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Environment

2010 HIGHLIGHTS...

- Among *Newsweek's* Top 100 Green Companies for the second consecutive year
- Received the Energy Star Sustained Excellence Award for the sixth consecutive year
- Reduced landfill waste per vehicle by 12.4 percent, relative to 2009
- Continued to expand our standards and requirements for sustainable materials

This section reports on the environmental impacts of our operations, including those from our products, our manufacturing processes and our facilities and properties. For a high-level view of impacts throughout our value chain, please see Our Value Chain and Its Impacts.

Assessing Materiality

The materiality analysis used to plan this report identified eight environment-related issues as among the most material:

- Low-carbon strategy
- Vehicle greenhouse gas (GHG) emissions
- Fuel economy
- Cleaner technologies
- Public policy: GHG/fuel economy regulation
- Vehicle electrification
- Water strategy
- Supply chain environmental sustainability

The analysis also revealed a global theme of increasing expectations regarding, and regulation of, a range of environmental issues associated with our products and manufacturing facilities. These issues include energy and water use (due to rising costs and concerns about long-term availability); tailpipe emissions and end-of-life management (due to increasing regulation); and product materials use (due to opportunities to improve the sustainability of vehicles and cut costs through “cradle-to-cradle” solutions).

Some of these topics are covered in this section, while others are covered in the Climate Change section, the Water section and the Supply Chain section.

Precautionary Principle

The precautionary principle is the idea that if the consequences of an action are unknown, but are judged to have some potential for major or irreversible negative consequences, then it is better to avoid that action. We do not formally apply the precautionary principle to decision making across all of our activities. However, it has influenced our thinking. For example, in addressing climate change as a business issue, we have employed this principle. In addition, we assess and manage environmental, safety, supply chain, operational and other risks as described throughout this report.

Related Links

This Report:

- Our Value Chain and Its Impacts
- Materiality Analysis
- Climate Change
- Water
- Supply Chain

ENVIRONMENT
- Progress and Goals
- Environmental Management
- Design for Lifecycle Sustainability
- Products
- Operations
- Data
- Case Studies

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Progress and Goals

Progress | Goals

Progress

In 2010, Ford made significant progress on the environmental aspects of our products and operations. For example:

- In 2009, we committed that every all-new or redesigned vehicle we introduce will be the best in class or among the best in class for fuel economy in its segment. Since then, we have followed through on this commitment with vehicles introduced in both the U.S. and Europe, and we will continue to do so with future product launches. In 2010, we developed carbon dioxide (CO_2) reduction targets for all of our facilities, following the same science-based process used to develop our CO_2 reduction targets for vehicles. These targets are based on the CO_2 reductions that will help stabilize atmospheric carbon dioxide at 450 ppm.
- For the 2010 model year, our fleet CO_2 emissions increased slightly by about 1 percent relative to the 2009 model year, but improved 11 percent compared to the 2006 model year. Preliminary data for the 2011 model year project that the Corporate Average Fuel Economy (CAFE) values for the car and truck fleets will be about the same as the car and truck fleet averages for the 2010 model year. On an overall fleet basis, preliminary estimates indicate a 2011 CAFE improvement of 2.9 percent compared to 2010.
- We are continuing to expand corporate standards and requirements for sustainable materials and in-vehicle air quality. We are developing in-vehicle air-quality specifications, which we plan to roll out to all of our operating regions over the next few years. We are expanding the use of recycled and renewable materials across vehicle lines. And, we are continuing to develop new applications for sustainable materials. As of 2011, all of our vehicles produced in North America use soy foam seating.
- In 2010 we developed and adopted a global water strategy. This strategy includes a strong focus on understanding and reducing water risks in the water-scarce regions in which we operate. It also addresses water use throughout our supply chain. We began implementing this strategy in 2011.
- In 2010, we completed the global implementation of our Environmental Operating System – including metrics, data collection and reporting – in all of our plants in all regions. Also in 2010, our Powertrain Operations (PTO) completed the global implementation of the Sustainability Tracking and Rating system to encourage the implementation of environmental manufacturing best practices in all new PTO programs.
- For the sixth consecutive year, we received the Energy Star Sustained Excellence Award from the U.S. Environmental Protection Agency and the U.S. Department of Energy. This award recognizes Ford's continued leadership in and commitment to protecting the environment through energy efficiency.
- From 2000 to 2010, we reduced CO_2 emissions from our facilities by a total of approximately 49 percent and on a per-vehicle basis by 30 percent.
- We continued our leadership in facility greenhouse gas reporting in 2010. Voluntary GHG reports were developed for all four Ford manufacturing sites in China.
- We continued to reduce water use and waste sent to landfill on a per-vehicle basis in 2010. We reduced global water use per vehicle by 8 percent and landfill waste per vehicle by 12.4 percent, relative to 2009.
- We introduced packaging guidelines for the transport of parts and materials used in Ford vehicles. These guidelines require supplier-provided packaging to support corporate sustainability goals by seeking a neutral or positive environmental footprint through zero waste to landfill and the use of 100 percent recycled, renewable or recyclable materials.

Related Links

This Report:
- Climate Change
- Water
- Sustainable Materials
- Ford's Goals, Commitments and Status

2010 Year-Over-Year Environmental Performance Metrics and Goals

Products

Goal	2010 Accomplishments
Product Sustainability Index (PSI)	

Expand use of the PSI and Design for Sustainability principles in product development	All-new Ford Fiesta, introduced in North America in 2011, designed using PSI • All new 2012 Ford Focus, to be introduced in North America in 2011, designed using PSI
Sustainable Materials	
Increase the use of recycled, renewable and lightweight materials	• Expanded use of soy foam seating; from 2011 on, all vehicles produced in North America have soy foam seating • Introduced soy foam headliner • Introduced wheat-straw-reinforced plastics • Expanded use of recycled-content fabrics for seats and headliners • Continued to develop strategy requiring recycled plastics and textile materials for many applications in North America
Increase the use of and certification for allergen-free and air-quality-friendly interior materials	• Established global design guidelines for allergen-free materials and in-vehicle air filtration that are being migrated across product lines
Eliminate mercury and lead content in vehicles	• As of 2009, all Ford, Lincoln and Mercury vehicles in the U.S. are mercury-free, with the exception of the Lincoln Town Car, which uses mercury in its high-intensity discharge headlamps • Have eliminated use of lead wheel weights in North America and Europe
Product Fuel Economy and Greenhouse Gas Emissions	
Do our share to stabilize carbon dioxide (CO_2) concentrations in the atmosphere at 450 ppm, the level generally accepted to avoid the most serious effects of climate change.	• Expanded the climate stabilization analysis that we had undertaken previously for the U.S. and Europe to the other regions in which we operate. This analysis defines the emission reductions needed to meet our stabilization commitment. • Further developed our electrification strategy and launched our first electric vehicle. • Reduced fleet-average CO_2 emissions from our 2010 model year U.S. and European new vehicles by 10.5 percent and 8.1 percent, respectively, compared to the 2006 model year.[1] • Announced three more engines with our patented EcoBoost™ fuel-saving technology. By 2013, we expect to be producing approximately 1.5 million EcoBoost engines globally, about 200,000 more than originally expected. • Offered four models in North America that provide 40 miles per gallon or better – compared to 2009, when our most fuel-efficient vehicle achieved 35 miles per gallon. • Offered 18 models in Europe that achieve a CO_2 emission level of 130 grams per kilometer, and two that achieve less than 100 grams per kilometer.
Have every all-new or redesigned vehicle we introduce be the best in class or among the best in class for fuel economy in its segment	• Since 2009, have followed through on this commitment with vehicles introduced in both the U.S. and Europe, and we will continue to do so in future product launches

Facilities

Metric	2010 Target	2010 Actual	2011 Target
Energy Use			
Facility energy efficiency (global)	3% improvement	5.6% improvement[2]	3% improvement
Facility energy efficiency (U.S.)	3% improvement	4.6% improvement[3]	3% improvement
Energy use	No specific goal; continue use reductions	44% improvement compared to 2000 levels	No specific goal; continue use reductions
Emissions			
VOC emissions from painting at North American assembly plants	Maintain 24 g/sq meter or less	21.6 g/sq meter	Maintain 23 g/sq meter or less
Water Use			
Water use (global)	6% per unit reduction from 2009[4]	8% reduction	5% per unit reduction from 2010
Waste Production			
Landfill waste (global)	10% per unit reduction from 2009[5]	12.4% reduction	10% per unit reduction from 2010

1. Please see Sue Cischke's letter for a discussion of our CO_2-reduction goal for North America and Europe.
2. Energy efficiency is calculated in million BTUs per unit. For our global efficiency calculation, energy use is not adjusted for variances in production or weather.
3. The North American Energy Efficiency Index is a normalized indicator based on a calculation that adjusts for typical variances in weather and vehicle production. The Index was set at 100 for the baseline year 2006 to simplify tracking against our annual 3 percent energy efficiency target. A year 2000 baseline was used through 2006; the baseline will be reset to year 2010 starting in 2011. The year 2010 improvement indexed against the year 2006 baseline was 14.4, indicating a 14.4 percent improvement in energy efficiency since 2006.
4. Starting in 2010, our main water reduction target was set and tracked on a per-vehicle basis as opposed to a total global reduction, as has been done in previous years.
5. Starting in 2010, our main waste reduction target was set and tracked on a per-vehicle basis as opposed to a total global reduction, as has been done in previous years.

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Environmental Management

Ford has an environmental Policy and environmental Directives that apply to our operations globally (see our Code of Conduct Handbook). All Ford manufacturing facilities and product development functions are certified to ISO 14001, the leading global standard for managing environmental issues. In addition, we have asked our preferred "Q1" suppliers of production parts to certify their facilities. These commitments place our most significant potential environmental impacts under one comprehensive environmental management system.

In this section, we report on the environmental management systems we use in manufacturing and product development, as well as with our supply chain, to ensure that environmental issues are addressed.

Related Links

This Report:

- Supply Chain Environmental Sustainability

Corporate.ford.com:

- Code of Conduct Handbook

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Manufacturing

Ford's manufacturing management sets environmental targets annually for all of our facilities. We develop these targets through a comprehensive process that considers past performance, future regulation trends, environmental technology advances, financial conditions and other relevant factors. Global targets are translated into regional- and facility-level targets, which differ depending on the relevant regulations and financial and production constraints in each region.

Ford's Vehicle Operations (VO) and Powertrain Operations (PTO) functions are implementing systems to track and enhance the sustainability of new programs. In 2010, PTO completed global implementation of the Sustainability Tracking and Rating system (STAR) to further enhance the implementation of environmental manufacturing best practices in all new PTO programs. The STAR system uses a one- to five-star rating system to evaluate new programs based on how well they incorporate environmental best practices from a continually updated list. The list of best practices includes initiatives to reduce energy, water, waste and hydrocarbon (lubricating oil). To encourage constant improvement, once a best practice becomes the standard, it is removed from the list and can no longer count as an improvement under the STAR system.

In 2010, Ford completed the full global implementation of an Environmental Operating System (EOS). As a counterpart to our Quality Operating System, the EOS provides a standardized, streamlined approach to maintaining compliance with all legal, third-party and Ford internal requirements, including government regulations, ISO 14001 and Ford's own environmental policies and business plan objectives and targets. The EOS drives compliance responsibility to the operations level by assigning compliance-related tasks to the appropriate personnel and tracking the completion of those tasks. The system also standardizes tracking and reporting systems, which simplifies compliance, reporting and analysis at all levels of the Company. This system allows us to manage an ever-increasing range of external regulations and internal performance objectives more effectively and with fewer resources. For example, the average plant has to comply with approximately 90 corporate requirements, 100 to 400 national regulations and 200 plant-specific requirements. The EOS consolidates all of these requirements into easy-to-follow tracking and reporting systems organized by recurring tasks, non-recurring tasks and critical tasks.

Ford has moved to a single group ISO 14001 certification for its plants in North America. All plants and Ford Customer Service Division facilities in North America share this group certification. Likewise, South American plants share a single group certification. Group certification saves time and money, with no degradation in plant environmental performance.

In 2007, we implemented the Global Emissions Manager (GEM) database, which provides a globally consistent approach for measuring and monitoring environmental data. This system helps us track our efforts to reduce water consumption, energy use, carbon dioxide emissions and the amount of waste sent to landfill. The data that GEM provides and the level of analysis it allows also helps us set more effective environmental management targets and develop more specific strategies for improving environmental performance. We are continuing to add metrics and tracking systems to GEM to further enhance our environmental management objectives.

We are also implementing corporate design specifications for the development of new plants, to make them more sustainable. These specifications require that new manufacturing facilities be designed and constructed using the best practices Ford has developed at plants all over the world. These standards will act to replicate best practices across our global operations and create efficient and sustainable plants.

For more information on our new plant development standards please see Green Buildings. For more information on our plans to develop new plants in Asia, please see Case Study: Sustainable Growth in Asia.

Related Links

This Report:

- Green Buildings
- Case Study: Sustainable Growth in Asia

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Product Development

In Ford's Global Product Development System, environmental objectives – including targets for fuel economy, vehicle emissions, the use of recycled and renewable materials, and restrictions on substances of concern – are defined at the outset of the design process for every new Ford vehicle. We track our progress toward these targets throughout product development.

As part of our ONE Ford global integration process, we are developing targets for a range of vehicle attributes, including for fuel economy, quality and safety that aim to make our vehicles either leaders or among the leaders compared to competitor vehicles in the same segments. We develop these competitive vehicle attribute targets for every vehicle program, to deliver on key customer demands and Ford strategies, by using a range of consumer data, internal brand data and competitor vehicle data. Based on this process, in 2009 we committed that every all-new or redesigned vehicle we introduce will be the best in class or among the best in class for fuel economy in its segment. Since that time, we have followed through on this commitment with vehicles introduced in both the U.S. and Europe, and we will continue to do so in future product launches. For examples of 2010 and 2011 vehicles that meet this commitment, please see Vehicle.

In addition, we have identified global leaders and attribute teams within Ford who coordinate the development of the global product attribute targets in key areas such as sustainable materials, recycling, materials of concern, vehicle interior air quality and vehicle lifecycle issues. These leaders coordinate the global implementation of our corporate sustainability strategies and support our ONE Ford strategy to harmonize product development across regions.

We use our Design for Environment (DfE) tool to bridge the gap between product development and environmental management. DfE uses simplified lifecycle assessments and cost calculations, substance restrictions, checklists and other tools to identify and reduce significant impacts. We are continuing to broaden the range of issues we consider in our product development process as we move from Design for Environment to Design for Sustainability (DfS). Ford of Europe's Product Sustainability Index is incorporating DfS principles, to improve each vehicle's environmental, social and economic performance.

Related Links

This Report:

- Vehicle
- Product Sustainability Index
- Working as One Team

Suppliers

ISO 14001 certification is expected of all "Q1," or preferred, production suppliers, as well as nonproduction supplier facilities if the supplier has a manufacturing site or a nonmanufacturing site that ships products to Ford and has significant environmental impacts.

We are continually improving our systems for influencing the integration of sustainability throughout our supply chain. We began this process by requiring all of our Q1 suppliers to obtain ISO 14001 certification, and in 2006 we attained our goal of having 100 percent of our Q1 production suppliers gain ISO 14001 certification for facilities supplying Ford. We also encourage our suppliers to extend the benefits of improved environmental performance by requiring their own suppliers to implement environmental management systems as well.

We work in cross-industry forums to encourage common approaches to the supply chain challenges of our industry. Since 2007, for example, we have been a member of the Suppliers Partnership for the Environment, an innovative partnership between automobile original equipment manufacturers, their suppliers and the U.S. Environmental Protection Agency. This partnership works to create new and innovative business-centered approaches to environmental protection and provides a forum for small, midsize and large automotive and vehicle suppliers to work together, learn from each other and share environmental best practices.

In 2006, we introduced our Aligned Business Framework (ABF), a strategy for working more closely with key suppliers to lower costs and improve quality. As part of this framework, ABF suppliers commit to managing and assuring proper working conditions and responsible environmental management in their facilities and in their supply chain.

Our work with ABF suppliers to date has focused on providing support and resources to help them align with Ford's Code of Basic Working Conditions and implement supporting processes, including responsible environmental management systems. Ford has committed to providing suppliers with a range of support and assistance based on our experiences in this area. During the fourth quarter of 2009, we held sustainability sessions in Dearborn, Michigan, and Cologne, Germany, which were attended by senior management from Ford and our ABF suppliers. Topics covered in these meetings included internal training development guidance, best practice sharing from suppliers on the topic of responsible working conditions, and environmental management in their own operations and their suppliers' operations.

We also held a workshop discussion on carbon measurement and management in the automotive value chain. In 2010 we will be conducting a pilot project with a select group of our suppliers that will involve the collection and reporting of greenhouse gas emissions data (see the Climate Change section for more information). For more information on our Supply Chain in general, please see Sustainable Supply Chain Management.

Related Links

This Report:

- Sustainable Supply Chain Management
- Supply Chain
- Supplier Relationships

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Design for Lifecycle Sustainability

We use a lifecycle approach to assess and minimize the total adverse impacts of our vehicles from a sustainability perspective – from raw materials extraction and transportation through manufacturing and use to end of life. This approach considers and works to minimize negative impacts upfront in product design decisions. Called Design for Sustainability (DfS), the approach is integrated and holistic, to ensure that we achieve a balance between environmental, social and economic aspects in our product development process.

We are continuing to advance how we apply DfS principles. For example, we developed a Product Sustainability Index tool, which has been used in our European product development operations since 2002. This tool helps us assess and find opportunities to reduce the impacts of our products over their entire lifecycle – including environmental impacts such as carbon dioxide, societal questions such as pedestrian protection and economic issues such as cost of ownership.

Among our product sustainability efforts, we are increasing our use of sustainable materials and eliminating undesirable materials. We are also working to reduce greenhouse gases and other emissions from our facilities and vehicles by developing cleaner and more energy-efficient production processes, improving the efficiency of our packaging and transportation logistics and introducing cleaner and more fuel-efficient vehicles. Downstream in our value chain, we are working with drivers to educate them on ways to increase fuel economy and reduce vehicle emissions through our eco-driving program. Upstream, we are working with our suppliers to increase the sustainability of our products throughout the supply chain.

Related Links

This Report:

- Product Sustainability Index
- Facilities
- Logistics
- Vehicle
- Driver
- Sustainable Supply Chain Management

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Quantifying Our Environmental Impacts

The first important step in improving the lifecycle impacts of our products is to understand the environmental aspects of our products and the potential environmental impacts associated with them.[1] The stages of a vehicle's lifecycle include materials production, parts fabrication, vehicle assembly, vehicle operation (including fuel production), maintenance and repair, and end-of-life disposal and recycling. While estimates vary depending upon the specifics of the vehicle analyzed, one cooperative, multi-industry analysis of a typical family sedan (a spark-ignited, gasoline-powered, Taurus-class family sedan weighing 1,532 kg) found that during its lifecycle:

- 960 gigajoules of energy are consumed
- 21,000 kg of hydrocarbon are consumed
- 60,000 kg of carbon dioxide are emitted

In that study, it was assumed the vehicle was driven a total of 120,000 miles at an average metro/highway fuel efficiency of 22.8 mpg. The study also found:

- Vehicle operation consumes 86 percent of the lifecycle energy
- Vehicle operation generates 87 percent of the lifecycle carbon dioxide (CO_2)
- Vehicle production generates 65 percent of the particulates and 34 percent of the lifecycle sulfur dioxide

This is consistent with a separate review of lifecycle studies, in which it was found that the operational stage generally accounts for 80 to 90 percent of the total energy consumption and CO_2 emissions of conventional gasoline-powered vehicles, depending on the vehicle's material composition, average fuel efficiency and lifetime drive distance. An ISO 14040-reviewed lifecycle assessment study of the Ford Galaxy and S-MAX confirmed that the vehicle's use phase consumes more energy and produces more CO_2 emissions than the vehicle's other lifecycle phases. Other impact categories are mainly dominated by the mining and materials production phases. These findings were confirmed in subsequent studies for all other models developed using our Product Sustainability Index.

