MATERIAL ISSUES

- Materiality Analysis
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Material Issues

In this section, we discuss our most important sustainability issues and how they were identified. We also present perspectives on key issues from external and internal experts.

IN THIS SECTION

Materiality Analysis

Ford uses a rigorous materiality analysis to prioritize key sustainability issues.

Read more

Climate Change

We're cutting greenhouse gas emissions from our products and operations and pursuing sound climate policies.

Read more

Mobility

By understanding our customers' and society's changing needs, we can help develop new models of sustainable mobility.

Read more

Human Rights

We're working with our suppliers and other automakers to promote human rights in the global automotive supply chain.

Read more

Vehicle Safety

We're delivering innovations in vehicle safety and promoting road safety in mature and emerging markets.

Read more

Sustaining Ford

In a tough economic climate, we're working to improve our financial performance and competitiveness.

Read more

Perspectives on Sustainability

Experts from Ford and other institutions offer their perspectives on our key sustainability issues.

Read more

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Materiality Analysis

For its 2008/9 Sustainability Report, Ford conducted a streamlined update of its materiality analysis, adding key inputs (such as the December 2008 Report to Congress), replacing outdated inputs and gathering feedback from internal experts and the Ceres Stakeholder Committee.

The results are largely similar to the previous analysis. Two groups of material issues – those pertaining to Ford's financial viability and climate change/fuel economy – would have moved up in priority to Ford and stakeholders if they were not already at the highest level.

However, some new issues emerged, some dropped out and others were recast or reorganized. Changes to the most material issues (upper-right part of the materiality matrix) included the following:

- In the financial viability grouping, labor costs, access to capital, the threat of competitor bankruptcy, and dealer and supplier viability were added as new issues.
- In the climate change grouping, low-carbon fuels replaced "clean/alternative fuels," reflecting a sharper focus on the life-cycle carbon emissions of fuels. Ford's electrification strategy was added as an issue, and emissions trading/cost of carbon emerged as a separate issue formerly subsumed within the low-carbon strategy issue.
- Urban mobility was added as an issue under mobility and emerging markets, as the unique characteristics of urban areas present challenges for traditional models of personal mobility and opportunities to develop new products and services.

Other changes included the addition of health care reform as a public policy issue and hazardous pollutants as an operational environmental issue, and a higher level of importance to Ford assigned to the congestion issue.

We have used this analysis to identify issues to cover in our reporting and as an input to our sustainability strategy development.

IN THIS SECTION

Materiality Matrix

Our interactive materiality matrix categorizes issues according to their concern to stakeholders and their current or potential impact on the Company.

View the Materiality Matrix

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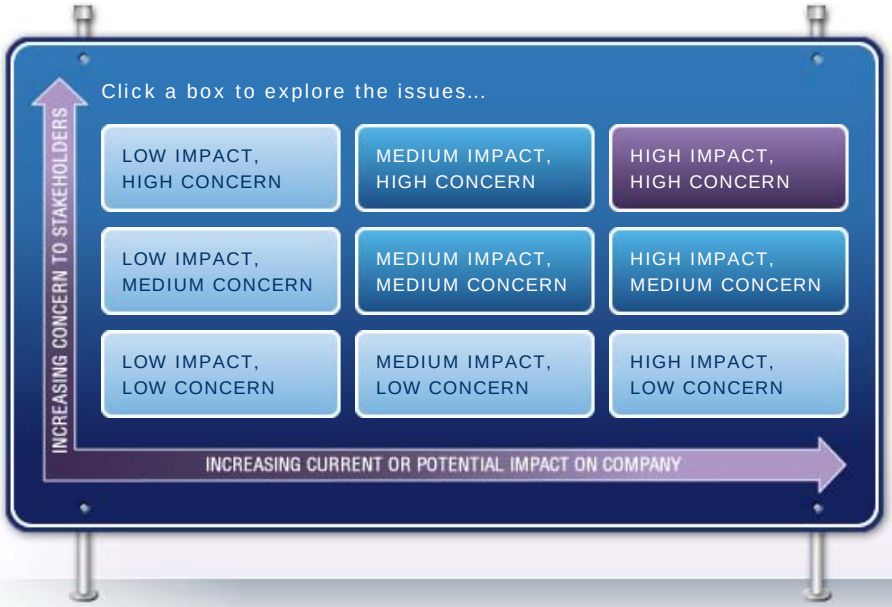
Materiality Matrix

Below is our interactive materiality matrix. In it, issues are categorized according to their concern to stakeholders and their current or potential impact on the Company. Click each box to see which issues are categorized within each sector.



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Materiality Matrix

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Click on the boxes in the navigator (right) to explore each level, and click on individual issues below to see details.

Ratings of control or influence reflect Ford's contribution to an issue through its operations and product offerings. Factors that can reduce Ford's control or influence include, among other things, technology limitations, costs and consumer demand.

