and meta-analysis project on crash avoidance technologies, including but not limited to advanced driver assist technologies such as AEB, lane departure, night vision and advanced lighting

Strategy and Governance

Customers and Products

Operations

People and Society

Performance and Data

- Along with USCAR, we have continued the collaboration with Sandia National Laboratories and the National Renewable Energy Laboratory to conduct research and crash testing of live lithium-ion batteries to evaluate their safety performance
- With Michigan State University, researching nano-liquid foam technology and its potential future applications in both restraints and structural applications
- With Wayne State University, researching methods to estimate a driver's age and gender
- With the Massachusetts Institute of Technology, evaluating the material properties of 3-dimensional metal lattices, produced by additive manufacturing, and developing the modeling methodology for crash-loading
- With the University of Michigan, researching methods to reduce the reaction time of electro-active polymeric materials for adaptive safety structural applications
- With SUNY, we're developing a topology methodology optimizing the cellular mesostructure's nonlinear behaviors for safety applications
- We are developing new state-of-the-art computer-aided engineering (CAE), using Iso-Geometric Analysis (IGA), and safety methods for process improvements, enhancement of computer simulation capabilities and to support virtual testing
- We have created a so-called "pre-crash matrix" based on real-world data to help us better understand and subsequently develop and validate active safety technologies

Related Page:

> [Driver Assist Technologies](#)

POST-CRASH RESPONSE

In-vehicle technology that helps occupants to call for assistance after an accident can give first responders potentially life-saving information, quickly and efficiently.

SYNC 911: Alerting Emergency Responders

Our SYNC® in-car connectivity technology, which enables drivers to use cell phones and MP3 players through voice commands, also comes with a call-for-help system. SYNC 911 Assist (or Emergency Assistance outside the U.S.) can make an emergency call using a paired cell phone after a severe crash where an airbag is deployed, or the fuel pump shut off. The call can be initiated automatically, although a vehicle occupant can choose to cancel it.

As well as providing the operator with a GPS location, the system can relay vital data such as impact velocity, crash type, safety belt usage, whether multiple impacts were sustained and whether airbags were deployed. This information helps the emergency services understand the severity of the incident and dispatch the most appropriate response.

Most of our vehicles also carry the SOS-Post Crash Alert System™, which alerts passers-by and first responders to a vehicle's location. In the event of airbag or safety belt pre-tensioner activation, it:

- Automatically starts the hazard lights
- Unlocks the vehicle doors
- Sounds the horn (non-European vehicles only)

A European Union regulation on "Automated Emergency Calling Systems" was finalized in 2017, becoming mandatory on April 1, 2018 for new vehicles. In parallel, a UN regulation was adopted in November 2017, covering all in-vehicle systems and requirements to drive harmonization of this technology on a global scale.

Talking Tech Saves Lives

Trying to locate the source of a siren while driving can be stressful, and not getting out of the way can delay the progress of an emergency vehicle. So in 2017, we began trialing our new Emergency Vehicle Warning technology, designed to tell drivers if an emergency vehicle is approaching, and how far away it is. The technology could eventually advise drivers on the best course of evasive action.

"Time is precious for emergency services and this technology could help to shave valuable seconds off their journeys by enabling drivers to avoid being an obstruction."

Christian Ress

Supervisor, Automated Driving Europe, Ford Research and Advanced Engineering

Related Pages:

> [Vehicle Safety Performance](#)

> [Data: Vehicle Safety](#)

> [Driver Assist Technologies](#)

ENCOURAGING SAFER DRIVING

Driver safety goes way beyond the construction and safety features of a vehicle. We also encourage safer behavior through a range of driver education and awareness programs, including our global Ford Driving Skills for Life initiative.

Our Flagship Program: Ford Driving Skills for Life

Worldwide research shows that car crashes are the leading cause of death among young people. In Europe alone, more than 3,600 are killed in accidents each year, and two-thirds of these are drivers (EU, 2016). Anything we can do to reduce this number is time, money and effort well spent.

Our global [Ford Driving Skills for Life \(Ford DSFL\)](#) program was established 15 years ago by Ford Fund, in partnership with the Governors Highway Safety Association (GHSA) and a panel of experts. It gives newly qualified drivers the skills they need to drive safely and make good decisions behind the wheel in real-world situations. Training on speed and space awareness, distracted driving, vehicle handling and the simulated effects of drugs and alcohol are delivered – free of charge – through hands-on courses, in the classroom and via an interactive training center ("The Academy") on the [Ford DSFL website](#).