1. *Environmental aspects* is a term used in the ISO 14001 framework to denote elements of an organization's activities, products and services that can interact with the environment. Potential environmental impacts include any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services. Local Ford facilities use corporate lists of environmental aspects and potential impacts to identify and amplify those aspects that apply to their operations.

Related Links

This Report:
- Product Sustainability Index

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Product Sustainability Index

Ford's European operations have been leading our efforts to incorporate the principles of designing for sustainability and the use of a lifecycle management approach. Ford began integrating Design for Environment principles into the product development process in the early 1990s. Initially, we focused on designing our vehicles to facilitate end-of-life disassembly and recycling by taking into account the accessibility of parts to be disassembled, the type and number of different fasteners used and the marking of parts for easy identification. Based on several studies, however, it became clear that focusing on a single lifecycle phase (e.g., end of life) leads to sub-optimizations and potentially increased impacts in other lifecycle phases.

Since then, we have shifted our focus to include a more comprehensive lifecycle approach to improving the sustainability of our vehicles. This focus incorporates the material and component production phase and the use phase, in addition to the end-of-life phase. Since 2002 we have been applying, as a sustainability management tool, the Product Sustainability Index, or PSI, in the development of all of our major new European vehicles. This tool follows a holistic Design for Sustainability approach that incorporates societal and economic aspects as well as environmental aspects[1] into our lifecycle analysis and design approach.

Ford's PSI tracks eight product attributes identified as key sustainability elements of a vehicle: lifecycle global warming potential (mainly carbon dioxide emissions); lifecycle air-quality potential (other air emissions); the use of sustainable materials (recycled and renewable materials); vehicle interior air quality (including allergy certification from TÜV Rheinland, a product-testing organization); exterior noise impact (drive-by noise); safety (for occupants and pedestrians); mobility capability (seat and luggage capacity relative to vehicle size); and lifecycle ownership costs (full costs for the customer over the first three years).

The PSI process has been used to develop the 2006 Ford S-MAX and Galaxy, as well as the 2007 Mondeo, 2008 Kuga, 2009 Fiesta and 2011 Focus. The Focus is the first Ford vehicle developed using the PSI system that is being sold globally. As a result of using the PSI assessment system, all of these models have shown improvements in environmental, social and/or economic performance when compared to the previous models. The chart below shows specific performance and areas of improvement for each model. The PSI will be used on all future products developed by Ford of Europe. Detailed reports on the PSI analysis for these vehicles can be downloaded from Ford of Europe's website.

In 2010 and 2011, the first joint PSI study was done by Ford of Europe and Ford North America on the all-new Ford Focus. This was a first step toward possibly implementing PSI in North America.

PSI Assessed Model Performance[2]

Lifecycle Global Warming

Measurement Method

Emissions of CO_2 and other greenhouse gases from raw material extraction to material, part, and vehicle production, driving period (150,000 km; incl. air conditioning) and final recycling/recovery (i.e., full vehicle lifecycle, cradle-to-cradle)

	Performance*	Better/worse than previous model
2006 Ford S-MAX 2.0L TDCi with DPF	39 metric tonnes CO_2	Similar
2006 Ford Galaxy 2.0L TDCi with DPF	40 metric tonnes CO_2	Similar
2007 Ford Mondeo 2.0-liter TDCi Diesel with DPF	37 metric tonnes CO_2	Better
2008 Ford Kuga	37 metric tonnes CO_2	No previous model
2009 Ford Fiesta ECOnetic, Diesel	21 metric tonnes CO_2	Better
2009 Ford Fiesta, Petrol	30 metric tonnes CO_2	Better

* 1 metric tonne = 1,000 kg

Lifecycle Air Quality

Measurement Method

Summer smog-related emissions from raw material extraction to material, part, and vehicle production, driving period (150,000 km; incl. air conditioning) and final recycling/recovery (i.e., full vehicle lifecycle, cradle-to-cradle)

Related Links

This Report:
- Sustainable Materials
- Lifecycle Vehicle CO_2 Emissions
- Materials Management

Ford.co.uk:
- Product Sustainability Index

	Performance	Better/worse than previous model
2006 Ford S-MAX 2.0L TDCi with DPF	37 kg ethene	Similar
2006 Ford Galaxy 2.0L TDCi with DPF	37 kg ethene	Similar
2007 Ford Mondeo 2.0-liter TDCi Diesel with DPF	35 kg ethene	Better
2008 Ford Kuga	35 kg ethene	No previous model
2009 Ford Fiesta ECOnetic, Diesel	22 kg ethene	Better
2009 Ford Fiesta, Petrol	32 kg ethene	Better

Sustainable Materials

Measurement Method

Use of recycled and natural materials

	Performance	Better/worse than previous model
2006 Ford S-MAX 2.0L TDCi with DPF	18 kg of non-metals	Better
2006 Ford Galaxy 2.0L TDCi with DPF	18 kg of non-metals	Better
2007 Ford Mondeo 2.0-liter TDCi Diesel with DPF	7.5% of non-metals	Better
2008 Ford Kuga	6% of non-metals	No previous model
2009 Ford Fiesta ECOnetic, Diesel	8.5% of non-metals	Better
2009 Ford Fiesta, Petrol	9% of non-metals	Better

Substance Management

	Performance	Better/worse than previous model
2006 Ford S-MAX 2.0L TDCi with DPF	Substance management, TÜV-tested pollen filter efficiency and allergy-tested label	Better
2006 Ford Galaxy 2.0L TDCi with DPF	Substance management, TÜV-tested pollen filter efficiency and allergy-tested label	Better
2007 Ford Mondeo 2.0-liter TDCi Diesel with DPF	Substance management; TÜV-tested interior and pollen filter efficiency	Better
2008 Ford Kuga	TÜV-tested interior and pollen filter efficiency	No previous model
2009 Ford Fiesta ECOnetic, Diesel	TÜV-tested interior and pollen filter efficiency	Better
2009 Ford Fiesta, Petrol	TÜV-tested interior and pollen filter efficiency	Better

Drive-by-Noise

Measurement Method

dB(A)

	Performance	Better/worse than previous model
2006 Ford S-MAX 2.0L TDCi with DPF	71 dB(A)	Better
2006 Ford Galaxy 2.0L TDCi with DPF	71 dB(A)	Better
2007 Ford Mondeo 2.0-liter TDCi Diesel with DPF	69 dB(A)	Similar
2008 Ford Kuga	72 dB(A)	No previous model
2009 Ford Fiesta ECOnetic, Diesel	69 dB(A)	Better
2009 Ford Fiesta, Petrol	72 dB(A)	Similar

Safety

Measurement Method

Complex method, structural stability, occupant safety, and pedestrian safety; active safety elements,

etc. including Euro NCAP stars

	Performance	Better/worse than previous model
2006 Ford S-MAX 2.0L TDCi with DPF	Euro NCAP safety rating: 5 stars for adult occupant protection, 4 stars for child protection and 2 stars for pedestrian protection	Better
2006 Ford Galaxy 2.0L TDCi with DPF	Euro NCAP safety rating: 5 stars for adult occupant protection, 4 stars for child protection and 2 stars for pedestrian protection	Better
2007 Ford Mondeo 2.0-liter TDCi Diesel with DPF	Euro NCAP safety rating: 5 stars for adult occupant protection, 4 stars for child protection and 2 stars for pedestrian protection	Better
2008 Ford Kuga	Euro NCAP safety rating: 5 stars for adult occupant protection, 4 stars for child occupant protection and 3 stars for pedestrian protection	No previous model
2009 Ford Fiesta ECOnetic, Diesel	5-star Euro NAP rating for adult occupant safety; electronic stability control available for all versions	Better
2009 Ford Fiesta, Petrol	5-star Euro NCAP rating for adult occupant safety; electronic stability control available for all versions	Better

Mobility Capacity

Measurement Method

Mobility service (including seats, luggage) to vehicle size; measured as vehicle shadow in m² and luggage areas in liters

	Performance	Better/worse than previous model
2006 Ford S-MAX 2.0L TDCi with DPF	10.25 m² shadow area, 1171 l luggage, 5 seats	Better
2006 Ford Galaxy 2.0L TDCi with DPF	10.4 m² shadow area, 435 l luggage, 7 seats	Similar
2007 Ford Mondeo 2.0-liter TDCi Diesel with DPF	9 m² shadow area, 530 l luggage, 5 seats	Better
2008 Ford Kuga	9.5 m² shadow area, 410 l luggage, 5 seats	No previous model
2009 Ford Fiesta ECOnetic, Diesel	7.5 m² shadow area, 295 l luggage compartment	Better
2009 Ford Fiesta, Petrol	7.5 m² shadow area, 295 l luggage compartment	Similar

Lifecycle Cost

Measurement Method

Sum of vehicle price and 3 years' service (fuel cost, maintenance cost, taxation) minus residual value

	Performance	Better/worse than previous model
2006 Ford S-MAX 2.0L TDCi with DPF	Approx. €22,100	Better
2006 Ford Galaxy 2.0L TDCi with DPF	Approx. €23,200	Better
2007 Ford Mondeo 2.0-liter TDCi Diesel with DPF	Approx. €18,300	Better
2008 Ford Kuga	Approx. €19,100	No previous model
2009 Ford Fiesta ECOnetic, Diesel	Approx. €13,000	Similar
2009 Ford Fiesta, Petrol	Approx. €11,000	Better

Ford of Europe published a detailed PSI report, soon after the launch of the first vehicles for which PSI had been used from the beginning of vehicle development. The PSI assessment system also has been reviewed and certified by outside experts. One study, conducted by experts in the area of lifecycle science and sustainability, found the PSI to be a design and analysis step that provides a full sustainability assessment and meets the requirements of ISO 14040, the international lifecycle assessment standard. PSI assessments of the 2006 S-MAX and Galaxy vehicles were certified by the International Organization for Standardization for lifecycle assessment improvements. This certification process also verified the overall PSI methodology used for all subsequent PSI-developed models.

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1. *Environmental aspects* is a term used in the ISO 14001 framework to denote elements of an organization's activities, products and services that can interact with the environment. Potential environmental impacts include any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services. Local Ford facilities use corporate lists of environmental aspects and potential impacts to identify and amplify those aspects that apply to their operations.
2. PSI-rated models are only available in Europe.

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Products

As a customer- and product-driven company, our vehicles are the foundation of our business. Our products are also a major focal point of our environmental impacts and our efforts to reduce those impacts.

This section reports on the environmental aspects[1] of our products, from their design through their use through to the end of their lifecycle. Specifically, we report on:

- Tailpipe emissions, including hydrocarbons, nitrogen oxides, carbon monoxide and particulate matter that can contribute to smog formation and other air-pollution issues
- Sustainable materials, including efforts to increase our use of recycled and renewable materials, improve vehicle interior air quality and eliminate substances of concern

The fuel efficiency of our products, as well as our product-related greenhouse gas emissions, are reported in the Climate Change section of this report.

1. *Environmental aspects* is a term used in the ISO 14001 framework to denote elements of an organization's activities, products and services that can interact with the environment.

Related Links

This Report:

- Climate Change Progress and Performance
- Sustainable Materials

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Non-CO_2 Tailpipe Emissions

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Related Links

Vehicle Websites:
- Ford Focus
- Ford Fusion Hybrid
- Ford Escape
- Mercury Milan Hybrid
- Lincoln MKZ

Vehicle smog-forming emissions result from the incomplete combustion of fuels, impurities in fuels, and the high-temperature oxidation of atmospheric nitrogen during the fuel-combustion process. Regulated smog-forming tailpipe emissions include hydrocarbons, nitrogen oxides, carbon monoxide and particulate matter. These emissions are regulated in the U.S. by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act as well as by the California Air Resources Board (CARB).

U.S.

As of 2010, all of Ford's U.S. vehicles have been certified to the EPA's Tier 2 regulations, a comprehensive and challenging set of vehicle emissions requirements.

The Tier 2 program began with the 2004 model year. It coordinates the introduction of cleaner fuels with more-stringent vehicle tailpipe emissions standards to achieve near-zero non-carbon dioxide (CO_2) tailpipe emissions from cars and light trucks. These regulations significantly reduce targeted vehicle emissions, including nitrogen oxides and non-methane organic gases, to help reduce the formation of ozone and particulate matter. The Tier 2 regulations apply to all passenger cars, light trucks and medium-duty passenger vehicles. Ford completed implementing Tier 2 emissions requirements on all relevant vehicles in the 2009 model year.

The EPA estimates that this program has resulted in reductions in oxides of nitrogen emissions (from all relevant mobile sources) by at least 1.2 million tons as of 2010.

For the California market, Ford is required to meet the state's stringent Low Emission Vehicle II (LEVII) emissions requirements for light-duty vehicles. Under the LEVII program, manufacturers are effectively required to produce a number of Partial Zero Emission Vehicles (PZEVs). A PZEV is a vehicle certified to near-zero emissions standards. Strictly speaking, PZEV vehicles are required to:

- meet California's Super Ultra-Low Emission Vehicle exhaust emissions standard (SULEVII),
- produce zero fuel system evaporative emissions, and
- be emissions compliant for a full useful life of 150,000 miles.

For the 2010 model year, we offered a PZEV version of the Ford Focus. The hybrid versions of the 2010 Ford Fusion, Mercury Milan and the Lincoln MKZ also met the PZEV requirements. For the 2011 model year, Ford is offering the Focus PZEV and hybrid PZEV versions of the Ford Fusion, Lincoln MKZ and Ford Escape.

Both the EPA and CARB are in the process of developing the next generation of emissions standards (Tier 3 and LEV III, respectively). CARB is also in the process of revising its future Zero Emission Vehicle regulations, to integrate greenhouse gas emissions.

We are working with the agencies through their regulatory processes to help develop rules that are both effective and feasible. In setting tailpipe emission regulations, other vehicle rules – such as fuel economy/greenhouse gas standards and safety standards – must be taken into account to ensure that the total package of requirements is workable.

Ford continues to oppose technology mandates that seek to impose quotas or limits on the production or sale of vehicles with specified powertrain technologies. Regulatory efforts to dictate market outcomes, or to pick technology "winners" and "losers," have never produced successful outcomes. Manufacturers need the flexibility to build the kinds of vehicles that the marketplace demands based on consumer preferences and other external factors. Emissions standards should be performance-based and should be designed to enable manufacturers to introduce vehicles with an array of different technologies.

Information about the emissions performance of all Ford vehicles sold in the U.S. can be found at the EPA's Green Vehicles site.

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Europe

Since 1990, we have decreased the non-CO_2 tailpipe emissions from our vehicles sold in Europe by up to 90 percent through the development of a new generation of downsized, high-efficiency gasoline- and diesel-powered vehicles with improved engine technologies and high-tech exhaust gas treatment devices. As part of these emissions-reduction efforts, all of our diesel engines are now fitted with a maintenance-free diesel particulate filter system that requires no additives for filter regeneration.

Further air-quality improvements have been generated as we have introduced vehicles equipped with technology to meet the more-stringent Euro 5 emissions standards. In 2010, for example, Ford introduced the 1.6L and 2.0L GTDI Ecoboost™ engines in Europe. These are among the most technologically advanced engines in production, combining high-pressure direct injection, a low-inertia turbo and twin independent variable cam timing. They join an all-new lineup of high-efficiency common rail diesel engines all complying with Euro 5 emissions levels. All of our new passenger cars registered as of January 1, 2006, and all light-duty vehicles registered as of January 1, 2007, comply with the Euro 4 standard.

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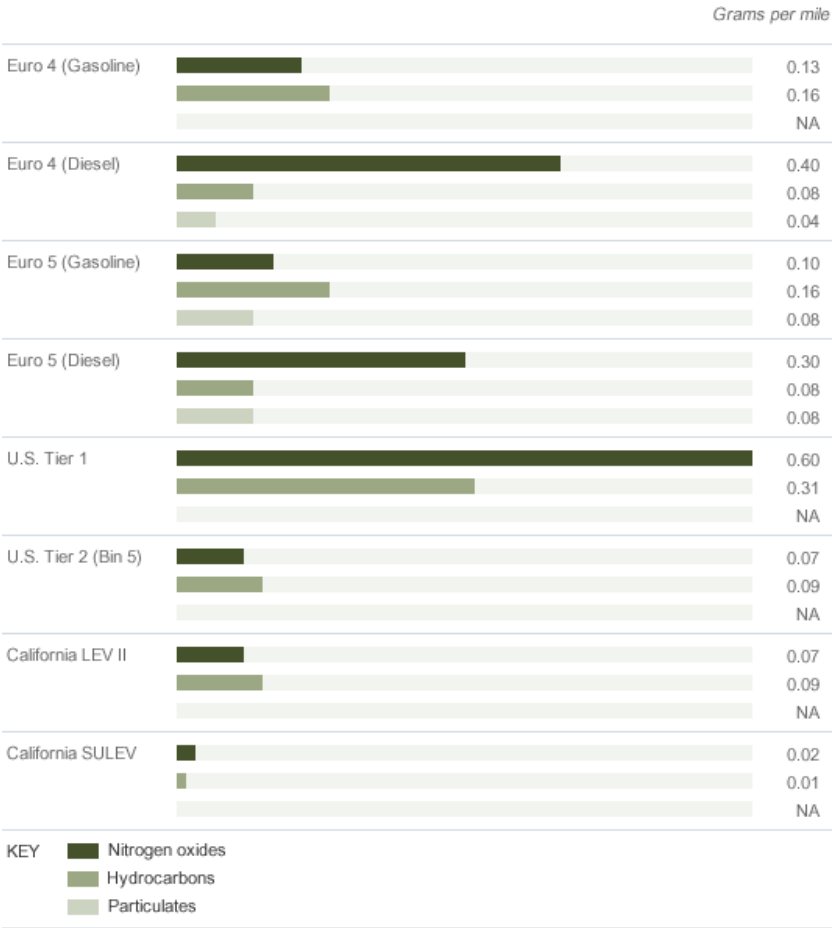
Emissions Regulations in the U.S. and Europe

Chart | Table



Grams per mile

	Nitrogen oxides	Hydrocarbons	Particulates
Euro 4 (Gasoline)	0.13	0.16	NA
Euro 4 (Diesel)	0.40	0.08	0.04
Euro 5 (Gasoline)	0.10	0.16	0.08
Euro 5 (Diesel)	0.30	0.08	0.08
U.S. Tier 1	0.60	0.31	NA
U.S. Tier 2 (Bin 5)	0.07	0.09	NA
California LEV II	0.07	0.09	NA
California SULEV	0.02	0.01	NA

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Asia Pacific and Africa

Since 2007, our new passenger vehicles have been designed to comply with China Stage III requirements (based on Euro 3 standards). China plans to implement the most recent European standards (Euro 5) starting in 2012 in large cities. Korea and Taiwan have adopted very stringent U.S.-based standards for gasoline vehicles and European-based standards for diesel vehicles. Japan has unique standards and test procedures, and began implementing more-stringent standards in 2009. Ford is working to comply with all of these standards using a variety of approaches, including on-board diagnostics and after-treatment technologies.

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South America

New passenger and commercial vehicles in South America must comply with varying levels of U.S.- or European-based emissions regulations. Argentina, Brazil and Chile are leading the adoption of more-stringent standards for light- and heavy-duty vehicles, to be phased in between 2011 and 2015.