High Current or Potential Impact on Company

High Concern to Stakeholders

23 material issues have been identified at this level (click on an issue for more details).

LEVEL OF CONTROL OR influence

	LOW	MEDIUM	HIGH
Ford Financial Viability	Competitor and Supplier Viability	Profitability Level and Timing Alignment of Products with Demand Health Care and Legacy Costs Labor Costs Access to Capital – Private and Government Dealer Viability	Quality Managing Downsizing
Climate Change	Low-Carbon Fuels Emissions Trading/Cost of Carbon Energy Security	Vehicle GHG Emissions Advanced Clean Vehicle Technology	Low-Carbon Strategy Fuel Economy Electrification Strategy
Public Policy		Greenhouse Gas/Fuel Economy Regulations	
Safety		Vehicle Safety	
Human Rights		Other Issues	Supply Chain Practices
Mobility and Emerging Markets	Urban Mobility		Emerging Market Products and Services Strategy

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Ratings of control or influence reflect Ford's contribution to an issue through its operations and product offerings. Factors that can reduce Ford's control or influence include, among other things, technology limitations, costs and consumer demand.

Medium Current or Potential Impact on Company

High Concern to Stakeholders

Two material issues have been identified at this level (click on an issue for more details).

LEVEL OF CONTROL OR influence

	LOW	MEDIUM	HIGH
Community			• Community Engagement • Community Impacts and Contributions

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Medium Current or Potential Impact on Company
Medium Concern to Stakeholders

10 material issues have been identified at this level (click on an issue for more details).

LEVEL OF CONTROL OR INFLUENCE

	LOW	MEDIUM	HIGH
Governance			Shareholder Concerns
Operations			Operational Environmental Management/Environmental Compliance Hazardous Pollutants
Product		End of Life Management	Marketing Communications/Demand Creation/Advertising
Workplace			Employees/Labor Practices/Decent Work Diversity/Equal Opportunity
Mobility and Emerging Markets		Emerging Market Vehicle and Road Safety	
Public Policy	Health Care Reform		Political Payments and Contributions

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

12 material issues have been identified at this level (click on an issue for more details).

LEVEL OF CONTROL OR influence

	LOW	MEDIUM	HIGH
Ford Financial Viability			Manufacturing Efficiency
Sustainablity Strategy			Sustainability Vision, Governance and Management
Governance			Ethical Business Practices
Public Policy		Global Environmental Regulation	
Operations			Energy Use Water Use GHG Emissions
Product			Tailpipe Emissions Sustainable Materials Product Compliance
Moblity and Emerging Markets	Congestion		
Workplace			Health and Safety

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Low Current or Potential Impact on Company

High Concern to Stakeholders

No issues have been identified at this level.

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Low Current or Potential Impact on Company

Medium Concern to Stakeholders

Three issues have been identified at this level.

LEVEL OF CONTROL OR influence

	LOW	MEDIUM	HIGH
Operations			• Land and Nature • Other Environmental Issues: Spills, Nuisances
Product		• Noise	

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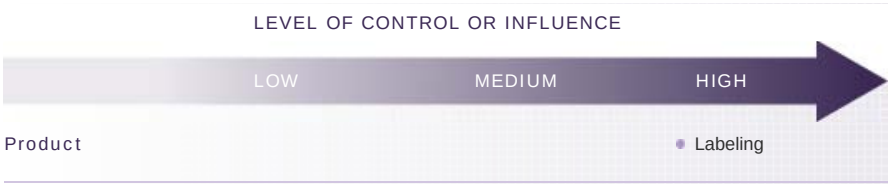
Low Current or Potential Impact on Company

Low Concern to Stakeholders

One issue has been identified at this level.



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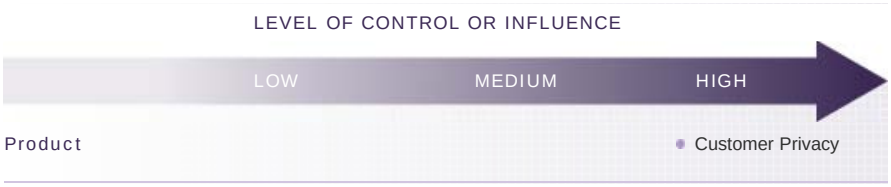
Medium Current or Potential Impact on Company

Low Concern to Stakeholders

One issue has been identified at this level.



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High Current or Potential Impact on Company

Low Concern to Stakeholders

Five issues have been identified at this level.