The program is expanding geographically and as it does, we adapt it to suit different regions. In North America and Europe, Ford DSFL programs are more focused on helping teenagers, the primary age group of first-time drivers. For example, our three-day DSFL course in London, held in November 2017, trained 470 young drivers, our highest participation rate yet. However, in many Asian, Middle Eastern and African markets, our novice driver participants cover a wider range of ages, as use of motor vehicles becomes more prevalent.

Related Page:

> [A Force for Good](#)

DSFL in Numbers

- **More than 1.03 million** young people and new drivers received free training since 2003
- Currently active in **41 countries**, with first-time programs in Hungary, Norway and Zambia
- Expanding to include **Cambodia, Czech Republic and Morocco**, and female drivers in **Saudi Arabia**, in 2018
- **40,000 participants worldwide** in 2017, with 32,000 taking part in hands-on training and 8,000 online
- **Over \$55 million** invested since 2003

Addressing Driver Distraction

We conduct a significant amount of research into driver distraction, both on our own and with universities and organizations such as the Alliance of Automobile Manufacturers (Auto Alliance), to help make driving safer for everyone. The results gleaned from these studies has informed the development of a number of [driver assist technologies](#).

Fatigue and Tiredness

Truck drivers often drive thousands of miles every year, making their profession tiring – and therefore potentially dangerous. In Brazil, more than 11 percent of truck drivers have been involved in a recent collision (Brazilian National Transport Confederation), so in 2017 our local Heavy Truck division developed innovative technology to help drivers recognize the signs of fatigue and act to stay safe.

The Safe Cap looks like a normal baseball cap, but it comes equipped with sensors that interpret the wearer's head movements. If they are tired or sleepy behind the wheel, an alert is issued through vibration, sound and light flashes. The prototype Safe Cap was tested for eight months in real driving conditions, and we hope that patenting and certification will follow.

Driving Under the Influence

In Europe, alcohol is a factor in about 17 percent of road accident fatalities. In the United States, alcohol-impaired driving is involved in about 28 percent of traffic fatalities. Additionally, a National Highway Traffic Safety Administration (NHTSA) study found that about 20 percent of drivers surveyed tested positive for potentially impairing drugs.

To educate teens and new adult drivers about the dangers of driving while under the influence of alcohol or drugs, participants at some of our Ford DSFL driving clinics can try on our "[Drink Driving Suits](#)" and "[Drug Driving Suits](#)." These help them appreciate how being impaired can slow movement, reduce reaction times, and affect vision and coordination.

Ford DSFL courses in Europe also offer students the chance to experience the "[Hangover Suit](#)," which recreates the classic "morning after the night before" symptoms such as a throbbing head, dizziness, and feeling tired and weak. The 37-pound suit, created by Ford Europe, shows that even hungover driving can be as lethal as drunk driving.

Cell Phones

Cell phone misuse is one of the biggest killers on British roads. Despite new laws and tougher penalties, over half of drivers in the U.K. still admit to using their phone while driving, while 37 percent have their phone in view (Ford and Brake).

To help change driver behavior, we launched a campaign with road safety charity Brake that banishes handsets to the glove box, which we renamed the "phone box." Prompting drivers to put their phone out of sight, we created a #MyNewPhonebox sticker, which we gave out at our annual DSFL event in London in November 2017.

Our Ford MyKey® system also helps parents encourage their teenagers to drive more safely. Available on millions of Ford and Lincoln vehicles, the programmable key can redirect incoming phone calls and text messages. It can also:

- Limit the vehicle's top speed
- Activate alarms until front occupants have fastened their safety belts
- Limit the volume on the audio system
- Prevent safety and driver assist systems from being disabled

Related Page:

> [Our Contribution to Society](#)

Case Study

Giving Young Drivers a Virtual Reality Check

In 2017, our work on driver distraction expanded into a collaboration with Google to produce Ford Reality Check, a virtual reality (VR) app that brings to life the potentially fatal consequences of distracted driving.

The first-of-its-kind experience, created with VR studio Happy Finish, uses Google Daydream VR to cast the participant as a distracted driver picking up friends on the way to a party. Instant messages, phone calls and chatty passengers all compete for attention, sparking a series of near misses before a final, fatal distraction.

The interruptions are based upon the most prevalent and dangerous distractions for this age group, including smartphones and passengers. The app tracks the time the driver takes their eyes off the road, displaying the total at the end.

In initial tests, 90 percent of app users said they would change their driving behavior.

"Virtual reality is the ideal medium to highlight the dangers of distracted driving to young motorists and, by providing a chilling glimpse of how easily a crash could actually happen, we hope to encourage them to drive more safely. This age group is more likely to engage with VR, and studies suggest immersive experiences in virtual worlds can positively influence behaviors in the real world."

Jim Graham

Manager, Ford Driving Skills for Life