As a consequence, the following non-CO_2 emissions-control technologies have been or will be introduced on our vehicles sold in South America: on-board diagnostic systems in Brazil and Argentina (which are being studied in Chile); particulate filter technology for some diesel products; and selective catalytic reduction systems for heavy diesels in these three countries.

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Sustainable Materials

Materials are an important element of a vehicle's lifecycle sustainability. Choices about materials can influence the safety, fuel economy and performance of the vehicle itself and can have implications throughout the value chain. A material can be more or less sustainable based on a number of factors, including its origin (virgin, renewable or recycled), the resources and manufacturing methods used, the emissions produced throughout its lifecycle, and its application.

Ford has been working for many years to increase the use of recycled and renewable materials and reduce the use of undesirable materials. Vehicles in North America typically are composed of 20 to 25 percent post-consumer recycled material by weight, primarily due to the extensive use of metals with recycled content. Therefore, Ford has concentrated its efforts on developing new uses for recycled materials in the non-metallic portions of the vehicle, which are typically composed of virgin materials. While the amount of recycled content in each vehicle varies, we are continuously increasing the amount of recycled material used in each vehicle line. As described in the section on Design for Lifecycle Sustainability, we have tools available such as Design for Sustainability, lifecycle assessment and lifecycle costing which help us to make beneficial materials choices on future products.

For many years, Ford has had a Voluntary Recycled Content Usage Policy in North America, which sets goals for the use of non-metallic recycled content for each vehicle and increases those targets year by year and model by model. Under this program, recycled materials are selected for all of our vehicles whenever technically and economically feasible. We are now in the process of reinforcing the targets and migrating successful applications of recycled and renewable content across more vehicles for increased environmental benefit. We are focusing on implementing materials technologies that improve environmental and social performance and lower costs.

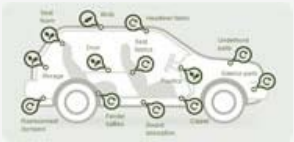
To facilitate this, we are working with our commodity business planners, materials purchasers and materials engineers to develop a comprehensive list of cost-effective sustainable materials that can be implemented across multiple parts and vehicle lines. All recycled and renewable materials on this list are evaluated versus comparable virgin grades, to guarantee appropriate mechanical properties and the same level of component performance that would be obtained with virgin materials. By combining sustainable materials goals for updated or redesigned vehicles with sustainable materials identification and testing processes, we are standardizing and broadening the use of sustainable materials in our vehicles.

As part of our sustainable materials strategy we are also developing global materials specifications, which will facilitate the incorporation of sustainable materials where they meet performance requirements. By developing global specifications we will ensure that the benefits of more sustainable materials will have a global impact. For example, we are introducing recycled material specifications onto the same documents that house our virgin material specifications. This will simplify monitoring of the use of recycled content in our vehicles and will ensure that component engineers and Tier 1 suppliers are confident in the performance of the recycled material, by means of a direct comparison with an equivalent virgin material.

Our efforts to use recycled materials where they make financial sense are already bearing fruit. For example, many commodity purchasing plans already list recycled-content materials as a preferred material option, including those for battery trays, battery shields and wheel arch liners. In addition, we developed a comprehensive resin strategy that requires the use of recycled plastics for underbody and aerodynamic shields, fender liners, splash shields, stone pecking cuffs and radiator air deflector shields manufactured in North America.

In addition, Ford has a material specification that defines ***post-consumer, post-industrial*** and ***depolymerized recycled content*** and ensures that the use of in-house scrap is not counted toward recycling targets. We also have a material specification for recycled content textiles and are working on specifications for renewable materials. These specifications make it easier for vehicle engineers to choose sustainable material options.

As we introduce sustainable materials, we are conscious that recycled materials are not always the preferable solution. For example, we take into consideration whether recycled materials may increase weight or have significant energy demand in collection/recycling. We also consider the availability of a local recycled material feedstock versus the need for a global commonality of materials. Our global materials strategy has dramatically reduced the number of materials we specify and use, to enable quality and cost reductions. (For more information please see Increasing Global Integration.) In some cases, the introduction of recycled and renewable materials will run counter to that commonization progress, since the feedstocks for these materials can vary by region. Therefore, we are focusing on the most-efficient opportunities to use recycled and renewable materials. For example, it is often more efficient to use local waste materials that divert waste from local landfills, than to ship waste material inputs across the globe. We are working to ensure that we use local materials as a feedstock for our recycled content materials.



Choosing More Sustainable Materials

Explore the sustainable materials we use in our vehicles.

READ MORE

Related Links

This Report:

- Design for Lifecycle Sustainability
- Materials Management
- Increasing Global Integration

As a result of this comprehensive sustainable materials strategy, we will increase the sustainable materials content of every new model year vehicle and standardize the use of sustainable materials across more vehicle components.

Choosing More Sustainable Materials

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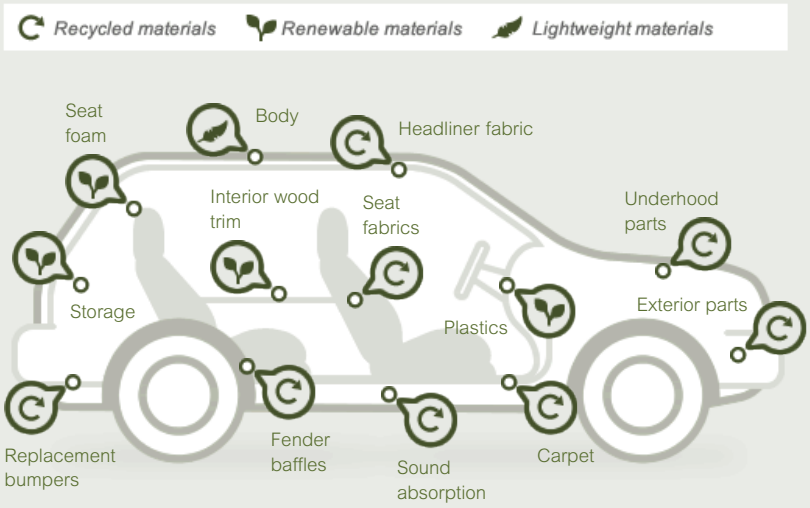

Carpet

Recycled content carpets are used on many vehicles including the U.S. and European Focus and the 2011 Explorer

Replacement bumpers

Many European vehicles use recycled plastic replacement bumpers when original bumpers are damaged

Recycled seat fabric

Seat fabrics in versions of the Fiesta, Taurus, Mustang, Focus, F-150, Super Duty, Fusion, and Escape Hybrid use between 25% and 100% recycled content

Seat foam

Soy foam

Starting in 2011 all vehicles manufactured in North America use seat foam made with soy oil, which reduces CO_2 emissions and decreases dependency on oil

Body

High strength steels

Many vehicles including the 2011 Explorer and European Fiesta use high-strength steels, which weigh less than traditional steels with the same or better performance

Aluminium and Magnesium

Many vehicles including the Lincoln MKT and Ford Kuga use aluminium and magnesium parts, which are lighter weight than traditional steel

Recycled headliner fabric

The 2011 Fiesta in North America use between 50% and 75% recycled content in the headliner fabric

Underhood parts

Recycled plastics and nylon are used in non-surface parts on many vehicles including fan shrouds, battery trays, heater/air conditioning housing, wheel arch liners, engine fans and covers, and underbody systems

Decorative exterior parts

The 2011 Super Duty uses recycled content plastics on a range of parts including the bumper valences, license place brackets, and fog lamp bezels

Sound absorption materials

Recycled blue jeans are used in sound absorption materials on many vehicles including the 2012 Focus

Fender baffles

This noise dampening part on the 2011 Explorer is made of recycled steel from F-150 door panels, reducing manufacturing related CO_2 emissions

Storage

Wheat Straw reinforced plastics

Injection molded plastics reinforced with renewable wheat straw instead of glass fibers were first implemented in storage bins on the 2010 Flex

Engineered wood technology

The Lincoln Navigator, MKX, and MKS use engineered wood from certified, sustainably managed forests, which reduce input materials and waste sent to landfill

Plastics

Natural fibre reinforced compression molded plastics

Multiple European vehicles use compression molded plastics including the Ford Mondeo which uses plastics made with 50% kenaf and 50% polypropylene

We are working to improve the sustainability of our vehicles by using materials that are more sustainable from a total lifecycle perspective. This includes increasing the use of recycled, renewable, recyclable and lightweight materials. Recycled materials incorporate post-consumer and/or post-industrial waste materials; renewable materials are made from plant-based materials; and lightweight materials use special materials and/or designs that provide the same or better performance as other alternatives with less weight.

Recycled Materials

Our efforts to increase recycled materials focus on non-metallic parts, which traditionally have little or no recycled content. Since 2009, as part of our **comprehensive recycled resin strategy**, plastics for underbody and aerodynamic shields, fender liners, splash shields, stone pecking cuffs and radiator air deflector shields manufactured in North America have been made out of post-consumer recycled waste from detergent bottles, tires and automotive battery casings. In 2010, we improved this strategy to specify that rear wheel liners be produced from materials derived from 30 to 40 percent recycled content. These fabric parts are 50 percent lighter than plastic wheel liners and absorb sound, which will enable improved noise vibration and harshness performance while potentially reducing the need for sound-deadening insulators, sprays and foams.

Many Ford vehicles already use recycled materials for these applications, including the Ford Flex, Focus, Fusion, Edge, Ranger, F-150 and Explorer; and the Lincoln MKZ, MKX and Navigator. This recycled materials resin strategy saves money and reduces landfill waste. We estimate that Ford saved approximately $8 million in 2010 by using these recycled materials and diverted between 45 and 50 million pounds of plastic from landfills.

We are also using post-consumer **recycled nylon** in many exterior and under-hood parts, including air cleaner housings, engine fans, fan shrouds, HVAC temperature valves, engine covers, cam covers and carbon canisters.

The 2009 Ford Flex won the Society of Plastics Engineers 2008 Vehicle Engineering Team Award for use of innovative materials. The Flex's recycled plastic underbody system uses approximately 20 pounds of post-consumer recycled waste per vehicle while reducing costs by 10 to 40 percent.

The **all-new 2011 Ford Explorer** uses many recycled materials, including materials recycled from our own manufacturing processes. For example, the noise-dampening fender baffles, which fit between the vehicle's outer shell and its inner structure, are made from steel left over after stamping the door openings out of F-150 body sides. This reuse allows Ford to reduce its use of virgin steel by an estimated 119 tons for one year of production. Using less virgin steel also reduces carbon dioxide (CO_2) emissions. As outlined in more detail below, the Explorer uses

Related Links

This Report:

- Ford's Sustainable Technologies and Alternative Fuels Plan
- Materials Management

Vehicle Websites:

- Ford Explorer
- Ford Focus
- Ford Mondeo

between 25 and 40 percent recycled fiber in its interior fabrics, including seat upholstery, bolster and carpeting. The use of recycled fiber instead of virgin fiber for the seating material is estimated to reduce energy consumption by 20 percent, waste by 17 percent and CO_2 emissions by 14 percent.

The current Ford Mustang and the 2012 Ford Focus and Fiesta will each use more than 20 pounds of **recycled polypropylene plastics** in a range of parts, including the front and rear fender aprons, the front air dam, side rockers and the rear air deflector and under body air deflectors.

Overall, the **2012 Focus** uses approximately 300 separate parts formed with recycled material, diverting approximately 20,000 tons of waste away from landfills each year. The parts incorporating recycled content and the amount of recycled content vary somewhat from region to region. Though this is a global vehicle, approximately 20 percent of parts and parts sourcing are different in different regions. In addition, the availability of recycled material feedstocks varies by region. The U.S. version of the Focus uses recycled content in a wide range of parts including:

- Carpet backing and sound absorption
- Carpets
- Seat fabric
- Front bumper
- Trim panels
- Battery housing, cover and base plate
- Wheel arch liners
- Heating/ventilation components
- Fan shrouds
- Seat supports

In Europe, we strive to use recycled polymers in all of our vehicles when they provide a more sustainable solution. In addition to recycled content in our new vehicle parts, we are also recycling damaged parts collected by dealers. In the UK, we are **recycling bumpers** that have been damaged in accidents or replaced in service. Ford dealers collect the bumpers, which are recycled into new bumpers and other plastic parts. Previously, dealers had to pay to dispose of these bumpers as waste. Currently, dealers store them in a container that is collected by Ford for free. In 2009, more than 23,000 bumpers across the UK Ford dealer network (equating to 70 metric tons of plastic) were diverted from landfills through this program.

Across our global operations, we are also using **recycled materials for interior parts**. This can be much more challenging than using recycled materials for underbody, subsurface and exterior black parts, because it is difficult to get the necessary appearance and performance when using recycled materials. We are continuing to expand our use of recycled seat fabrics and seat components that meet all appearance and performance requirements. The following table highlights some of these efforts:

Interior Recycled Materials Achievements

Vehicle	Material	Partner	Benefits
2011 Ford Fiesta – North America	25 percent post-consumer recycled yarns for seat fabric	Aunde	• Reduces consumer waste • Reduces depletion of natural resources
	75 percent post-consumer recycled yarns for non-woven headliner	Freudenberg	
2011 Ford Explorer	25–40 percent post-industrial recycled seat upholstery, bolster and carpeting	Aunde, Guilford	• Reduces energy consumption by at least 20 percent • Reduces waste by at least 17 percent • Reduces CO_2 emissions by at least 14 percent • Reduces water use by at least 9 percent
2010 Ford Taurus SHO	100 percent post-consumer recycled yarns for seat fabric	Miko Fabrics	• Reduces waste • Reduces energy required for yarn manufacturing by 64 percent and manufacturing-related CO_2 emissions by 60 percent • Fabric manufacturing process uses only neutral, nontoxic dyes and no harmful solvents
2010 Ford Taurus SEL	25 percent post-industrial recycled yarns for seat fabric	Guilford	• Reduces consumer waste • Reduces depletion of natural resources
2010 Mustang Base Series	25 percent post-industrial recycled yarns for seat fabrics	Sage Automotive Interiors	• Reduces consumer waste • Reduces depletion of natural resources
2010 Ford F-150 XL, XLT & FX4 2011 Ford Super Duty®	25 percent post-industrial recycled yarns for seat fabrics	Sage Automotive Interiors, Guilford, Aunde	• Reduces waste • Reduces depletion of natural resources
2010 European Ford Focus RS (fabric option)	100 percent post-consumer recycled yarns for seat fabric	Miko Fabrics	• Reduces waste • Reduces energy required for yarn manufacturing by

			64 percent and manufacturing-related CO_2 emissions by 60 percent • Fabric manufacturing process uses only neutral, nontoxic dyes and no harmful solvents
2010 Ford Fusion and Mercury Milan Hybrids	85 percent post-industrial recycled yarns and 15 percent solution-dyed yarns in seat fabric	Sage Automotive Interiors	• Reduces energy use • Reduces CO_2 emissions • Reduces the use of dyes and chemicals • Reduces water use • Decreases the use of foreign oil
2010 Ford Fusion S series	27 percent post-industrial recycled yarns for seat fabric	Guilford	• Reduces waste • Reduces depletion of natural resources
2010 Ford Escape and Mercury Mariner Hybrid and gas vehicles	100 percent post-industrial recycled yarns in seat fabric	Aunde	• Reduces waste, water use and CO_2 emissions
2008–2009 Ford Escape and Mercury Mariner Hybrids and gas vehicles	100 percent post-industrial recycled yarns in seat fabric	Interface	• Uses 600,000 gallons less water* • Produces 1.8 million lbs less CO_2 equivalents* • Reduces electricity use by 7 million kWh*

* Based on an annual volume of 80,000 vehicles

Since the 2009 model year, the **seat fabrics** in most of our new or redesigned vehicles are made from at least 25 percent post-industrial or post-consumer recycled content. In addition, many of our non-woven headliner fabrics now contain 50 to 75 percent recycled yarns, depending on the color.

In 2009, Ford joined a three-year research project investigating a new wood/plastic compound known as "**liquid wood**." Early findings show excellent recycling potential, as the material can be reprocessed up to five times and has an overall near-neutral CO_2 balance.

We have expanded the use of recycled materials in several Class "A" **decorative applications**. For example, the 2011 Ford Super Duty® will use material derived from recycled battery casings on several aesthetic parts, such as license plate brackets, the 4x2's bumper valence panel and the fog lamp bezels. These parts are "molded in color" and color-matched to provide visual harmony. The Super Duty is also using post-industrial and post-consumer recycled plastic for its fascia lower valence. This plastic was a finalist for the 2009 Society of Plastics Engineers Innovation awards.

Recycled materials do not mean low-quality materials. Our researchers work to insure that post-industrial recycled and post-consumer recycled plastic materials have the same level of quality and material specifications originally. In some cases, we are working to recycle the materials from our auto parts right back into the same use. For example, we are developing methods for recycling and cleaning post-industrial recycled fascia and bumper scrap so that it can be molded into new fascias and bumpers. We are even working to "upcycle" certain materials – that is, recycle it into uses with higher material and performance requirements than the virgin material. For example, we are working on upcycling post-consumer laundry and milk bottles into blow-molded automotive components. In addition, we are developing a method to recycle polyurethane foam scrap to make new polyurethane foam components instead of landfilling it at the end of its life.

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Renewable Materials

We are actively researching and developing renewable material applications that will reduce our dependence on petroleum products and reduce our carbon footprint, while providing superior performance. Research scientists at Ford's Research and Innovation Center in the U.S., Ford's Research Center in Aachen, Germany, and Ford of Brazil are focused on developing automotive foams, plastics and composites that are derived from renewable resources.

Since 2002, our researchers have pioneered research and development of **soy-based polyurethane foams** for automotive applications. The use of soy foam reduces CO_2 emissions, decreases dependency on oil and increases the utilization of renewable agricultural commodities. Soy foam also offers the potential for cost savings as well as insulation from petroleum product price swings.

Many technical difficulties had to be overcome to produce soy-based foams that met all of our stringent durability and performance specifications for seating. In 2007, Ford was the first automaker to implement this innovative technology (on the seat cushions and seat backs of the 2008 Ford Mustang), and we have since migrated its use to 23 vehicle programs. As of 2011, all Ford Motor Company vehicles built in North America have soy foam in their seat cushions and backs. In addition, at least 75 percent of headrests produced in North America have soy foam, and the headliner on the Ford Escape is made from another kind of bio-based foam.

Ford currently has soy foam seats in more than 3 million vehicles on the road, which reduces petroleum oil usage by more than 1 million pounds (or 10,500 barrels) annually. Lifecycle analyses that compare soy foams with traditional petroleum-based foams show a net decrease of 5.5 pounds of CO_2 per pound of soy oil used. Ford's use of soy foam reduces our annual CO_2

emissions by 15 million pounds – the annual equivalent of more than 1,000 typical American households. In addition, soy foam has up to 24 percent renewable content.

Ford has been recognized for its leadership on soy foam technology through multiple awards, including the 2009 R&D 100 award from R&D magazine, which honors technologies across multiple industries that help to solve societal, scientific and/or business challenges. Additional awards for this material include the United Soybean Board's Excellence in New Uses Award (2006), the Society of Plastics Engineers' Environmental Division Award (2008), the Society of Automotive Engineers' International Environmental Excellence in Transportation Award (2008), and the Society of Plastics Engineers' Automotive Division Innovation Award in the Environment category (2008).

Ford has licensed its soy foam technology to two companies – John Deere and Sears Manufacturing – that are investigating soy foam for seating applications in their agricultural equipment products. We are proud to have environmental technologies researched and developed by our Company used by other industries. Ford also continues to collaborate with the United Soybean Board, which has sponsored research grants for new applications using soy products. For example, Ford scientists are currently assessing the use of soy meal, flour and hulls as fillers in synthetic rubber and plastic applications.