LEVEL OF CONTROL OR influence

	LOW	MEDIUM	HIGH
Ford Financial Viability	Commodity Costs		
Operations			Non-GHG Emissions Waste Generation and Management
Workplace			Employee Morale and Teamwork
Supply Chain		Supplier Environmental Sustainability	

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High Current or Potential Impact on Company

High Concern to Stakeholders

Competitor and Supplier Viability

Definition/Description	Potential disruptions to supply base due to competitor or supplier bankruptcies
Comments	Concerns about bankruptcy of competitors a new and major concern
Trend (from previous analysis)	NEW
Level of control or influence	Low
More information	• Sustaining Ford • Suppliers • Working with Suppliers

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High Current or Potential Impact on Company

High Concern to Stakeholders

Profitability Level and Timing

Definition/Description	Broad concerns about Ford's financial performance and future
Comments	A top concern for Ford and stakeholders
Trend (from previous analysis)	Already at the highest level
Level of control or influence	Medium
More information	Letter from Alan Mulally Sustaining Ford Economy

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High Current or Potential Impact on Company

High Concern to Stakeholders

Alignment of Products with Demand

Definition/Description	Ford's realignment of production capacity to lower levels of demand and the shift from trucks and SUVs to cars; supply-base rationalization
Comments	New issue (formerly included in several others) of great concern to Ford and stakeholders, particularly investors
Trend (from previous analysis)	NEW
Level of control or influence	Medium
More information	• Sustaining Ford • Delivering New Products

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High Current or Potential Impact on Company

High Concern to Stakeholders

Health Care and Legacy Costs

Definition/Description	Ford's U.S. cost to provide health care coverage for current employees; health care and pension for retirees; Ford's participation in health care public policy formulation. Significant competitive issue as foreign manufacturers in U.S. have few retirees; may not provide health care to employees in home markets
Comments	High concern to investors; increasing awareness/concern to customers and general public
Trend (from previous analysis)	Already at the highest level
Level of control or influence	Medium
More information	Workforce Working with the UAW Health as a Strategic Advantage Ford and Juvenile Diabetes Public Policy Positions

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High Current or Potential Impact on Company

High Concern to Stakeholders

Labor Costs

Definition/Description	Cost structure including hourly wages, benefits, post-retirement benefits; effect on competitiveness
Comments	Have become a higher-profile issue since they figured in Congressional debate over aid to U.S. automakers
Trend (from previous analysis)	NEW
Level of control or influence	Medium
More information	• Workforce • Restructuring Our Business • Financing Our Plan and Improving Our Balance Sheet

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High Current or Potential Impact on Company

High Concern to Stakeholders

Access to Capital – Private and Government

Definition/Description	Includes impact of credit crisis on availability of private capital and potential need for government loans
Comments	New issue
Trend (from previous analysis)	NEW
Level of control or influence	Medium
More information	• Sustaining Ford • Financing Our Plan and Improving Our Balance Sheet

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High Current or Potential Impact on Company

High Concern to Stakeholders

Dealer Viability

Definition/Description	Size of dealer network; profitability and creditworthiness of dealers
Comments	"Dealer relationships" issue redefined as viability due to mismatch of number of dealers with vehicle demand
Trend (from previous analysis)	NEW
Level of control or influence	Medium
More information	• Sustaining Ford • Dealers • Working with Dealers

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High Current or Potential Impact on Company

High Concern to Stakeholders

Quality

Definition/Description	Product quality and customer service/customer relationship management
Comments	Growing recognition of Ford's dramatic quality improvements, but still a key factor in financial viability
Trend (from previous analysis)	Already at the highest level
Level of control or influence	High
More information	• Economy: Progress and Goals • Customer Satisfaction and Quality

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High Current or Potential Impact on Company

High Concern to Stakeholders

Managing Downsizing

Definition/Description	Financial impacts on company and business partners; availability of funding for restructuring; employee morale; community impacts of plant closures; managing EH&S impacts of downsizing
Comments	Continued cutbacks present challenges to Ford, employees, dealers, communities and investors
Trend (from previous analysis)	Already at the highest level
Level of control or influence	High
More information	Handling Downsizing Responsibly Restructuring Our Business Society: Progress and Goals Employees Community

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Low-Carbon Fuels

Definition/Description	Redefinition of clean/alternative fuel issue. Includes renewably produced fuels, biofuels. Sub-issues include infrastructure, fuel availability and cost, competition between food and fuel
Comments	Increasing focus on life-cycle carbon footprint of fuels, indirect effects like land use changes due to biofuel production
Trend (from previous analysis)	Already at the highest level
Level of control or influence	Low
More information	• Fuel • Ford's Sustainable Technologies and Alternative Fuels Plan • U.S. Climate Change Legislation • Electrification: A Closer Look

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High Current or Potential Impact on Company

High Concern to Stakeholders

Emissions Trading/Cost of Carbon

Definition/Description	Ford's participation in carbon markets and strategic response to cost of carbon
Comments	New issue reflecting establishment of carbon markets in some regions and likely future establishment in others
Trend (from previous analysis)	NEW
Level of control or influence	Low
More information	• Emissions Trading

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High Current or Potential Impact on Company

High Concern to Stakeholders

Energy Security

Definition/Description	Concerns about the stability of energy supplies, particularly oil from politically unstable regions; development of supplies within national boundaries
Comments	Volatility in fuel prices has reinforced concerns, particularly in the U.S.; a driver of interest in alternative fuels including ethanol/E85 and electrification
Trend (from previous analysis)	Already at the highest level
Level of control or influence	Low
More information	• Letter from Alan Mulally • Climate Change Risks and Opportunities • Fuel • Electrification: A Closer Look

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High Current or Potential Impact on Company

High Concern to Stakeholders

Vehicle GHG Emissions

Definition/Description	Ford's product actions to meet its CO_2 target
Comments	Increasingly driven by regulatory requirements as well as Ford's voluntary product CO_2 goal; of increasing interest to government and investors
Trend (from previous analysis)	Already at the highest level
Level of control or influence	Medium
More information	• Climate Change • Vehicle • Letter from Alan Mulally • Fuel Economy and Greenhouse Gas Emissions • Environment: Progress and Goals

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High Current or Potential Impact on Company

High Concern to Stakeholders

Advanced Clean Vehicle Technology

Definition/Description	Ford's development of low-carbon technologies, including hybrids, electric vehicles, clean diesel, fuel cells; also emerging technologies like nanotechnology
Comments	High customer/NGO interest in technologies but also concerns over cost and infrastructure
Trend (from previous analysis)	Greater customer awareness of technology options
Level of control or influence	Medium
More information	• Ford's Sustainable Technologies and Alternative Fuels Plan • Vehicle • Delivering More Fuel-Efficient Vehicles • Products

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High Current or Potential Impact on Company

High Concern to Stakeholders

Low-Carbon Strategy

Definition/Description	Ford's strategy to reduce carbon emissions from products and operations; goals and targets; use of renewable energy and offsets
Comments	Strongly related to other material issues; of increasing interest to government and investors
Trend (from previous analysis)	Already at the highest level
Level of control or influence	High
More information	• Climate Change • Our Strategy: Blueprint for Sustainability • Environment • Delivering New Products • Electrification: A Closer Look • Operational Energy Use and Greenhouse Gas Emissions

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High Current or Potential Impact on Company

High Concern to Stakeholders

Fuel Economy

Definition/Description	Global issue, but particular focus on Ford U.S. fleet
Comments	Increasingly driven by regulatory requirements as well as Ford's voluntary product CO_2 goal; of increasing interest to government and investors
Trend (from previous analysis)	Already at the highest level
Level of control or influence	High
More information	Fuel Economy and Greenhouse Gas Emissions Environment: Progress and Goals Design for Life-Cycle Sustainability Delivering More Fuel-Efficient Vehicles Letter from Alan Mulally Greenhouse Gas Emissions Overview Climate Change Risks and Opportunities Our Strategy: Blueprint for Sustainability Ford's Sustainable Technologies and Alternative Fuels Plan

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High Current or Potential Impact on Company

High Concern to Stakeholders

Electrification Strategy

Definition/Description	Ford's strategy to deliver electric vehicles to the marketplace and work with partners to address infrastructure and utility interface issues
Comments	New issue reflecting interest in alternatives to fossil fuels and domestically produced energy
Trend (from previous analysis)	NEW
Level of control or influence	High
More information	• Migration to Alternative Fuels and Powertrains • Electrification: A Closer Look • Public Policy Positions

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High Current or Potential Impact on Company

High Concern to Stakeholders

Greenhouse Gas/Fuel Economy Regulations

Definition/Description	Regulation of vehicle emissions globally, state-by-state regulation in U.S.; USCAP and likelihood of federal climate change legislation in U.S.
Comments	With passage of new CAFE requirements in U.S. and new EU requirements in Europe, focus is increasingly on economy-wide policy approaches.
Trend (from previous analysis)	Already at the highest level
Level of control or influence	Medium
More information	U.S. Climate Change Legislation U.S. Greenhouse Gas and Fuel Economy Regulation Incentives for Fleet Renewal European Policy Climate Change Risks and Opportunities Emissions Trading Greenhouse Gas Emissions Overview Public Policy Positions

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High Current or Potential Impact on Company

High Concern to Stakeholders

Vehicle Safety

Definition/Description	Active and passive safety; pedestrian safety; customer interest in and demand for safe vehicles; increasing regulation generally with focus on active safety; challenge of evolving in-vehicle technology
Comments	Developed and emerging market issues differ
Trend (from previous analysis)	Ford increasingly emphasizing market opportunity for safer products
Level of control or influence	Medium
More information	• Vehicle Safety • Public Policy Positions

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High Current or Potential Impact on Company