Ford is also pioneering the use of **soy oil in rubber**. By using renewable soy oil as a 25 percent replacement for petroleum oil, Ford researchers more than doubled the rubber's "stretchability" and at the same time reduced its environmental impact. Soy-based rubber parts – such as radiator deflector shields, air baffles, cup holder inserts and floor mats – are under consideration for future Ford vehicle programs.

Ford Research has also begun work on a new technology to **make urethane foams even greener**. This innovative technology will enable us to use old foam scrap (including soy foams) as a feedstock for new foam. Polyurethane makes up 5 percent of total solid municipal waste (about 1.3 million tons) in the U.S., and almost 24 percent of that is attributed to the automotive industry. The landfilling of foam at the end of an automobile's useful life is a significant issue, and one that we continue to work to address. Our initial results formulating both rigid and flexible recycled foams in the laboratory have shown promise. We are excited about recycling foam because it is prevalent in landfills and because the current recycling of foam is limited to low-requirement applications such as carpet backing.

In November 2009, Ford introduced the world's first application of **wheat-straw-reinforced plastic** in the third-row storage bins of the 2010 Ford Flex. Wheat straw is used to replace the glass fibers or minerals commonly used to reinforce plastic parts. The use of wheat straw is a highly efficient use of natural fiber, because it is a byproduct of growing wheat that is typically discarded. Furthermore, the use of wheat straw-reinforced plastics in the 2010 Flex storage bins reduced our petroleum usage by some 20,000 pounds and CO_2 emissions by about 30,000 annually. The material weighs up to 15 percent less than plastic reinforced with glass or talc. Additional implementations of wheat-straw-reinforced plastics under consideration by the Ford team include console bins and trays, interior air registers, door trim panel components and armrest liners.

We are using **engineered wood technology**, which comes from a certified, sustainably managed forest and is a renewable resource, on several interior applications in North American vehicles. This wood, which is harvested under strict guidelines, is assembled into a composite and then stained to give it a warm, rich appearance. In addition, the use of engineered wood eliminates many of the extra processing steps necessary in producing real wood automotive trim parts, and the processing required is more environmentally friendly. For example, water-based stain can be used instead of solvent-based, and a solvent wash to remove oils is not needed. Additional bleaching and sealing operations are eliminated, which greatly reduces the production of volatile organic compounds. Engineered wood technology uses input materials more efficiently, so less waste material is sent to landfills. Engineered ebony wood was implemented on the 2008 Lincoln Truck, the 2008 and 2009 Navigator, the 2008 MKX and the 2009 MKS. Ford is also exploring other wood veneer alternatives, such as veneers from managed sustainable forests, to reduce our environmental impact footprint.

We are also using renewable materials on our **European vehicles**. For example, the Ford Mondeo uses a mixture of 50 percent kenaf plant fiber and 50 percent polypropylene in the compression-molded interior door panel. The average Ford vehicle sold in Europe uses between 10 and 20 kilograms of renewable materials, depending on the vehicle size class. The 2011 Ford Focus has natural fiber compression-molded door panels. Almost 300 parts used across Ford's European vehicles are derived from sources such as cotton, wood, flax, hemp, jute and natural rubber.

To maintain our sustainable materials leadership in the future, Ford researchers are developing and formulating new materials and applications for other renewable materials, such as **corn-based, compostable and natural-fiber-filled plastics**. These materials will help to reduce the resource burden and waste generated and will help to reduce the weight of vehicles, thereby improving fuel economy. For example, we are developing a sustainable replacement for the fiberglass now used between the headliner of a vehicle and the roof sheet metal. The replacement material is bio-based, reduces weight, improves acoustics and neutralizes odor.

We are also developing **natural-fiber composites** as a potential substitute for the glass fibers traditionally used in plastic automotive components to make them stronger. We are assessing the possibility of substituting up to 30 percent of the glass-fiber reinforcement in injection-molded plastics with natural sisal and hemp fibers. These parts have competitive mechanical and thermal properties and good surface appearance, and can be cost competitive. These natural-fiber-reinforced parts also reduce vehicle weight and lifecycle CO_2 emissions compared to glass-fiber-

reinforced parts.

Finally, we are investigating ways to use plastics made entirely from renewable resources such as corn, sugarcane and switchgrass. These **bio-based materials** could have multiple benefits, including reduced dependency on petroleum, reduced CO_2 emissions and the ability to compost instead of landfill materials at end of life. Ford researchers have made considerable inroads with polylactic acid (PLA) – a biodegradable plastic derived completely from the sugars in corn, sugar beets, sweet potatoes, sugar cane, Indian grass and other plants. When plastic parts made from PLA reach the end of their useful life, they can biodegrade in 90 to 120 days. In contrast, traditional petroleum-based plastics are projected to remain in landfills for hundreds of years. We are also assessing bio-yarns for use in making plant-based fabrics. Several technical issues must be overcome before these compostable plastics and fabrics meet our stringent wear, performance and durability requirements, but they hold great promise for future vehicles.

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Lightweight Materials

We are actively pursuing the development and use of cutting-edge materials – including high-strength steels, lightweight metals such as aluminum and magnesium, and composite materials – to reduce the weight of our vehicles and improve their fuel economy without compromising safety or performance.

On the **2011 Ford Explorer**, for example, nearly half of the vehicle structure, including the A-pillars, rocker panels and front beams, comprise high-strength steels, such as boron. These materials substantially reduce weight, while increasing vehicle strength and safety.

Similarly, the European Ford Fiesta stands on virtually the same footprint as the previous model, but weighs approximately 40 kilograms less, depending on engine choice, even after adding 10 kilograms of safety features and sound insulation. The use of **high-strength steels** – cold- and hot-formed – was the key to delivering the lighter weight and higher strength we needed for structural efficiency and crash performance. The materials used on the new Fiesta are setting a new benchmark in the small-car segment.

Ford researchers are investigating additional **new types of steel** that are up to three times stronger than current steels and improve manufacturing feasibility because they can be formed into parts more easily. We are also investigating polymeric plastic strengthening foams that are strong enough to stabilize bodywork in an accident but light enough to float on water. These foams are being used to reinforce sections of the steel auto body, such as the B-pillars. In addition, we are working on surface coatings that reduce engine friction and remain intact even under the most adverse conditions.

Ford is also increasing the use of **aluminum and magnesium** to reduce vehicle weight. For example, we implemented a new liftgate on the 2010 Lincoln MKT that combines a lightweight, die-cast magnesium inner panel with two stamped aluminum outer panels. This liftgate is more than 20 pounds, or 40 percent, lighter than a similar part made from standard steel.

In Europe, we launched a lightweight liftgate inner panel on the 2009 Ford Kuga, which reduced weight compared to a steel liftgate inner panel by 40 percent and reduced costs by 10 to 20 percent. This liftgate inner panel was a finalist for the Society of Plastics Engineers' 2008 Chassis/Hardware/Powertrain Innovation Award. Ford researchers in Europe are also developing alternative (copper-based) wire harness technologies that will enable significant weight reductions.

We are also using **nanotechnology** to develop advanced lightweight materials that will allow us to decrease vehicle weight without sacrificing strength, safety or performance. Much of this work focuses on developing the ability to model material properties and performance at the nanoscale, which will allow us to develop better materials more quickly and with lower research and development costs.

In addition to this modeling work, Ford is experimenting with **nano-filler materials** in metal and plastic composites to reduce their weight while increasing their strength. For example, we are developing the ability to use nano-clays that can replace glass fibers as structural agents in reinforced plastics. Early testing shows plastic reinforced with 5 percent nano-filler instead of the typical 30 percent glass filler has strength and lightweight properties that are better than glass-reinforced plastics.

Ford is also working to understand the health and safety issues that may be posed by nano-materials. Ford has joined with other automakers under the U.S. Council for Automotive Research (USCAR) umbrella to sponsor research into nano-materials' potential impact on human health and the environment. This research has addressed many health and environment-related questions so that we can focus our nano-materials research and development in areas that will be most beneficial.

Weight reductions alone may have relatively small impacts on fuel economy. By itself, a 10 percent reduction in weight results in approximately a 3 percent improvement in fuel efficiency. However, if vehicle weights can be reduced substantially, it becomes possible to downsize the powertrains required to run the vehicle. Weight reductions combined with powertrain rematching not only improves fuel economy, but helps maintain overall performance (compared to a heavier vehicle with a larger engine).

For more information on our weight-reduction activities, please see the Sustainable Technologies and Alternative Fuels Plan.

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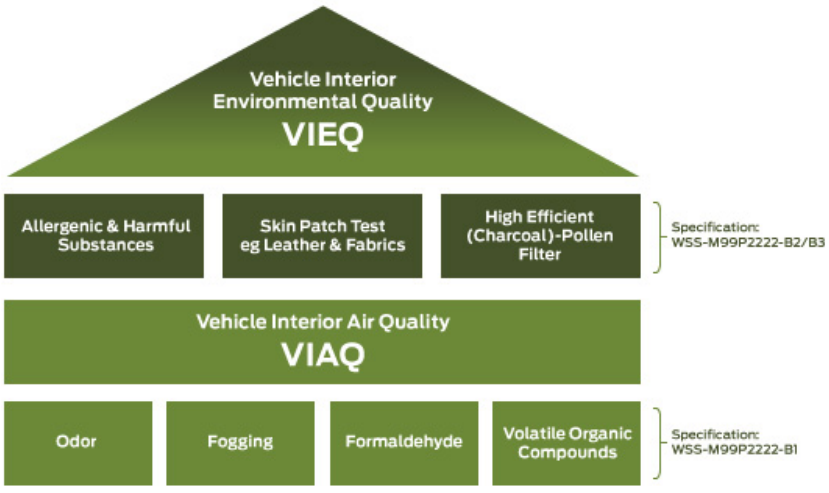
Improving Vehicle Interior Environmental Quality and Choosing Allergy-Tested Materials

At Ford, it is our corporate social responsibility to develop and offer products that are safe, sustainable and progressive. As part of this effort, Ford is proactively addressing society's growing concern about vehicle interior environmental quality, including air quality and allergens. Consistent with our ONE Ford global integration plan, a global cross-functional team at Ford focuses on selecting interior materials to reduce the risk of allergies and volatile organic compounds and works with suppliers to verify that we meet voluntary initiatives through rigorous scientific testing. This team is committed to investigating and developing comprehensive global approaches and strategies to address issues relating to vehicle interior air quality. The team has established global design guidelines for materials and filtration and is migrating those guidelines across Ford's product line.

Specifically, this team has been working since 2007 to develop a set of Vehicle Interior Air Quality (VIAQ) specifications that will require the consideration of the air quality and allergen impacts of the materials and components in our vehicles. Under this standard, vehicle engineers test more than 100 materials and components for allergy issues. In addition, all components that have direct and prolonged skin contact – such as the steering wheel and seat covers – are dermatologically tested. The complete VIAQ standards include requirements for fogging and odor at the component level, air filtration, allergy patch testing and total vehicle organic compounds. Many vehicles are also equipped with high-performance pollen filters to prevent allergenic pollens from entering the vehicle. Initially, the requirements were applied to European-based vehicles, and we are now phasing them in in the U.S. We plan to implement them in our South American and Asia Pacific and Africa operations in the future.

We are also implementing a voluntary vehicle interior air quality and allergen-free third-party certification process. This certification can be used by vehicle engineers in markets where certification is likely to be valued by consumers.

The following graphic shows our overall approach to improving vehicle interior environmental quality, including our allergen and VIAQ specifications.



Ford of Europe vehicles were the first vehicles worldwide to be awarded an "allergy-tested interior" certification by TÜV Rheinland, a Germany-based organization that controls and approves quality standards for industrial and consumer products. To obtain this certification, components in the vehicle interior must meet strict requirements focused on three key areas: measuring and meeting standards for the in-vehicle concentration of volatile organic compounds; minimizing the risk of allergic reactions; and high-efficiency air filtration. The requirements for minimizing the risk of allergic reactions include ensuring that no substances with allergenic potential (e.g., latex, nickel, chromium VI) are used for components likely to have contact with people's skin. They also require the use of an efficient pollen filter to protect passengers against allergenic particles in the outdoor air.

Nine of Ford's European models have met these requirements: the new Ford Fiesta, European Focus (including the Focus Coupe-Cabriolet), European Fusion, five-passenger C-MAX, seven-passenger Grand C-MAX, Kuga, S-MAX, Galaxy and Mondeo. In February 2008, the Berlin-based European Center for Allergy Research Foundation awarded Ford with its quality certificate – an additional recognition of the Company's "allergy-tested interior vehicle" initiative.

Related Links

This Report:

- Working as One Team

Vehicle Websites:

- Ford Fiesta
- Ford Focus
- Ford Fusion
- Ford C-Max
- Ford Kuga
- Ford Galaxy
- Ford Mondeo

Eliminating Undesirable Materials

For more than 20 years, our Restricted Substance Management Standard has spelled out materials to be avoided or eliminated in Ford operations and in the parts and materials provided by suppliers. This and other materials management tools are helping us to meet and exceed customer expectations and ensure compliance with regulations.

Eliminating Mercury

Ford has decreased the use of mercury-containing components, which can pose problems at the end of a vehicle's life. In 2001, we eliminated mercury-containing switches, which accounted for more than 99 percent of the mercury used in our U.S. vehicles. Since that time, we have continued to focus on mercury reduction, eliminating mercury in navigation system screens and family entertainment system screens and reducing the use of mercury in high-intensity discharge headlamps. As of 2010, all Ford and Lincoln vehicles in the U.S. are mercury-free, with the exception of the Lincoln Town Car, which uses mercury in its high-intensity discharge headlamps.

In addition, we helped to forge a collaboration between the U.S. Environmental Protection Agency (EPA), states, auto dismantlers, auto scrap recyclers, steelmakers and environmental groups to recycle mercury switches from end-of-life vehicles. This effort was rolled out across the U.S. in 2007 and now has more than 9,250 participants joining the effort from the recycling industry. By the end of 2009, more than 3.5 tons of mercury from these switches had been recovered. An online database tracks the number of participants in the program as well as the number of switches collected by state.

In Europe, an EU End-of-Life Vehicle directive and a Battery directive prohibit the use of the heavy metals lead, cadmium, hexavalent chromium and mercury, with limited exceptions. These regulations also include broad manufacturer responsibility for disposing of vehicle parts and substances, including taking vehicles back without charge for disposal and recycling requirements. This legislation has triggered similar regulatory actions around the globe, including, for example, in China and Korea and possibly in India in the near future. Ford is complying with all of these regulations.

Eliminating Chromium and Lead

Hexavalent chromium – "hex chrome" for short – is a corrosion coating (used, for example, on nuts, bolts and brackets in cars and trucks) that the U.S. Occupational Safety and Health Administration lists as a potential lung carcinogen. We did not wait for global regulations banning the use of hex chrome to take effect: we phased out its use worldwide. By 2007, Ford eliminated all hex chrome-containing parts in Europe and North America. Replacement coatings have been thoroughly tested to ensure that they meet Ford's performance requirements.

In North America, Ford has also completed the transition away from lead wheel weights. In addition, Ford's Customer Service Division no longer offers lead wheel weights for sale to dealers, offering steel wheel weights instead.

Ford has joined the EPA and other stakeholders in a commitment to reduce the use of lead in wheel weights through participation in the National Lead-Free Wheel Weight Initiative. Through this initiative, Ford has shared its experience with lead wheel weight phase-out with aftermarket wheel balancers, and encourages all stakeholders to discontinue the use of lead in wheel weights.

In mid-2003, Ford of Europe phased out lead in valve seats in all new vehicle models approved for launch in the European Union. Also in Europe, we phased out the use of lead wheel weights and reduced the lead content in aluminum in new and serviced vehicles in mid-2005, and phased out lead in pyrotechnic initiators by mid-2006. We further reduced the lead content in aluminum in 2008. A study by the Oeko-Institute in Germany calculated that, between 2000 and 2005, lifecycle emissions from lead had been reduced by 99.6 percent, from hexavalent chromium by 99.99 percent and from cadmium by 96 percent in Europe.

Reducing Undesirable Chemicals

Ford is one of the first automotive companies to begin efforts to reduce a range of undesirable chemicals that are monitored by the EU, U.S. and Canadian governments. These chemicals include hexabromocyclododecane (HBCDD), a chemical that has been identified as a substance of concern under the European Union's REACH regulations (Registration, Evaluation, Authorization and restriction of Chemicals). Ford is also working to reduce decabromodiphenyl ether (Deca-BDE), another substance of concern that the EPA has proposed to regulate. Ford is working to eliminate these substances ahead of the timelines defined by governmental regulations by working with suppliers to develop new and "greener" alternative materials that will make our products more environmentally friendly.

Related Links

This Report:
- Materials Management

External Websites:
- REACH

More and more countries are adopting chemical and substance of concern regulations like REACH. Turkey and Romania adopted their own versions of REACH in 2009; China adopted its own version in October 2010. South Korea and Japan will soon adopt REACH-like regulations to manage their chemicals. In the U.S., the federal Senate and House both proposed bills in 2010 to overhaul the Toxic Substances Control Act. The state of California is planning to promulgate regulations implementing a Green Chemistry law in 2011. And in January 2009, the UN implemented regulations requiring a globally harmonized system of classification and labeling of chemicals.

Regulatory requirements for the phase out of undesirable chemicals need to be prioritized and implemented in a workable manner. Government and industry resource constraints mean that not all chemicals of concern can be addressed at once. Moreover, manufacturers and suppliers need adequate lead-time to identify replacement substances that are more environmentally friendly than the ones they replace, and also to design and engineer components that incorporate these new substances. Ford will continue to work with regulatory agencies to help develop rules that target the highest-priority chemicals first, and that drive steady progress toward the elimination of chemicals of concern in an effective and efficient manner.

For more on Ford's efforts to manage materials and chemicals please see the Materials Management section.

End of Life

Automobiles are one of the most highly recycled consumer products in the world. All vehicles contain parts and materials – particularly iron, steel and aluminum – that can be recovered at the end of their useful lives. In North America, about 95 percent of vehicles that go out of registration are processed by a dismantler or scrap metal recycling facility, with approximately 86 percent of the vehicle by weight recovered for reuse, remanufacturing or recycling.

In theory, end-of-life vehicles are nearly 100 percent recoverable. In practice, however, the cost in energy and labor to recover the final fractions often exceeds the value of the materials, and recent independently reviewed environmental studies suggest that such efforts offer no value to the environment. Ford focuses on achieving the highest economically viable and environmentally sound recovery percentage through a number of means, including selection of materials, labeling and providing information to dismantlers on materials and methods for treatment.

In the EU, automakers are required by EU Directive 2000/53/EC to ensure a cost-free take-back of vehicles (that they put on the market) at the end of their lives. This directive also requires that end-of-life vehicles (ELVs) are treated in an environmentally responsible manner. Since 2002, Ford has been at the forefront of providing return networks in the EU member states that have established regulations. Ford now has ELV take-back and recycling networks for Ford brand vehicles in 18 EU markets and participates in collective ELV recycling systems in another 10. Ford was the first major manufacturer in the UK to put in place a comprehensive plan that met the European Commission's ELV directive. By working with Cartakeback.com, Ltd., we have a network of nearly 250 facilities providing unrivalled convenience to the last owner for the professional take-back, receipt and treatment of end-of-life vehicles.

In May 2007, Ford became one of the first European automakers to be certified in compliance with ELV requirements by demonstrating to external authorities that the Ford processes properly manage the reusability, recyclability and recoverability aspects of vehicles. In 2010, this certification was extended by another three years and now comprises all of Ford Motor Company operations globally. All Ford vehicles marketed in Europe are now certified as reaching recyclability of 85 percent and recoverability of 95 percent. An increasing number of vehicle models produced and designed in the U.S. are also following this approach. For example, 11 U.S. models exported to South Korea are providing self-certification documents meeting the 85–95 percent recyclability requirement.