High Concern to Stakeholders

Other Issues

Definition/Description	Code for Ford facilities, HR practices in broader community; indigenous people; environmental justice
Comments	High interest to communities, NGOs
Trend (from previous analysis)	Already at the highest level
Level of control or influence	Medium
More information	Human Rights Employees Community

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High Current or Potential Impact on Company

High Concern to Stakeholders

Supply Chain Practices

Definition/Description	Issues covered by Ford's working conditions code; need for industry cooperation
Comments	High interest to communities, suppliers, NGOs
Trend (from previous analysis)	Already at the highest level
Level of control or influence	High
More information	Human Rights Ford and the Automotive Industry Supply Chain Collaboration within the Automotive Industry

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High Current or Potential Impact on Company

High Concern to Stakeholders

Urban Mobility

Definition/Description	Ford's product and services strategy for urban areas in developed and developing countries
Comments	New issue: Unique conditions in urban areas present challenges for traditional models of personal mobility and opportunities to develop new products and services
Trend (from previous analysis)	NEW
Level of control or influence	Low
More information	• Mobility • Steve Marshall

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High Current or Potential Impact on Company

High Concern to Stakeholders

Emerging Market Products and Services Strategy

Definition/Description	Ford's approach to emerging markets: vehicles v. mobility services; base of the pyramid strategy; infrastructure development; Ford's target customer and position relative to emerging market OEMs; Ford's impacts/contributions in emerging markets (other than products and services), including local sourcing, pollution, potential for partnerships
Comments	Key drivers of the issue include congestion, shifting demographics, urbanization and social equity
Trend (from previous analysis)	Already at the highest level
Level of control or influence	High
More information	Mobility Increasing Global Integration Letter from William Clay Ford, Jr. Letter from Alan Mulally 2009 Sales and Highlights

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Medium Current or Potential Impact on Company

High Concern to Stakeholders

Community Engagement

Definition/Description	License to operate, NGO relationships and specific community concerns like breast cancer, obesity, compliance
Comments	High concern to communities and NGOs
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Community Society: Case Studies Engaging with Communities

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Medium Current or Potential Impact on Company

High Concern to Stakeholders

Community Impacts and Contributions

Definition/Description	Encompasses a range of direct and indirect economic impacts, including local hiring and sourcing and philanthropic donations to the community; also local environmental impacts
Comments	High concern to communities
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Community Human Rights Sustaining Ford Financial Recovery Plan Manufacturing Economic Impacts of the Auto Industry

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Shareholder Concerns

Definition/Description	Primarily concerns raised through shareholder resolutions
Comments	Rose in importance to Ford because of increasing focus on governance issues
Trend (from previous analysis)	Increased in importance to Ford
Level of control or influence	High
More information	Corporate Governance – Board of Directors Who Are Our Stakeholders?

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Operational Environmental Management/Environmental Compliance

Definition/Description	High-level environmental operation concerns, including environmental management; environmental compliance; sustainable production and consumption; tradeoffs between energy use and air quality (e.g., incineration of paint fumes)
Comments	Environmental compliance a concern to communities
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Sustainability Governance Sustainability Management Our Strategy: Blueprint for Sustainability Environment Compliance

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Hazardous Pollutants

Definition/Description	Hazardous substances in products, manufacturing and supply chain
Comments	Higher level of concern to Ford reflects increasing public interest
Trend (from previous analysis)	NEW
Level of control or influence	High
More information	• Sustainable Materials • Facilities-Related Emissions • Waste Management • Non-CO_2 Tailpipe Emissions • Emissions (VOC and Other)

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Medium Concern to Stakeholders

End of Life Management

Definition/Description	Trend towards "extended producer responsibility;" waste; design for recyclability; health and safety issues at dismantling facilities
Comments	Less of a concern relative to other issues
Trend (from previous analysis)	Lower level of concern to Ford
Level of control or influence	Medium
More information	• End of Life • Quantifying Our Environmental Impacts • Design for Life-Cycle Sustainability • Life-Cycle Vehicle CO_2 Emissions

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Marketing Communications/Demand Creation/Advertising

Definition/Description	Advertising and other communications with customers
Comments	Within Ford, primarily a compliance issue; for NGOs/multi-stakeholder groups, concern over whether Ford can only react to consumer desires or can lead them, e.g., toward more sustainable products
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	• Building Customer Awareness • Understanding Changing Customer Needs • Customers

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Employees/Labor Practices/Decent Work

Definition/Description	Ford's employment practices, including wages, wage ratios, benefits, permanent v. temporary positions; training and education; turnover; impact of aging workforce
Comments	High concern to communities and investors
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Employees Human Rights Restructuring Our Business

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Diversity/Equal Opportunity

Definition/Description	Diversity of Ford Board and management; harassment programs and monitoring
Comments	Relatively high concern to NGOs/stakeholders who see diversity as global strategic issue
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Diversity and Inclusion in the Workplace Corporate Governance – Board of Directors Code of Basic Working Conditions Engagement and Community