Ford has participated in research into alternative treatments for end-of-life vehicles. Most of the plastic, foam and other non-metal vehicle materials end up being shredded. Most of this "auto shredder residue" (ASR) ends up going to landfill. We have been working to assess the environmental impacts of burning ASR for energy. Together with other European automotive manufacturers, we sponsored a fully ISO 14040-compliant lifecycle assessment that showed that – from a purely environmental point of view – using recycled ASR for energy recovery is as beneficial as recycling it.

Related Links

External Websites:
- European End of Life Vehicles

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Operations

We have adopted a rigorous and holistic approach to reducing the overall environmental impacts of our manufacturing facilities. We have established global facility environmental targets that address the range of our environmental impacts, including energy use, emissions, water use and waste generation.

Every facility uses a detailed scorecard to report against environmental targets, so that we can track and accelerate improvements. Progress toward the targets is reviewed throughout the year by senior management at regular Business Plan Review meetings. In addition, these targets become part of the performance review metrics for every plant manager and regional manufacturing manager, as well as others in the management hierarchy up to the Executive Vice President of Manufacturing and Labor Affairs. Our 2010 and 2011 targets and progress are shown in the Year-over-Year Environmental Targets chart.

To facilitate performance tracking, we launched the Global Emissions Manager database (GEM) in 2007. This industry-leading database provides a globally consistent approach for measuring and monitoring environmental data, which helps us track and improve our efforts to reduce water consumption, energy use, carbon dioxide emissions and the amount of waste sent to landfill. GEM also provides a library of environmental regulations relevant to each plant, significantly increasing the efficiency of tracking and meeting those regulations.

This section reports on our facilities' environmental performance, including non-CO_2 facilities-related emissions (including volatile organic compounds), water use, waste reduction, sustainable land use and biodiversity, compliance and remediation.

Operational energy use and greenhouse gas emissions are discussed in the Climate Change section.

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- Environment Progress and Goals
- Facilities
- Water

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Non-CO_2, Facility-Related Emissions

We report on a variety of facilities-related emissions in the Environment data section of this website. Our facility-related greenhouse gas emissions (GHG) are discussed in the Climate Change Facilities section. The metrics and data for our GHG emissions and our non-GHG, facility-related emissions can be found in the Environment data section.

In this section, we discuss how we are reducing emissions of volatile organic compounds (VOCs) at our facilities. VOCs are a significant aspect of Ford's manufacturing operations due to the size and number of paint shops that we operate.

Since 2000, Ford's North American operations have cut VOC emissions associated with the painting process (by far our largest source of VOC emissions) by more than 30 percent. In 2010, these operations emitted 21.6 grams of VOCs per square meter of surface coated. Because the control equipment used to reduce VOC emissions consumes significant amounts of energy, we have worked to identify innovative approaches to painting that meet cost, quality and production goals while allowing us to reduce energy use significantly and maintain environmental compliance.

In one innovative approach, Ford developed a "fumes-to-fuel" system in partnership with Detroit Edison. Initially tested at the Ford Rouge Center, the system concentrated fumes containing VOC emissions from solvent-based paint for use as fuel to generate electricity. The fuel was tested on a solid oxide fuel cell.

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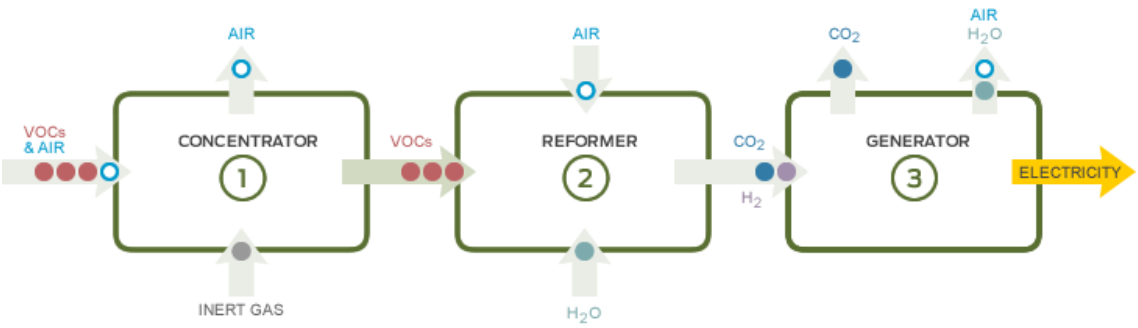
- Environment Data
- Facilities



Generating electricity from paint fumes

Move over the numbers above to see what happens at each stage.

1 CONCENTRATOR

Strips air from paint fumes, leaving concentrated volatile organic compounds (VOCs)

2 REFORMER

Ford-patented process converts VOCs to hydrogen gas

3 GENERATOR

Uses hydrogen gas as fuel for fuel cell or conventional power plant to make electricity

To further support these research and development efforts, in 2008 a research facility was built at our assembly plant in Oakville, Canada, with support from the Canadian government. This site contains a production-scale version of the fumes-to-fuel system, including a paint emissions concentrator, a VOC fuel reformer, a 300 kW molten carbonate fuel cell and a 120 kW internal combustion engine. The intent of this technology is to collect a portion of the VOCs from the spray booth exhaust, then super-concentrate the VOCs in the paint emissions concentrator, followed by condensing the VOCs for use as a fuel for either the 120 kW internal combustion engine or as feed to the VOC reformer, which would then be used in the 300 kW molten carbonate fuel cell.

In 2010, the paint emission concentrator at this facility continued to run and generate solvent, and the internal combustion engine continued to be evaluated for long-term performance. In addition, the VOC reformer was started up, and operations are now being optimized for long-term performance. Research efforts are now underway with two Canadian universities to help drive the research and development of this innovative technology.

Ford's fumes-to-fuel system, with or without energy generation, has the potential to reduce carbon dioxide (CO_2) emissions by 80 percent to 85 percent compared to traditional abatement equipment. A fumes-to-fuel system with energy generation using the fuel cell also has the

potential to eliminate nitrogen oxide emissions.

Moreover, we are reducing VOC emissions with an innovative paint process called “three wet.” This process reduces VOC emissions by 10 percent and has other environmental, financial and quality benefits. For more information on three wet, please see the Climate Change Facilities section.

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Water Use

A decade ago, Ford launched a water-reduction initiative and set a target of 3 percent year-over-year reductions in water use. We have exceeded this goal. From 2000 to 2010, Ford's global manufacturing operations reduced water consumption by 62 percent, or 10.5 billion gallons. While our global water use increased slightly – by 1 percent – from 2009 to 2010, our water use per vehicle decreased from 5.2 cubic meters in 2009 to 4.8 cubic meters in 2010, which reflects the fact that we are using water more efficiently during production.

At the end of 2010, we revised and updated our Ford Motor Company Water Strategy, which looks at our water use from both an environmental and a social perspective. To better understand our water impacts, we have undertaken an assessment of our water footprint throughout the lifecycle of our vehicles. For more information about our water strategy and approach to water use, please see our new Water section.

The new strategy builds on the water-use reduction strategy we began 10 years ago. When we initiated our water-reduction goals in 2000, many facilities had little ability to track their water usage. Ford engineers thus developed a patented Water Estimation Tool (WET), a software program that helps facilities to predict their water usage. They then paired WET with WILD (Water Ideas to Lessen Demand), a list of practical ideas for reducing water use depending on where and when use is the greatest. Our facilities made good progress for several years, meeting or exceeding the 3 percent year-over-year water-reduction goal that applied to all facilities. To encourage continued progress, Ford environmental engineers are developing "single point lessons" that document practices demonstrated to save water. These lessons are cascaded for mandatory implementation in all facilities and are included in facility business plans. Single point lessons implemented thus far include leak identification, cooling tower optimization and vehicle water testing.

Water use at each facility is also tracked in the Global Emissions Manager (GEM) database, our global emissions management and tracking system. Water use is included in GEM in a monthly tracking scorecard reviewed by senior management. The water use tracking and reporting provided by GEM has been a key factor in our ability to understand and reduce our water use.

In addition, we are using an innovative new machining process, called minimum quantity lubricant (MQL) machining, to reduce water use. In MQL machining, the cutting tool is lubricated with a very small amount of oil sprayed directly on the tip of the tool in a finely atomized mist, instead of with a large quantity of coolant/water mixture. The process saves hundreds of thousands of gallons of water and oil per year. By eliminating the coolant/water mixture, MQL machining eliminates the need to treat and dispose of an oily waste stream. The MQL process is also delivering significant benefits in energy use, waste production, quality, working conditions and costs. We have already implemented the MQL system at a number of transmission and engine plants in the U.S., UK and Europe and are currently investigating possible applications in our Asia Pacific plants.

Managers at all of our plants continually strive to use water more efficiently. In 2011, Ford's Valencia (Spain) Plant received a "Premio ECO-Excelencia 2011" recognition from the Ministry of Environment, in recognition of the plant's continued efforts in environmental preservation and particularly for their actions to reduce water use and improve wastewater treatment. This award recognized the plant for developing an alternative wastewater treatment system that reduces the use of chemicals and the development of hazardous waste resulting from the treatment process.

In Mexico in 2010, our Chihuahua Engine Plant (CHEP) won the Environmental Leadership for Competitiveness Award from the Mexican federal environmental agency. This recognition rewards companies for implementing actions to improve environmental performance. Overall, the plant is saving 32,416 cubic meters of water per year due to their environmental leadership projects. Examples include the following:

- The plant is now using reverse-osmosis-treated gray water from the city water system instead of fresh drinking water in the cooling towers of compressor machines and in all other manufacturing processes. This system saves more than 3,500 cubic meters of water per year and more than 290,000 pesos, or almost $25,000 per year.
- They are also using reverse-osmosis-treated water for washing equipment and floors in the facility instead of using drinking water. This project is estimated to save 28 cubic meters of fresh water per year and approximately 475,000 pesos, or over $40,000 per year.
- The plant is saving an additional 112 cubic meters of water and over 140,000 pesos, or approximately $12,000 per year by switching to a new floor cleaning system.

These efforts build on CHEP's continuing efforts to reduce water use. Overall, the plant's use of city gray water instead of drinking water has reduced consumption of drinking water at the plant by 60 percent since 2005. The plant also treats and recycles its own gray water from sinks, dining

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- Water
- Environment Data: Water Use

rooms and showers for use irrigating the facility grounds. As a result of these efforts, city-provided drinking water supplies are now only used for human consumption at CHEP. See the Water Reductions at the Chihuahua Engine Plant case study for more information.

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Waste Management

Ford's environmental goals include reducing the amount and toxicity of manufacturing-related wastes and ultimately eliminating the disposal of waste in landfills. Manufacturing byproducts include both hazardous and nonhazardous wastes. Ford has chosen to target eliminating the landfill of hazardous waste first, because this provides the quickest and most cost-effective benefits to human health and the environment.

In 2010, Ford facilities globally sent approximately 73,000 metric tons of waste to landfill, a slight increase of 4.6 percent from 2009. This increase is the result of higher production from 2009 to 2010. However, we reduced waste to landfill on a per-vehicle basis by about 13 percent, which reflects the fact that we are reducing waste produced per unit of production. Also in 2010, Ford facilities globally generated approximately 43,000 metric tons of hazardous waste, an increase of 9 percent from 2009. Again, this increase is the result of higher production from 2009 to 2010. However, we reduced hazardous waste on a per-vehicle basis by 9 percent.

The following Ford facilities have achieved zero waste to landfill: the Rawsonville Engine Plant in Michigan; the Cologne, Germany, manufacturing facilities, including the Engine and Vehicle Operations plants, technology development center and Ford Customer Service Division facility; the Saarlouis Body and Assembly Plant in Germany; the Genk Assembly Plant in Belgium; our assembly and powertrain plants in India; our Lio Ho plant in Taiwan; and our joint-venture assembly plant with JMC in Nanchang, China.

Managers at all of our plants strive continually to increase their waste recycling. Ford's Geelong Foundry in Australia, for example, has developed processes to recycle foundry sand, scrap steel and process water. These recycling efforts are saving the plant almost $900,000 annually. The foundry is one of the few facilities in the world that does not buy any steel or pig iron from external recyclers. Instead, the facility uses recycled scrap steel generated by Ford's nearby stamping plant. To use this scrap steel, which has been coated with zinc rust-proofing materials, the foundry developed a new melting process that makes it possible to reuse the metal scraps without impacting the environment. The facility also has begun to recycle process water in a closed-loop system that allows water to be reused again and again. In addition, the foundry developed a process to separate metal and different sand components from used foundry sand. Metals are melted down and fed back into the foundry process, while used sands are shipped off for use in cement manufacturing and road building. The Geelong Foundry won Ford's 2010 Environmental Leadership Award for the Asia Pacific and Africa region for this project.

Ford's Sharonville Transmission Plant in Cincinnati, Ohio, won the 2010 Environmental Leadership Award for the North America region, for their efforts to recapture and recycle waste oil from machining processes. Through this project, machining oil is removed from machining "swarf," the fine metallic byproducts that result from the machining process. The collected machining oil is recycled, substantially reducing the volume of total machining waste and reusing a valuable resource instead of sending it to a landfill. As a result of these oil-recycling practices, the Sharonville Transmission Plant expects to recycle approximately 40,000 gallons of oil per year at an annual cost saving of $395,000.

In 2010, our Ohio Assembly Plant in Avon Lake received a Silver Award for its recycling efforts from the Lorain County Solid Waste Management District. This award recognized the plant's successful efforts to reduce waste to landfill and increase recycling. In 2010, the plant recycled 2,539 tons of material from eight different waste streams, including cardboard, plastics, wood, steel and more. The Ohio Assembly Plant achieved these results through the work of a cross-functional team that targeted packaging waste as well as other waste streams. The team's efforts resulted in reducing waste to landfill by more than 30 percent. Ohio Assembly was runner-up for Ford's Environmental Leadership Award for the North America region for these waste-reduction actions.

Ford's Kocaeli Assembly Plant in Turkey won our 2010 Environmental Leadership Award in the Europe region for an innovative approach to waste reduction. The plant's "Six Sigma" team, led by the Maintenance and Environmental Engineering Department, implemented a new sludge de-watering process that reduces wastewater treatment plant sludge waste by nearly 57 percent and reduces disposal costs by nearly 87 percent. The process uses a drying unit to de-water sludge waste after it has been through the conventional sludge thickening and filtering process. The dried sludge can then be used as an energy source for local cement facilities. Previously it had to be disposed of as a waste product in landfills or incinerated.

In South America, Ford's Taubate Plant began recycling all of the organic waste generated by its cafeteria in 2010 to generate fertilizer rather than be disposed of in a landfill. The project was the result of a cross-functional team that included employees of Ford and the cafeteria supplier, Gran Sapore.

Finally, our Dunton facility in England has initiated a waste management contract whereby all

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- Environment Data: Waste

general waste materials onsite (454 metric tons in 2010) are recycled via a materials recovery facility instead of going direct to landfill, resulting in at least a 90 percent recycling rate. Dunton continues to segregate and recycle 100 percent of its waste metal, paper, wood, cardboard, vehicles and parts, as well as waste electrical and electronic equipment.

Sustainable Land Use and Biodiversity

Our activities have the potential to affect land use, nature and biodiversity, directly and indirectly. Our real estate portfolio includes properties for manufacturing and office use. The construction and operation of these facilities have direct impacts on land.

Ford's most significant potential impacts on land and biodiversity are indirect, occurring elsewhere in our value chain or arising from the use of our vehicles. Indirect impacts include the extraction of raw materials to make vehicle parts, habitat fragmentation from road construction, localized pollution from vehicles and the potential effects of climate change on biodiversity.

Many of our facilities have taken steps to improve biodiversity and wildlife habitat on their lands, as follows.

Sustainable Landscapes

A highly visible example of Ford's commitment to sustainability can be seen on more than 200 acres of Ford-owned land throughout southeast Michigan, which is adorned with sunflowers, wildflowers, prairie plants and other non-turf grass plantings. This landscaping provides habitat for wildlife: for example, fox, wild turkeys and coyote have been spotted on Ford properties. This landscaping reduces mowing and other maintenance costs. By replacing what otherwise would be traditional turf grass, the Company saves approximately 30 percent on the costs of labor, gas and fertilizer. We also use native plants in our landscaping whenever possible, which require less water and fertilizer to maintain.

We are also installing "smart" irrigation systems at some of our Dearborn (Michigan) properties. These systems use site conditions – such as soil and plant types, evapo-transpiration rates and local weather data – to program watering only when it is needed. Based on the experience of other uses, we expect to see water savings from these systems of 30 percent. If the systems prove successful, we plan to implement them at approximately 60 additional Ford sites in the next few years.

Creating Wildlife Habitat

Ford has created wildlife habitats at many of our facilities. We are committed to maintaining our existing wildlife habitat sites and to creating as many new sites as possible in the future. Wildlife habitats on Ford facilities range in size from five acres to more than 100 acres and include ecosystems as diverse as wetlands, woodlands, prairies, meadows and forests. Ford employees, often in partnership with local civic and education groups, develop and maintain the habitats, which host dozens of native plant and wildlife species. At many of the facilities, employees and other volunteers have built nature trails, erected bird and bat houses and planted wildflower gardens, in addition to establishing wildlife habitats. These facilities have also developed community education programs to encourage broader understanding of the importance of corporate wildlife sanctuaries.

In 2009, Ford's Romeo Engine Plant in Romeo, Michigan, was awarded a Neighborhood Environmental Partners Award from the Michigan Department of Environmental Quality for its work to build wildlife habitat on the plant site. Plant employees have worked hard to preserve and enhance the wildlife habitat available on the site's 141 acres, planting trees and building nest boxes to attract native birds, including bluebirds and screech owls. To promote habitat awareness and increase community participation, the Romeo Engine Plant's wildlife team organizes an annual tree sale and plant exchange, and plant employees organize clean-ups and other activities to celebrate Earth Day.

In February 2010, Ford and Automotive Components Holdings announced the donation of a coastal wetland in Monroe, Michigan, to the U.S. Fish and Wildlife Service. The property, known as Ford Marsh, will add 242 acres to the Detroit River International Wildlife Refuge.

In Europe, we have created large natural reserves at our facilities in Valencia, Spain, and Kocaeli, Turkey.

Our Mexican operations and dealers are also working to protect wildlife habitat and biodiversity. Since 1997, our Mexican operation's "civic committee" has been funding work to protect the peninsular pronghorn, an endangered species in Baja, California. This project has used captive breeding and reintroduction into the wild to increase the number of pronghorns. When the program first began, there were only 160 pronghorns in the area. A comprehensive field census is currently underway, but project managers estimate there are now nearly 900. This project has received global attention because it is one of the only species that has been successfully reintroduced into the wild and is reproducing naturally in its own habitat. This project is managed by Espacios Naturales y Desarrollo Sustentable, a nonprofit organization, and Comisión Nacional

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- Climate Change
- Sustainable Materials
- Non-CO_2 Tailpipe Emissions

de Areas Naturales Protegidas, the government office that oversees natural protected areas. The project also receives support from Animal Kingdom, the San Diego Zoo and other international wildlife organizations.

Our Mexican operation's civic committee is also funding the "Mexican Natural Reserves: A Natural Solution for Climate Change," a communications campaign to raise awareness about the more than 150 natural protected areas in Mexico. The campaign is intended to foster understanding of the important services that these natural areas provide to communities, including air and water purification, food and wildlife habitat. So far, this project has produced several videos of natural areas shown in cinemas, airline TV programs, buses, airports and other locations. The project also includes a print campaign. We are planning to assist with a second phase of this project, which will focus on how people can help to protect natural areas.

Green Buildings

Ford is a leader in green building, committed to the sustainable design of our facilities and landscapes using the basic principles of resource effectiveness, lifecycle assessment, health, safety and environmental performance. In the past, we have included green building design principles into our buildings on a case-by-case basis. To help standardize and broaden our efforts in this area, we are currently developing corporate specifications for building new facilities that will focus on sustainability. These specifications require that new manufacturing facilities are designed and constructed using the best practices Ford has developed at plants all over the world. These standards will act to replicate best practices across our global operations and create efficient and sustainable plants. Some examples of best engineering practices that will be implemented in our new facilities include:

- Advanced water-treatment technologies to allow the reuse of water and reduce water supply requirements, water discharges, use of treatment chemicals and generation of solid waste
- Energy-saving technologies such as advanced control of air compressors, high-efficiency lights, variable-drive electric motors, skylights and daylighting, and white roofing materials
- Advanced paint shop technologies to reduce emissions, energy use and waste, including wet-on-wet paint and advanced automated paint application equipment

For more information on our plans to develop new plants please see Case Study: Sustainable Growth in Asia.

Ford is a member of the U.S. Green Building Council and a supporter of its green building rating system, known as LEED® (Leadership in Energy and Environmental Design). The LEED system includes a series of standards used for certifying buildings as “silver,” “gold” or “platinum.” It is recognized as the industry standard for green building. Ford employees who are involved in the design, operation and maintenance of commercial and manufacturing facilities have obtained LEED Accredited Professional certification, which demonstrates their proficiency in the application of the LEED rating systems. Having this expertise in-house will continue to strengthen our knowledge and the speed at which we apply environmentally sustainable technologies and processes at our facilities.

Ford is evaluating existing buildings to achieve LEED certification. The LEED v3 Building and Operations Maintenance Rating System, or LEED GBOM, helps building operators measure operations, improvements and maintenance on a consistent scale, with the goal of maximizing operational efficiency while minimizing environmental impacts. The standards are intended to promote healthful and environmentally friendly buildings that are also durable, affordable and high performing by focusing on six key areas: sustainable site management, water efficiency, energy and atmosphere impacts, materials and resource use, indoor environmental quality and innovations in operations.

Ford is piloting the Existing Building certification process on Corporate Crossings, an office building that Ford developed in 1999 in Dearborn, Michigan. In 2010 we submitted our application for LEED-EB certification for Corporate Crossings. In 2011, we are evaluating our Research and Innovation Center in Dearborn, Michigan, with the goal of certifying this building as well. Based on the experience of certifying these buildings, Ford hopes to expand certification to other office buildings.

Ford is also working to advance green building practices through partnerships with our building-related service providers. These partnerships help to educate service providers and provide a forum to exchange information on the concepts of sustainable design. For example, we have held training sessions on site selection, water efficiency, energy use reductions, sustainable materials and resources, and indoor environmental quality.

Green Dealership – Dagenham Motors, Barking, United Kingdom

Ford’s Dagenham motors dealership in Barking, England, recently built an all-new “green” dealership using the latest environmentally friendly materials and a number of sustainable and special energy-saving features. The new facility includes new and used car showrooms and a service center.

Water use at the facility is reduced by capturing rainwater runoff from the roof and storing it in a 3,500-gallon underground tank that supplies water for washing cars and flushing toilets. The rainwater-harvesting tank includes a UV sterilization unit and inline contaminate and particulate filters that enable the water to be suitable and hygienic for hand washing. In addition, waste oil from cars that have been serviced is re-used for heating the premises by fueling an integrated used oil burner on the site. In addition, a wind turbine was installed to generate up to 10 percent of the site’s electricity, and the facility used green construction practices. Approximately 1,800 square meters of nonhazardous soil that was excavated from the site during construction will be

Related Links

This Report:
- Case Study: Sustainable Growth in Asia
- Supply Chain
- Water

reused to landscape the site rather than being transported to landfill.

Green Housekeeping Program

Ford promotes the use of environmentally friendly products in the operation and maintenance of its facilities. One example of this is the continued expansion of our “green housekeeping” program. Through this program, we are working with our Tier 1 suppliers and contractors to promote the use of environmentally friendly cleaning practices and water-based products that help to reduce the impact of facility operations on the environment. Our cleaning service providers use highly concentrated, water-based chemicals with more efficient packaging, which significantly reduces product waste and the amount of fuel required to ship products. These green housekeeping practices are now in use throughout our North American manufacturing locations and commercial office buildings.

Ford Rouge Center

Ford’s largest green building initiative is the redevelopment of the 600-acre Ford Rouge Center in Dearborn, Michigan, into a state-of-the-art lean, flexible and sustainable manufacturing center. The focal point of the center, the Dearborn Truck Plant, boasts a 10.4-acre living roof, part of an extensive stormwater management system that includes bio-swales and porous pavement to slow and cleanse the water. The Dearborn Truck Plant also features abundant skylights to maximize daylight in the facility. The Rouge Center features 100 acres of sustainable landscaping to help restore soils and support wildlife habitat.

Rouge Visitor Center (LEED-Gold)

The redeveloped Ford Rouge Center includes the LEED-Gold certified Rouge Visitor Center, a 30,000-square-foot facility featuring two multi-screen theaters and an observation deck. The facility uses rainwater for plumbing and irrigation, and solar panels to produce energy. In addition, “green screens” of shading vines cover some parts of the building to reduce energy use.

Fairlane Green (LEED-Gold)

Ford has developed a 1-million-square-foot green retail center on its 243-acre industrial waste landfill in Allen Park, Michigan, earning the national Phoenix Award for excellence in brownfield development. In addition, Fairlane Green Phase I received the nation’s first LEED-Gold certification for a core and shell retail development, for its use of retention ponds for irrigation, sustainable landscaping and white roofs, and for the preservation of natural areas. The buildings feature high-efficiency heating and cooling systems, added insulation and weather sealing, and efficient windows and doors.

Product Review Center (LEED-Silver)

Ford’s Product Review Center in Dearborn showcases Ford’s latest products and green building principles. The LEED-Silver-certified building incorporates an innovative system to recycle water for irrigation and cooling, large windows to maximize daylight and extensive use of local and recycled materials.

Toolbox

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Compliance

Manufacturing Plant Notices of Violation

Ford received four notices of violation (NOV) from government agencies in 2010. All but one of the NOVs received were in the U.S. The issuance of an NOV is an allegation of noncompliance with anything from a minor paperwork requirement to a permit limit, and does not mean that the Company was in noncompliance or received a penalty.

Offsite Spills

No offsite spills occurred at Ford manufacturing facilities in 2010.

Fines and Penalties Paid

In 2010, Ford paid $80,640 in fines and penalties for a violation at the Research and Engineering Center in Dearborn, Michigan.

Toolbox

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Remediation

Ringwood Mines Landfill Site

Ford Motor Company continues to address concerns raised in connection with Ford's prior disposal activities in Ringwood, New Jersey, including the adequacy of the prior investigation and cleanup. The Ringwood site was used for decades for the legal and illegal disposal of a wide variety of wastes by the Borough of Ringwood and other parties. Ford used the site to dispose of waste materials (primarily cardboard, wood wastes and paint sludge from the former Mahwah Assembly Plant) from 1967 to the middle of 1971. Ford participated in remediation activities at the site in the 1980s and 1990s. In September 2004, Ford entered into an Administrative Order on Consent and Settlement Agreement (AOC) with the U.S. Environmental Protection Agency (EPA) regarding additional environmental activities at the Ringwood site. The EPA also requested the Borough of Ringwood's assistance in completing work at the site, and the EPA issued a Unilateral Administrative Order to the Borough regarding the Ringwood site. Ford entered into a second AOC with the EPA in May 2010 that obligates Ford to complete the remedial site investigations, human health and ecological risk assessments, as well as feasibility studies for each of the operable units. Ford is conducting further interim removal work at the site under the direction of the EPA and the New Jersey Department of Environmental Protection. It is anticipated that construction of the final remedies will begin in 2012.

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Data

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- Ford U.S. CO_2 Tailpipe Emissions Per Vehicle (Combined Car and Truck Fleet Average CO_2 Emissions)
- Ford Europe CO_2 Tailpipe Emissions Per Vehicle

Tailpipe Emissions

- Ford U.S. Average NOx Emissions
- Ford U.S. Average NMOG Emissions
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Fuel Economy and CO_2 Emissions

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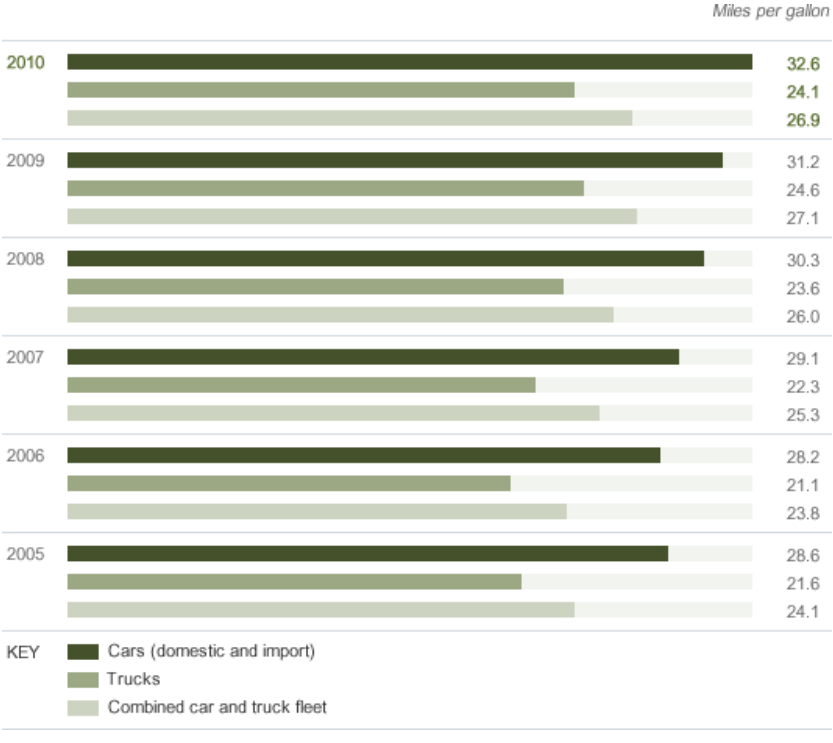
A. Ford U.S. Corporate Average Fuel Economy

Chart | Table



Miles per gallon

	2005	2006	2007	2008	2009	2010
Cars (domestic and import)	28.6	28.2	29.1	30.3	31.2	32.6
Trucks	21.6	21.1	22.3	23.6	24.6	24.1
Combined car and truck fleet	24.1	23.8	25.3	26.0	27.1	26.9

Reported to regulatory authorities

Notes to Data | Analysis | Related Links

The decrease in the combined car and truck year-over-year fuel economy is due to a shift in our mix of vehicles sold, including a longer model year for certain trucks and the removal of Volvo from the 2010 data.

For the 2010 model year, our fleet fuel economy declined slightly by about 1 percent relative to the 2009 model year due to a shift in our mix of vehicles sold, including a longer model year for certain trucks and the removal of Volvo from the 2010 data. Preliminary data for the 2011 model year project that the

Corporate Average Fuel Economy (CAFE) values for the car and truck fleets will be about the same as the car and truck fleet averages for the 2010 model year. On an overall fleet basis, preliminary estimates indicate a 2011 CAFE improvement of 2.9 percent compared to 2010. The reason the overall fleet average can improve while the individually calculated car and truck fleet averages remain about the same is that there have been changes to the vehicles required to be included in the car and truck categories.

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B. Ford U.S. CO_2 Tailpipe Emissions Per Vehicle (Combined Car and Truck Fleet Average CO_2 Emissions)

Chart | Table

Grams per mile

Grams per mile

2005	2006	2007	2008	2009	2010
368	371	352	340	326	329

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Improvement is reflected in decreasing grams per mile.

For the 2010 model year, our fleet CO_2 emissions increased slightly by about 1 percent relative to the 2009 model year, but have improved 11 percent compared to the 2006 model year.

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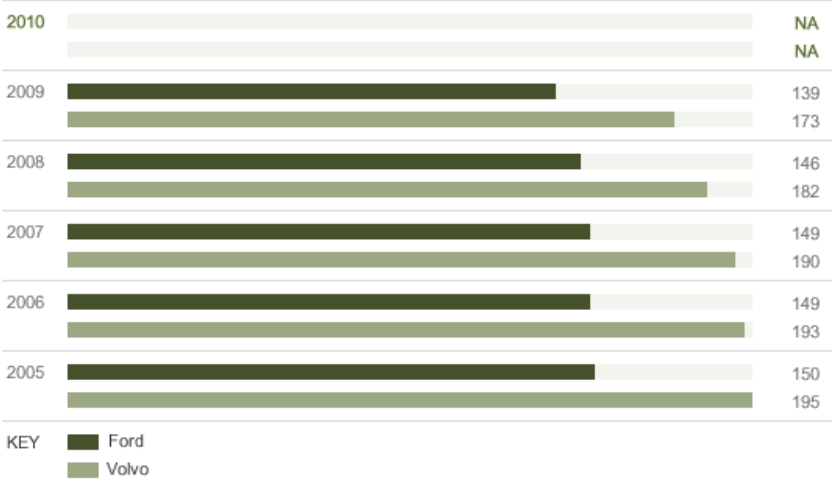
C. Ford Europe CO_2 Tailpipe Emissions Per Vehicle

Chart | Table

Grams per kilometer



Grams per kilometer

	2005	2006	2007	2008	2009	2010
Ford	150	149	149	146	139	NA

Volvo	195	193	190	182	173	NA

Notes to Data | Analysis | Related Links

Improvement is reflected in decreasing grams per kilometer.

Based on production data for European markets. European and U.S. fleet CO_2 emissions are not directly comparable because they are calculated in different units and because they are assessed based on different drive cycles. In 2009, we switched from reporting European vehicle CO_2 emissions as a percent of a 1995 base to reporting actual fleet average CO_2 emissions, to parallel our reporting for other regions.

In Europe, we have reduced the average CO_2 emissions of 2010 model year vehicles by 8.1 percent compared to the 2006 model year (not including Volvo). We have achieved this through the introduction of a variety of innovations, such as advanced common rail diesel engines available across the European model range – including the ECOnetic range of low-CO_2 vehicles – and the use of lightweight materials.

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- Vehicle

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Tailpipe Emissions

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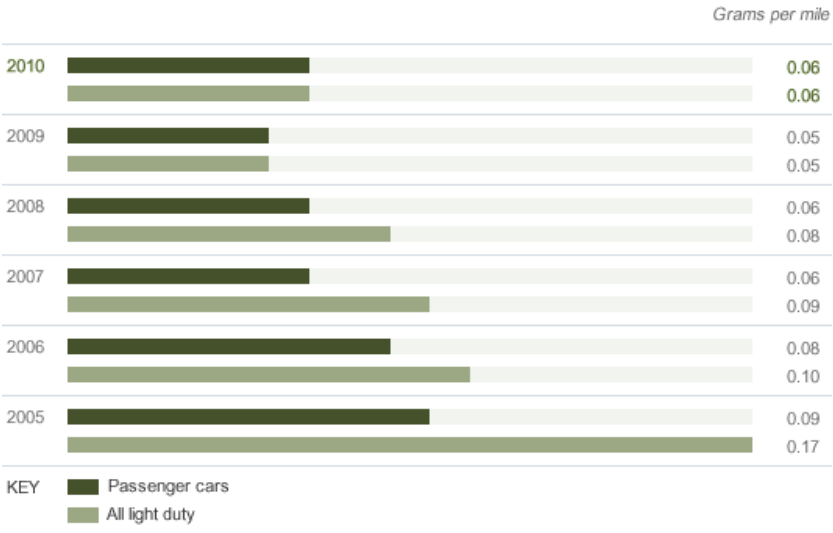
A. Ford U.S. Average NOx Emissions

Chart | Table



Grams per mile

	2005	2006	2007	2008	2009	2010
Passenger cars	0.09	0.08	0.06	0.06	0.05	0.06
All light duty	0.17	0.10	0.09	0.08	0.05	0.06

Reported to regulatory authorities (EPA)

Analysis | Related Links

In 2010, Ford's average NOx emissions increased slightly for the first time in seven years.

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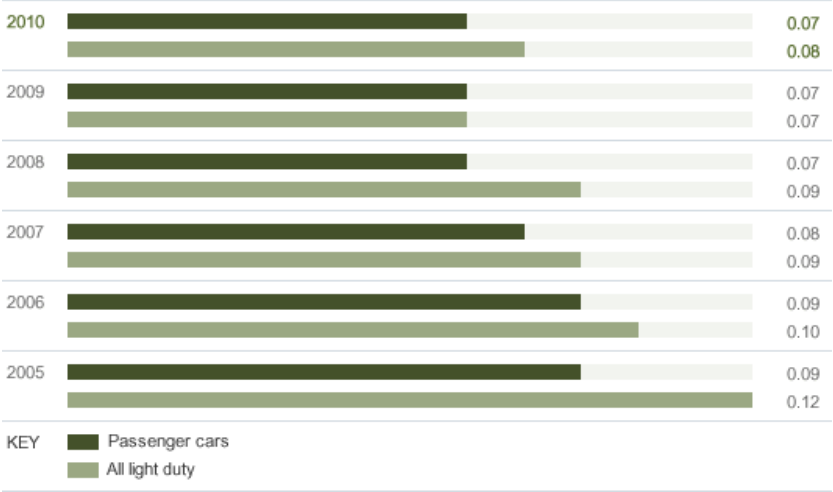
B. Ford U.S. Average NMOG Emissions

Chart | Table

Grams per mile



Grams per mile

	2005	2006	2007	2008	2009	2010
Passenger cars	0.09	0.09	0.08	0.07	0.07	0.07
All light duty	0.12	0.10	0.09	0.09	0.07	0.08

Reported to regulatory authorities (EPA)

Notes to Data | Analysis | Related Links

NMOG = Non-Methane Organic Gases

In 2010, Ford's average NMOG emissions remained the same for passenger cars, and increased slightly for all light-duty vehicles for the first time in seven years.

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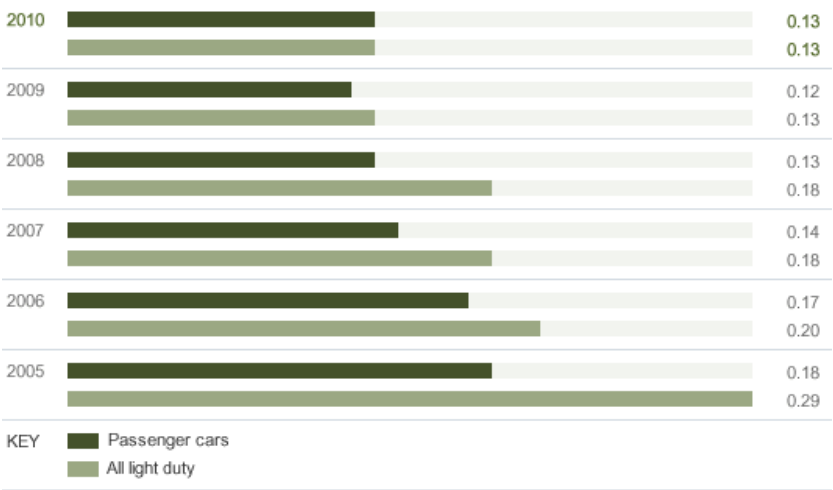
C. Ford U.S. Average Vehicle Emissions

Chart | Table

Grams per mile



Grams per mile

	2005	2006	2007	2008	2009	2010
Passenger cars	0.18	0.17	0.14	0.13	0.12	0.13
All light duty	0.29	0.20	0.18	0.18	0.13	0.13

Reported to regulatory authorities (EPA)

Average vehicle emissions are the smog-forming pollutants from vehicle tailpipes, characterized as the sum of [(NMOG + NOx emissions) x volume] for all products in the fleet.