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Emerging Market Vehicle and Road Safety

Definition/Description	Road safety as a public health issues: safety for motorists and non-car users; infrastructure; driver education
Comments	Increasing focus of Ford's outreach to customers
Trend (from previous analysis)	Increased in importance to Ford
Level of control or influence	Medium
More information	Vehicle Safety: Challenges and Opportunities How We Manage Vehicle Safety

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Health Care Reform

Definition/Description	Collaborative efforts to improve quality and reduce cost of health care; potential for legislative overhaul of U.S. health care system
Comments	Formerly subsumed in health care costs; identified as a separate issue due to its impact on Ford and new administration's commitment to reform
Trend (from previous analysis)	NEW
Level of control or influence	Low
More information	• Working with the UAW • Health as a Strategic Advantage • Public Policy Positions

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Medium Current or Potential Impact on Company

Medium Concern to Stakeholders

Political Payments and Contributions

Definition/Description	Company donations to candidates and campaigns; lobbying costs; employee Political Action Committee; indirect giving through trade associations, etc.
Comments	Stakeholders, including shareholders, are showing increasing interest and advocacy for "political accountability" or transparency around the various forms of corporate political donations
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Public Policy Participation in the Policy-Making Process Policy Letters and Directives

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Manufacturing Efficiency

Definition/Description	Includes reduced complexity of products, lean and flexible manufacturing, flexible work rules
Comments	Key element of Ford's ability to respond to changing markets; part of public discussion about aid to automakers
Trend (from previous analysis)	NEW
Level of control or influence	High
More information	• Increasing Global Integration • Improving New Product Development Process

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Sustainability Vision, Governance, and Management

Definition/Description	Includes governance structures, goals and indicators, business case, stakeholder engagement, reporting
Comments	Governance added to vision and management, reflecting growing investor and NGO interest in integrating sustainability into business processes
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Letter from William Clay Ford, Jr. Letter from Alan Mulally Letter from Sue Cischke Sustainability Governance Sustainability Management Sustainable Mobility Governance Code of Basic Working Conditions How We Manage Vehicle Safety Environmental Management

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Ethical Business Practices

Definition/Description	Concerns covered by codes of conduct, e.g., corruption and anti-competitive behavior; also concerns about Board independence
Comments	Among stakeholders, of most concern to investors
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Ethical Business Practices Corporate Governance – Board of Directors Sustainability Governance

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Global Environmental Regulation

Definition/Description	Trend toward greater regulation and the cost of compliance
Comments	Not a new issue but now under a "public policy" heading
Trend (from previous analysis)	Same position
Level of control or influence	Medium
More information	• Climate Change Risks and Opportunities • Climate Change Policy and Partnerships • Public Policy Positions

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Energy Use

Definition/Description	Operations/facilities: concerns about cost and availability; energy security
Comments	High concern to communities
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Environment: Progress and Goals Operations Environment: Case Studies Operational Energy Use and CO_2 Emissions

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Water Use

Definition/Description	Includes impacts on water sources; water management, cost of water and discharges to water
Comments	Particular concern in areas of water scarcity; issue gaining a higher public profile
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Environment: Progress and Goals Water Use Environment Data: Water Use Water: More Than Just Environmental Concerns

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

GHG Emissions

Definition/Description	Includes cost of controlling GHG emissions
Comments	Less of a concern than GHG emissions from vehicles, but rated high for Ford and NGOs/stakeholders
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Greenhouse Gas Emissions Overview Environment: Progress and Goals Our Strategy: Blueprint for Sustainability Operational Energy Use and Greenhouse Gas Emissions Renewable Energy Use Environment: Data

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Tailpipe Emissions

Definition/Description	Air-quality impacts of vehicle emissions other than GHGs; trend toward greater regulation
Comments	High concern to customers/NGOs/stakeholders; more impact on Ford due to increased and inconsistent regulation
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Non-CO_2 Tailpipe Emissions Environment: Progress and Goals Ford's Sustainable Technologies and Alternative Fuels Plan Environment Data: Tailpipe Emissions

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Sustainable Materials

Definition/Description	Cradle-to-cradle approach; use of renewable, recycled, recyclable materials
Comments	Formerly "materials use;" increased interest within Ford as a way to address life-cycle impacts
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Environment: Progress and Goals Choosing More Sustainable Materials Product Sustainability Index

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Product Compliance

Definition/Description	Monetary value of significant fines for non-compliance with laws and regulations concerning the provision and use of products and services
Comments	GRI item; of concern to Ford due to potential cost and impact on reputation
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Environment: Progress and Goals Non-CO_2 Tailpipe Emissions U.S. Safety Recalls Compliance