In 2010, Ford's average vehicle emissions remained the same for all light-duty vehicles, and increased slightly for passenger cars for the first time in seven years.

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Operational Energy Use and CO_2 Emissions

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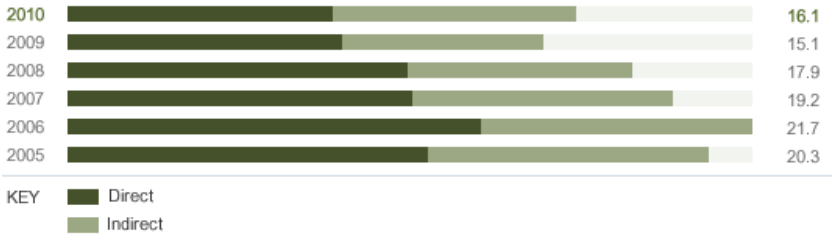
A. Worldwide Facility Energy Consumption

Chart | Table

Billion kilowatt hours



Billion kilowatt hours

	2005	2006	2007	2008	2009	2010
Direct	11.4	13.1	10.9	10.8	8.7	8.4
Indirect	8.9	8.6	8.3	7.1	6.4	7.7
Total	**20.4**	**21.7**	**19.2**	**17.9**	**15.1**	**16.1**

Data managed through the Global Emissions Manager database

Analysis | Related Links

In 2010, overall global energy consumption increased by 6.6 percent compared to 2009, due primarily to a 13 percent increase in production volume. This increase followed a four-year declining trend. For more information, please see Progress and Performance – Facilities

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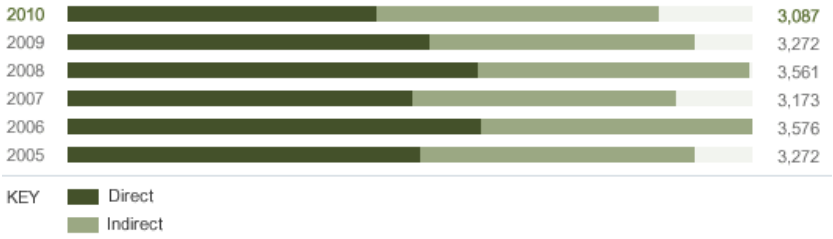
B. Worldwide Facility Energy Consumption Per Vehicle

Chart | Table

Kilowatt hours per vehicle



Kilowatt hours per vehicle

	2005	2006	2007	2008	2009	2010
Direct	1,837	2,161	1,804	2,142	1,891	1,609
Indirect	1,435	1,415	1,369	1,419	1,381	1,478
Total	**3,272**	**3,576**	**3,172**	**3,561**	**3,272**	**3,087**

Data managed through the Global Emissions Manager database

Analysis | Related Links

Our 2010 energy consumption per vehicle produced improved by 5.6 percent compared to 2009. These reductions were accomplished through a wide range of energy-efficiency projects. For more information, please see Progress and Performance – Facilities.

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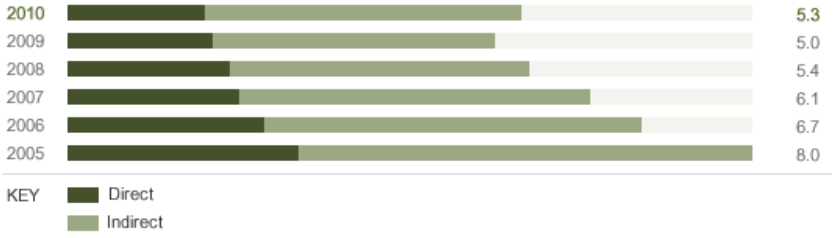
C. Worldwide Facility CO_2 Emissions

Chart | Table

Million metric tons



Million metric tons

	2005	2006	2007	2008	2009	2010
Direct	2.7	2.3	2.0	1.9	1.7	1.6
Indirect	5.3	4.4	4.1	3.5	3.3	3.7
Total	**8.0**	**6.7**	**6.1**	**5.4**	**5.0**	**5.3**

Third-party verified (North America and EU)[1]

Reported to regulatory authorities (EU). Voluntarily reported to emissions registries or other authorities in Australia, Brazil, Canada, China, Mexico, the Philippines and the U.S.

Notes to Data | Analysis | Related Links

1. Sixty-one percent of Ford's global facility GHG emissions are third-party verified. All of Ford's North American GHG emissions data since 1998 are externally verified by The Financial Industry Regulatory Authority, the auditors of the NASDAQ stock exchange, as part of membership in the Chicago Climate Exchange. In addition, all of our European facilities impacted by the mandatory EU Trading Scheme are third-party verified.

Facility CO_2 emissions increased by approximately 6 percent due to production increases.

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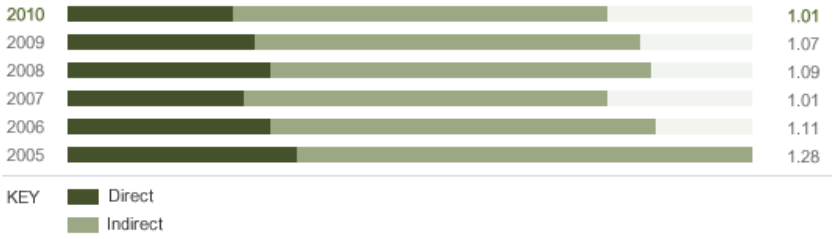
D. Worldwide Facility CO_2 Emissions Per Vehicle

Chart | Table

Metric tons per vehicle



Metric tons per vehicle

	2005	2006	2007	2008	2009	2010
Direct	0.43	0.38	0.33	0.38	0.35	0.31
Indirect	0.85	0.72	0.68	0.71	0.72	0.70
Total	**1.28**	**1.11**	**1.01**	**1.09**	**1.07**	**1.01**

Data managed through the Global Emissions Manager database

Analysis | Related Links

CO_2 emissions per vehicle declined for the third year, reflecting our focus on improving the energy efficiency of our operations. During 2010, we adopted a new goal to reduce global facility CO_2 emissions per vehicle by 30 percent by 2025.

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E. Energy Efficiency Index

Chart | Table

Percent

Percent

2006	2007	2008	2009	2010
NA	4.3	11.7	18.3	14.4

Notes to Data | Analysis | Related Links

The North American Energy Efficiency Index is a normalized indicator based on a calculation that adjusts for typical variances in weather and vehicle production. The Index was set at 100 for the baseline year 2006 to simplify tracking against our annual 3 percent energy-efficiency target. A year 2000 baseline was used through 2006; the baseline will be reset to year 2010 starting in 2011. The year 2010 improvement indexed against the year 2006 baseline was 14.4, indicating a 14.4 percent improvement in energy efficiency since 2006.

The 2010 North American Energy Efficiency Index value of 14.4% represents a decline in efficiency compared to the 18.3% in 2009. We attribute the decline to an over-adjustment in 2009 related to the dramatic drop in production. We know that our energy adjustment model tends to over-adjust for large drops in production that are managed using extended non-production periods. This is one of the key reasons to index against a typical baseline year rather than doing a year-over-year comparison. The long-term trend of our Energy Efficiency Index is very favorable.

In This Report:

Water Use

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A. Global Water Use Per Vehicle Produced

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Cubic meters per vehicle produced

Cubic meters per vehicle produced

2005	2006	2007	2008	2009	2010
7.7	7.6	6.2	5.6	5.2	4.8

Data managed through the Global Emissions Manager database

Analysis | Related Links

The reduction in water use from 2009 to 2010 reflects a long-term trend of reducing water use per vehicle each year. Ford facilities have achieved reductions in water consumption through a broad range of actions.

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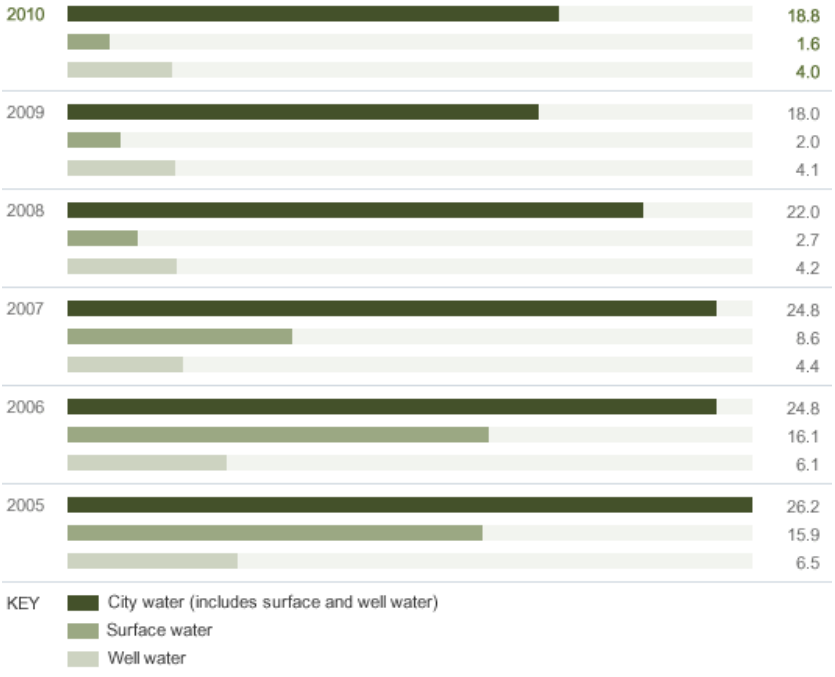
B. Global Water Use By Source

Chart | Table

Million cubic meters



Million cubic meters

	2005	2006	2007	2008	2009	2010
City water (includes surface and well water)	26.2	24.8	24.8	22.0	18.0	18.8
Surface water	15.9	16.1	8.6	2.7	2.0	1.6
Well water	5.6	6.1	4.4	4.2	4.1	4.0

Data managed through the Global Emissions Manager database

Analysis | Related Links

While our global water use increased from 2009 to 2010, our water use per vehicle decreased from 5.2 cubic meters in 2009 to 4.8 cubic meters in 2010, which reflects the fact that we are using water more efficiently during production.

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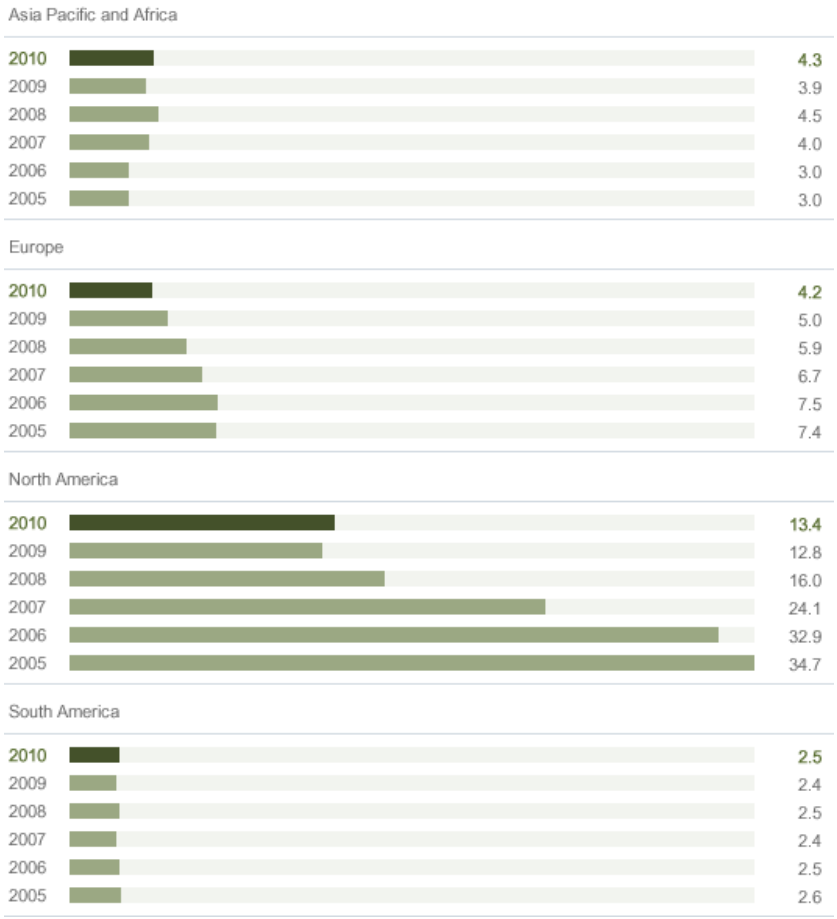
C. Regional Water Use

Chart | Table

Million cubic meters



Million cubic meters

	2005	2006	2007	2008	2009	2010
Asia Pacific and Africa	3.0	3.0	4.0	4.5	3.9	4.3
Europe	7.4	7.5	6.7	5.9	5.0	4.2
North America	34.7	32.9	24.1	16.0	12.8	13.4
South America	2.6	2.5	2.4	2.5	2.4	2.5

Data managed through the Global Emissions Manager database

Analysis | Related Links

In 2010, water use increased in all regions except Europe due to increases in production. In Asia Pacific and Africa, water use has been increasing over the past few years, due largely to the increase in vehicles produced in this region. In South America, water use has remained largely constant since 2003.

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Emissions (VOC and Other)

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A. North America Volatile Organic Compounds Released by Assembly Facilities

Chart | Table

2011 target = 23 g/sq meter or less

Grams per square meter of surface coated

Grams per square meter of surface coated

2005	2006	2007	2008	2009	2010
24	24	24	24	21	22

Data managed through the Global Emissions Manager database

Analysis | Related Links

VOC emissions in North America increased by 5 percent between 2009 and 2010; however we are still exceeding our goal of maintaining emissions at 24 grams per square meter of surface coated. We achieved this goal through, among other things, the use of mold-in-color plastics (which preclude the need for painting) and our fumes-to-fuel technology, which captures VOC emissions from our paint shops and uses them as an energy source.

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B. Ford U.S. TRI Releases

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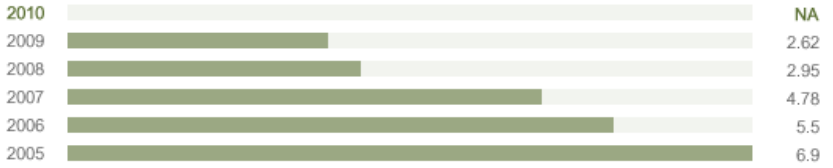
Million pounds



Million pounds

2005	2006	2007	2008	2009	2010
6.9	5.5	4.78	2.95	2.62	NA

Reported to regulatory authorities (EPA)

Notes to Data | Analysis | Related Links

Releases reported under the U.S. Toxics Release Inventory are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

Our U.S. Toxic Release Inventory releases decreased from 2008 to 2009, continuing a long-term trend of reducing these releases. These reductions were achieved through material and process changes.

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C. Ford U.S. TRI Releases Per Vehicle

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Pounds per vehicle

Pounds per vehicle

2005	2006	2007	2008	2009	2010
2.5	2.7	2.37	2.06	2.0	NA

Notes to Data | Analysis | Related Links

Releases reported under the U.S. Toxics Release Inventory are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

Our U.S. Toxic Release Inventory releases per vehicle decreased from 2008 to 2009, the fourth year in a row we have reduced these emissions. These reductions were achieved through material and process changes.

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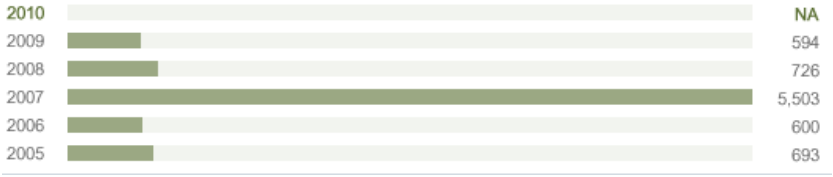
D. Ford Canada NPRI Releases

Chart | Table

Metric tonnes



Metric tonnes

2005	2006	2007	2008	2009	2010
693	600	5,503	726	594	NA

Reported to regulatory authorities (Environment Canada)

Notes to Data | Analysis | Related Links

Releases reported under the Canadian National Pollutant Release Inventory are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

Our Canada National Pollutant Release Inventory releases decreased substantially from 2008 to 2009. With this decrease, we continue a multi-year trend of reducing NPRI releases each year. These reductions were achieved through material and process improvements.

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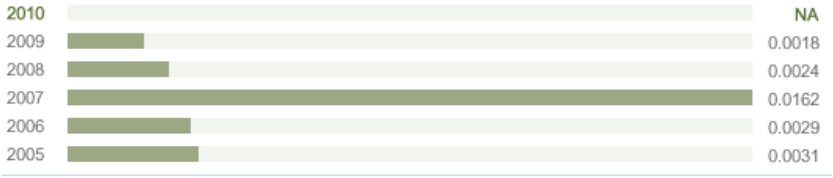
E. Ford Canada NPRI Releases Per Vehicle

Chart | Table

Metric tonnes per vehicle



Metric tonnes per vehicle

2005	2006	2007	2008	2009	2010
0.0031	0.0029	0.0162	0.0024	0.0018	NA

Notes to Data | Analysis | Related Links

Releases reported under the Canadian National Pollutant Release Inventory are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

Our Canada National Pollutant Release Inventory releases per vehicle continued to decrease from 2008 to 2009. These reductions were achieved through material and process changes.

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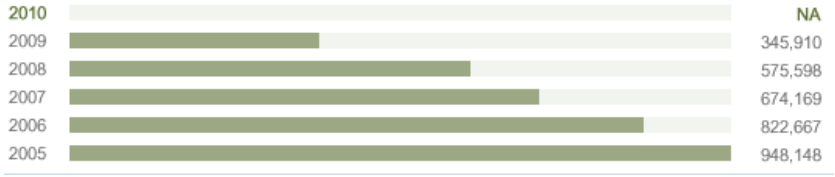
F. Australia National Pollutant Inventory Releases (Total Air Emissions)

Chart | Table

Kilogams per year



Kilograms per year

2005	2006	2007	2008	2009	2010
948,148	822,667	674,169	575,598	345,910	NA

Reported to regulatory authorities (NPI)

Notes to Data | Analysis | Related Links

Releases reported under the Australian National Pollutant Inventory are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

Our ANPI releases decreased by 40 percent from 2008 to 2009, the fifth year in a row we have reduced these releases. These reductions were achieved through material and process changes.

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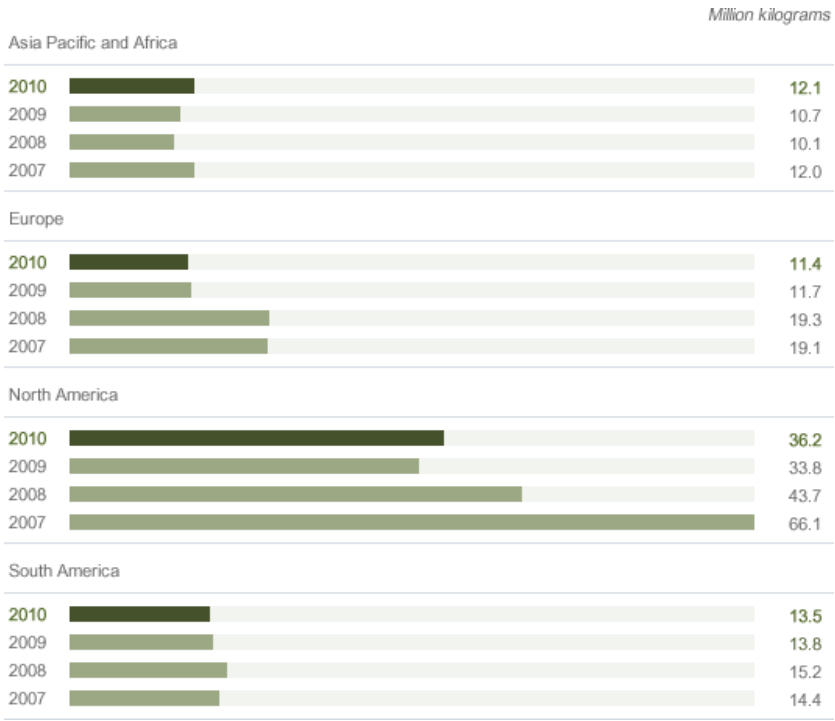
Waste

DATA ON THIS PAGE

View all data on this page as charts | tables

A. Regional Waste to Landfill

Chart | Table



Million kilograms

	2007	2008	2009	2010
Asia Pacific and Africa	12.0	10.1	10.7	12.1
Europe	19.1	19.3	11.7	11.4
North America	66.1	43.7	33.8	36.2
South America	14.4	15.2	13.8	13.5

Data managed through the Global Emissions Manager database

Notes to Data | Analysis | Related Links

AutoAlliance International, our joint-venture plant in Flat Rock, Michigan that produces the Ford Mustang, is included beginning in 2009.

In 2010, Ford facilities globally sent approximately 73,000 metric tons of waste to landfill, a slight increase of 4.6 percent from 2009. This increase is the result of higher production from 2009 to 2010.

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B. Waste to Landfill Per Vehicle

Chart | Table

Kilograms

Kilograms

2007	2008	2009	2010
18.63	17	16.1	14.1

Data managed through the Global Emissions Manager database

Notes to Data | Analysis | Related Links

AutoAlliance International, our joint-venture plant in Flat Rock, Michigan which produces the Ford Mustang, is included beginning in 2009.

In 2010, we reduced waste to landfill on a per-vehicle basis by about 13 percent, which reflects our focus on reducing waste produced per unit of production.

We decreased waste to landfill primarily through aggressive efforts to generate less waste and recycle more, and through the use of waste-to-energy incineration facilities.

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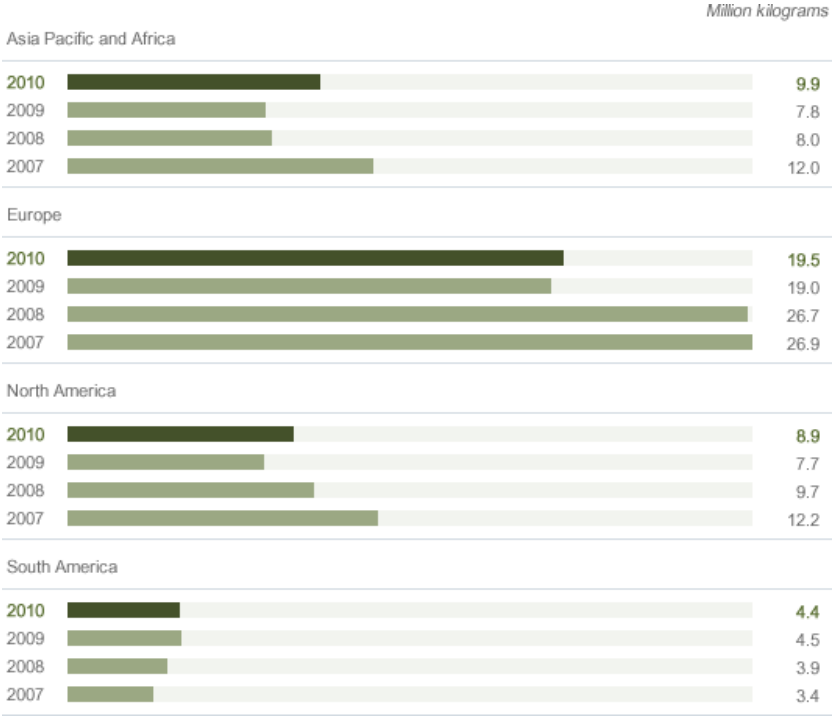
C. Regional Hazardous Waste Generation

Chart | Table

Million kilograms



Million kilograms

2007	2008	2009	2010

Asia Pacific and Africa	12.0	8.0	7.8	9.9
Europe	26.9	26.7	19.0	19.5
North America	12.2	9.7	7.7	8.9
South America	3.4	3.9	4.5	4.4

Data managed through the Global Emissions Manager database

Analysis | Related Links

In 2010, Ford facilities globally generated approximately 43,000 metric tons of hazardous waste, an increase of 9 percent from 2009; though hazardous waste generated per vehicle produced continues to decline. The increase is the result of higher production from 2009 to 2010.

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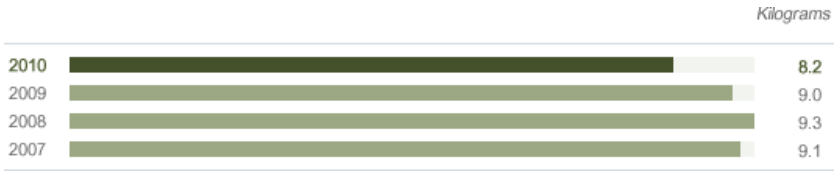
D. Hazardous Waste Generation Per Vehicle

Chart | Table



Kilograms

2007	2008	2009	2010
9.1	9.3	9.0	8.2

Data managed through the Global Emissions Manager database

Analysis | Related Links

In 2010, we continued a three-year improvement trend by reducing hazardous waste on a per-vehicle basis by 9 percent.

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Case Studies

IN THIS SECTION

Case Study: Michigan Assembly Plant

We invested $550 million to convert the Michigan Assembly Plant (MAP) facility from a large SUV factory into a modern and flexible plant that focuses on some of the smallest – and most fuel-efficient – products in our lineup.

READ MORE

Case Study: Green PC Purchasing Initiative

In 2010, the IT "PC renewal" planning team along with IT purchasing set out to meet the following challenge: Could a sustainability-focused PC purchase decision reduce Ford's environmental footprint ***and*** costs, while still meeting all other computing requirements?

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Case Study: Michigan Assembly Plant: A Symbol of Ford's Transformation

If ever there were a symbol of our Company's transformation, it's our former Michigan Truck Plant in the city of Wayne. Built in 1957 – initially to produce station wagons – it spent nearly half a century producing trucks and some of the largest vehicles in our fleet: the Ford Bronco, the F-series trucks, the Ford Explorer and the Lincoln Navigator.

Today, the plant is at the other end of the automotive spectrum. We invested $550 million to convert the facility from a large SUV factory into a modern and flexible plant that focuses on some of the smallest – and most fuel-efficient – products in our lineup.

These days, the newly named Michigan Assembly Plant (MAP) produces the global Ford Focus and the battery-electric Focus. The transformation of the plant embodies the larger transformation of our entire operations. It illustrates our focus on meeting increasing customer demand for fuel-efficient and advanced green vehicles; it reflects the best of our green and flexible manufacturing technologies; and it highlights how we as a company can contribute to economic growth by advancing sustainable products and manufacturing technologies.

MAP Production Lineup:

- Ford Focus (2010)
- Ford Focus Electric (2011)
- Ford C-MAX
- Ford C-MAX Hybrid
- Ford C-MAX Energi

The new Michigan Assembly Plant will initially make the all-new, fuel-efficient Ford Focus and the Focus Electric, Ford's first commercially available all-electric passenger car. The new Focus will achieve 40 mpg through a range of advanced engine, powertrain and other technologies – an 18 percent improvement over the previous model. The plant will also build three additional vehicles, including the Ford C-MAX, C-MAX Hybrid and C-MAX Energi, our first commercially available plug-in hybrid.

Advancing Green Manufacturing

The new plant demonstrates Ford's commitment to green production technologies. MAP boasts a 500 kW solar power generation system – one of the largest systems in the state – allowing the plant to operate on a blend of renewable and conventional electricity. Renewable energy collected by the solar panels feeds into the plant's energy-efficient microgrid, helping power the plant. As part of this solar power system, we are piloting a battery storage system to store solar energy during non-sunlight hours. The system uses a 750 kW energy storage facility that can store 2 million watt-hours of energy – enough to power 100 average Michigan homes for a year. The energy storage system will be used to power electric trucks that transport material around the site. By using this system, we are replacing diesel engine trucks with electric trucks powered by the sun. The stored solar energy will also provide power during periods of insufficient or inconsistent sunlight.

The solar panels and battery storage are being installed and managed through a joint effort between Ford, DTE Energy, Extreme Power, the city of Wayne, Michigan, and the state of Michigan. The solar energy installation is part of DTE Energy's pilot SolarCurrents program that calls for photovoltaic systems to be installed on customer rooftops or property over the next five years to generate 15 MW of electricity throughout southeast Michigan. The Michigan Assembly project is funded by a $3 million investment from DTE Energy's SolarCurrents program, a $2 million grant from the Michigan Public Service Commission in support of the state's smart-grid initiative, and approximately $800,000 worth of in-kind contributions from Ford.

In addition to the environmental benefits, this system is also projected to reduce the plant's energy costs by $160,000 per year. The electric trucks will save an estimated 86,000 gallons of diesel each year. We are using the experience gained at MAP to test the viability of alternative energy to supply power for other manufacturing facilities around the world.

The plant is also using renewable energy from landfill gas; the boilers at MAP are fed by methane gas collected from a nearby landfill.

Related Links

This Report:

- Electrification: A Closer Look
- Improving New Product Development Process
- Investing in Operations
- Regional Performance Highlights

Vehicle Websites:

- Ford Focus (2010)
- Ford Focus Electric (2011)
- Ford C-MAX
- Ford C-MAX Hybrid
- Ford C-MAX Energi

MAP also uses Ford's "three-wet" paint technology, which significantly reduces energy use and volatile organic compound (VOC) and other emissions, while saving money and improving paint quality. The three-wet process allows us to apply primer, base coat and clear coat, and then bake the vehicle only once; traditional painting processes require baking between each of these steps. As a result, we save electricity from the blowers that run the booths and the ovens, plus natural gas from heating the air and the ovens. The MAP three-wet system is expected to save about $3 million in production in natural gas and electricity, produce 6,000 metric tons fewer carbon dioxide (CO_2) emissions per year compared to waterborne systems and 8,000 metric tons fewer CO_2 emissions per year compared to conventional high-solvent-borne paint systems. It is also expected to reduce VOC emissions by 5 percent.

The plant is also improving environmental performance by reducing waste. For example, the cardboard packaging for all the parts that come from Europe – about 50 percent of the total parts for the Focus – is carefully collected, sorted and recycled, as is the bubble wrap, the Styrofoam and water bottles used by employees. The plant also recycled construction waste generated during the redesign. For example, the temporary wooden partitions that were put up as the plant was revamped and remodeled were donated to the local Habitat for Humanity.

A Leader in Flexible Manufacturing

In addition to being a greener facility, MAP is now one of Ford's most flexible manufacturing facilities. Flexible manufacturing allows us to switch production between vehicles on a single line, make vehicles more efficiently and adjust to changing customer demands almost instantaneously. More than 80 percent of the tooling in the plant is programmable to allow changing between vehicle lines and body styles without downtime. The Focus product development team also developed the vehicle with flexibility in mind by using designs that allow for the use of programmable tooling. MAP also uses virtual manufacturing and common build sequences in final assembly to improve quality, efficiency and flexibility.

As a result of these investments in flexible manufacturing, MAP will be the first facility in the world capable of building a full array of vehicles – gas-powered, electric, hybrid and plug-in hybrid – all on the same production line.

Supporting Economic Growth for All Our Stakeholders

Ford's investment in the Michigan Assembly Plant, the advanced green products we will build there and the advanced energy systems used to power the plant all help to support economic growth for our stakeholders in Michigan and around the world. For example, as part of our decision to produce three electrified vehicles at MAP, we also announced plans to bring our battery development and production in house; this decision will add 1,000 new jobs in Michigan for the production of electrified vehicles and battery packs, and contribute to moving our nation's economy forward into green and sustainable transportation and energy technologies. Furthermore, the new Focus will generate more than 5,500 new supplier jobs worldwide. Our investments in the MAP and the new Ford Focus are part of a much larger investment in upgrading existing plants and building new plants to support economic growth across our global operations. For more information on these investments please see Investing in Operations and Regional Performance Highlights.

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Case Study: Green PC Purchasing Initiative

Ford Motor Company has more than 100,000 personal computers (PCs) in use every day across our global operations. PCs are typically replaced on a rolling basis, to keep pace with technology advancements.

In 2010, the IT "PC renewal" planning team was in the initial stage of creating a Request for Quote (RFQ) for the next wave of PC purchases, and was interested in incorporating sustainability criteria into the RFQ process. At the same time, another group of IT employees – who, in addition to their regular roles, devote one to two hours a week to sustainability-related efforts – were looking for a project that would have a long-term, tangible impact on sustainability within IT. The two teams, along with additional employees in IT Purchasing, were brought together by individuals in the IT Supplier Relationship Management department.

The challenge they set out to meet was: Could a sustainability-focused PC purchase decision reduce Ford's environmental footprint ***and*** costs, while still meeting all other computing requirements?

Greening Ford's PC Requirements

In the past, Ford's RFQs for PCs have focused on functionality, service, quality and price. The team's main task was thus to research and understand what makes a PC "green" and then translate their findings into a set of specific, quantifiable requirements and questions for RFQ responders. The team would then have a consistent way to evaluate and compare suppliers' responses. "'Green' can mean a lot of different things," explained Eric Wingfield, a member of the team, "so we needed to ensure that we looked for broadly accepted industry standards upon which to build a credible set of questions that could allow the team to fairly compare suppliers' green offerings."

The team began by understanding Ford's current expectations of suppliers relating to sustainability and then benchmarking other organizations' methods of incorporating environmental criteria into the PC purchasing process. They looked at the approaches of groups as varied as non-automotive OEMs, health care organizations, standards bodies and government agencies around the globe. The U.S. Environmental Protection Agency (EPA), which runs the Energy Star Program, turned out to be an excellent resource for data on various standards globally.

Via the EPA the team found the Energy Performance and Environmental Assessment Tool, or EPEAT – a set of global standards and an accompanying certification process that provides a comprehensive list of sustainability criteria as well as levels of certification that are easily understood by both consumers and suppliers. EPEAT was developed using an EPA grant and is managed by the nonprofit Green Electronics Council. According to the Council, in their report ***Environmental Benefits of 2009 EPEAT Purchasing***, "Combined unit sales of EPEAT-registered notebooks and desktops (including integrated systems) constituted close to 17% of sales of notebooks and desktops worldwide, and 42% of combined product sales in the U.S."

EPEAT became the foundation upon which Ford built its own requirements. It also provided a credible certification system for assessing PC suppliers' compliance with sustainability criteria. Certified EPEAT manufacturers are independently verified by the Green Electronics Council to ensure they are actually meeting the standard. "We liked EPEAT standards because they are comprehensive," said Rob Thies, a member of the Ford team. "The standard requires environmental responsibility throughout the supply chain, including designs that manage the end-of-life concerns, reuse or recycling, where there is a great impact on the environment. We verified that the standards were recognized and used by both government and corporations, which is more cost effective for suppliers as they don't have to coordinate multiple customer requirements."

Nikola Ristivojevich, another member of the team, said: "Another benefit was that EPEAT requirements for PCs were completely aligned with Ford's own environmental standards for our vehicles and operations. Ford is working on sustainable materials, end-of-life issues, energy use reductions, and reducing packaging and waste, so we know firsthand how important these things are and how much effort it takes to accomplish these goals." (For information on other Ford efforts, please see the Environment and Climate Change sections of this report.)

EPEAT was also desirable because it is an international standard recognized in 49 countries. And according to the rules, a manufacturer cannot sell the certified model in one country and then sell an uncertified version of the same model in countries with lower regulatory standards. For the team, this provided assurance that the same level of compliance would be attained no matter where the product was delivered globally.

Putting Green PC Renewal into Action

Related Links

This Report:

- Setting Expectations for Our Suppliers

External Websites:

- EPEAT

In the second quarter of 2010, the RFQs were sent to potential global PC suppliers. The providers were asked to specify the level of EPEAT certification their products had attained, along with other sustainability, technical and commercial questions important to Ford. The suppliers' responses were encouraging, showing that nearly all of the PCs in the suppliers' quoted offerings would meet the EPEAT Gold standard. Any one of the potential suppliers could therefore meet the sustainability requirement of EPEAT Gold identified by the team and ensure that Ford PCs provide energy savings. The team then looked to the remaining sustainability, technical and commercial questions to determine a choice.

Due to the high performance of all of the potential suppliers, sustainability-related responses were not a differentiator in decision-making. The responses did prove to be a valuable benchmark of potential suppliers' capabilities and products, and provided important data for comparing energy savings between suppliers, and new vs. prior technology offerings. In addition, the Company was able to send a message to potential suppliers that sustainability is of importance to Ford.

The next step was to create contract language that would require continued compliance with the EPEAT standard. The team worked closely with IT Contracts, the Office of General Counsel and Purchasing to develop contract language that requires the chosen PC provider to show how they will continue to meet EPEAT standards and all of Ford's other requirements throughout the contract. The addition of EPEAT standards to already-robust contract terms that address human rights and working conditions, as well as environmental responsibility, created requirements appropriate to the IT buy. (For information on other Ford purchasing efforts, see the Supply Chain Sustainability section.)

Assessing the Benefits of Green PCs

The purchase of these PCs has resulted in a wide range of concrete benefits. For example, the PCs use significantly less energy than the previous models and will be responsible for fewer greenhouse gas emissions during their use at Ford. They also will be safer for Ford employees to operate, because they are low in volatile organic compounds (VOCs) and thus produce less "off-gassing" during use. The more eco-friendly composition of the PCs and a responsible end-of-life disposal process will reduce the likelihood that materials of concern will get into the environment when the PCs have completed their useful lives at Ford. For example, the EPEAT standard ensures that the computers are lead-free, an important end-of-life environmental consideration.

The team is now turning its attention to an opportunity to work with Ford's facilities management division – Ford Land – to assess the actual energy savings associated with switching to these PCs. Other large organizations using EPEAT-certified computers boast energy savings of nearly $2 million per year. Ford expects our energy-related cost savings to be somewhat less, because we have already implemented some very successful PC energy-management programs.

The team believes that adopting a sustainability mindset across the Company is important and that every employee plays an important role. "We've seen firsthand how our involvement in sustainability not only helped us to make the right business decision, but also helped Ford to affirmatively respond to fleet customer inquiries regarding how we incorporate sustainability in our purchasing practices," said Laurie DeJack of IT Supplier Relationship Management.

Teamwork Illustrates the ONE Ford Approach

The green PC renewal process has clearly been a team effort. It required commitment and support from a wide range of departments, including the IT Contracts and Supplier Relationship Management group, IT Purchasing, Ford Land's facilities energy management division, and Ford's Sustainability and Vehicle Environmental Matters Office.

"No one group within Ford could have single-handedly made this effort a success," said team member Carol Spisich. "This project brought together people who don't necessarily work together on a regular basis to do something innovative and exciting. That is the spirit of ONE Ford in action."

This is not the first time Ford's IT departments have worked together internally and with other departments to advance the Company's sustainability initiatives. Ford IT employees and groups have also worked on energy-reduction actions such as: implementing a remote power-management and software-upgrading program, redesigning and consolidating data centers, and introducing technologies to enable the "digital worker." (For more information on those projects, please see the Climate Change section.)

"The green PC renewal project is just one great example of how we are working together across departments to improve the overall sustainability of the Company," said Paul Friedrich, who oversees the PC renewal supplier management process for IT. "I know this won't be the last time we all come together to make a stronger business and a better world. That is what ONE Ford is all about."