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Congestion

Definition/Description	Key mega-trend with distinct manifestations in emerging and developed markets including infrastructure, public transportation; policy responses such as congestion pricing
Comments	Increasing importance to Ford as urban areas place restrictions on private vehicle use; driver of mobility strategy
Trend (from previous analysis)	Increased in importance to Ford
Level of control or influence	Low
More information	Mobility

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High Current or Potential Impact on Company

Medium Concern to Stakeholders

Health and Safety

Definition/Description	Health and safety management systems; ergonomics
Comments	Emerging issue is managing H&S impacts of downsizing
Trend (from previous analysis)	Same position
Level of control or influence	High
More information	Workplace Health and Safety Working Conditions in Ford Plants Ford and the Automotive Industry Supply Chain Workplace Safety

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Climate Change

2009 HIGHLIGHTS:

- Introduced the new Fiesta global small car in Europe and China
- On track to surpass our goal of a 30 percent reduction in CO_2 emissions from our U.S. and European new vehicles

Our blueprint for sustainability details our near-, mid- and long-term product plans to meet our CO_2 emissions goal.

Concerns about climate change and growing constraints on the use and availability of carbon-based fuels affect our operations, our customers, our investors and our communities. The issue warrants precautionary, prudent and early actions to enhance our competitiveness, protect our profitability in an increasingly carbon-constrained economy and do our share to prevent or reduce the potential for environmental harm due to climate change.

We have responded to the significant risks and opportunities presented by the climate change issue by developing a comprehensive global strategy to reduce greenhouse gas (GHG) emissions from our products and processes while working cooperatively with the public and private sectors to advance climate change solutions. We are taking a holistic approach to the climate change issue, recognizing that it affects all parts of our business and is interconnected to other important issues, from water availability and energy security to human rights.

We are making progress in implementing our strategy, improving the fuel economy of our vehicles and reducing GHG emissions from our products and operations. According to the U.S. Environmental Protection Agency (EPA), for example, no automaker has posted a larger fleet-wide gain in fuel economy in the past five years than Ford. Based on EPA measurements, Ford's combined car and truck fuel economy has improved nearly 20 percent since 2004 – almost double the gain of the next-closest competitor. In addition, Ford's 2009 fleet-wide average carbon dioxide (CO_2) emissions were 5 percent lower than in 2008. In Europe, we have reduced the average CO_2 emissions of the vehicles we sell by more than 27 percent compared with a 1995 baseline (excluding Volvo).

We believe our commitment to addressing the climate change issue in a comprehensive and strategic way is one of the factors that has helped transform our Company's current and future products and prospects.

Our Commitment

In early 2008, Ford announced a goal to reduce CO_2 emissions[1] from its U.S. and European new vehicles by 30 percent by 2020, relative to a 2006 model year baseline. We also set out a technology migration plan – embodied in our blueprint for sustainability – that details our near-, mid- and long-term plans to meet this goal. Our commitment and plan are aligned with doing our part to achieve a 450 ppm climate stabilization pathway[2] (see figure below). Despite challenging economic conditions, we are making significant progress in implementing the plan and are on track to surpass the goal.

PERSPECTIVES ON SUSTAINABILITY

David Chock

Former Ford Scientist (1989–2009), Current Member of the Science Advisory Board (SAB), U.S. Environmental Protection Agency

Read more

RELATED LINKS

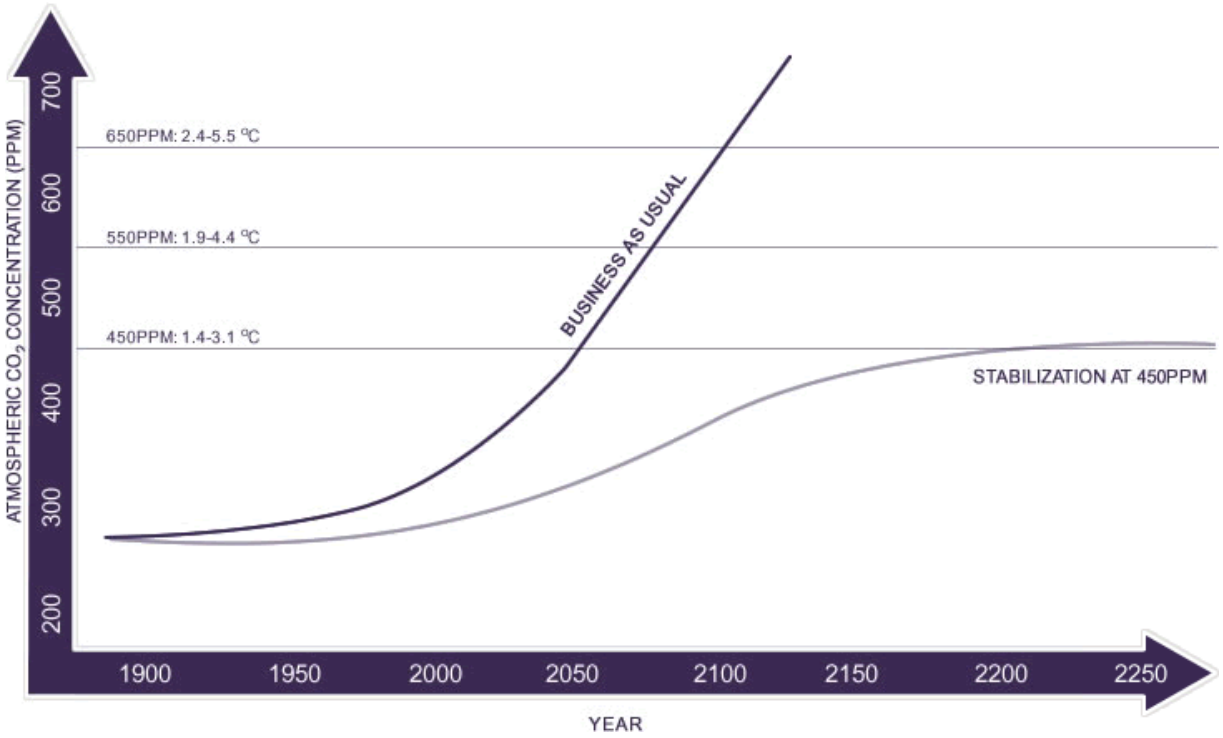
This Report:

Delivering more Fuel-Efficient Vehicles

External Web Sites:

U.S. Climate Action Partnership

Stabilizing Atmospheric CO_2 Levels



We have also announced an ongoing commitment, beginning with the 2010 model year, that all new or significantly refreshed vehicles will be best in class, or among the best in class, for fuel economy in their segment. We are committed to reducing CO_2 emissions from our operations, and we are exploring carbon emissions in our supply chain through participation in the Carbon Disclosure Project's supply chain initiative and the World Resources Institute/World Business Council on Sustainable Development's Scope 3 road testing project. These and other climate change commitments are summarized in the Climate Change: Related Commitments and Progress table.

During 2009, we expanded our analysis of GHG emission reductions to include the products we sell in Brazil and China. In this analysis, we compared our current product plans to potential reductions aligned with long-term CO_2 stabilization at 450 ppm and considered the impact of low-carbon fuels. This is a step toward developing goals for these markets.

Our climate change strategy is based on delivering products that our customers want while doing our share to stabilize GHG concentrations in the atmosphere at levels generally accepted to minimize the effects of climate change. It encompasses our products, operations and, increasingly, our customers, dealers and suppliers.

Ford cannot achieve climate stabilization alone. Reducing emissions by the amount required calls for an integrated approach – a partnership of all stakeholders, including the automotive industry, the fuel industry, government and consumers. It can only be achieved by significantly and continuously reducing GHG emissions over a period of decades in all sectors of the economy. In the transportation sector, this means increases in vehicle fuel economy globally, as well as the development of lower-carbon fuels along with price signals to align consumers with climate stabilization goals.

We are committed to advocating effective and appropriate climate change policy in the United States and around the world. We are an active member of the U.S. Climate Action Partnership (USCAP), a coalition of diverse stakeholders that released its Blueprint for Legislative Action in January 2009, setting out consensus recommendations for U.S. climate protection legislation. The USCAP blueprint includes an aggressive emission-reduction schedule, a proposed scope of coverage for a cap-and-trade program, and recommendations for how to include as much of the U.S. economy under the cap as administratively and politically feasible. It is a balanced and integrated approach to key linked issues that must be addressed in any national climate legislation; however, we recognize that the blueprint recommendations are not the only possible path forward.

Our CO_2 product goal is aligned with the USCAP recommendations and with the broad goal of climate stabilization. It also aligns our product plans to meet or exceed new fuel economy requirements in the United States and Europe. We recognize that future developments in technologies, markets, policy actions and even the natural manifestations of climate change are all uncertain. Accordingly, we will continue to monitor and adjust our goal based on changing

conditions.

In This Section

In this section of our sustainability report we provide an overview of GHG emissions, including data on the contribution of light-duty vehicles, life-cycle CO_2 emissions from a typical vehicle, Ford's own climate "footprint" and stabilization pathways. We also discuss the risks and opportunities the climate change issue poses for Ford, our climate change strategy – including our blueprint for sustainability – and how we are addressing climate change public policy issues.

1. CO_2 is the major long-lived greenhouse gas. Greenhouse gases trap heat in the Earth's atmosphere, contributing to global climate change. CO_2 is the most prevalent GHG associated with the manufacture and use of our products, so our targets are set for CO_2 rather than all GHGs. See the Beyond CO_2 section for discussion of Ford's other GHG emissions.
2. It is generally accepted that stabilization of CO_2 in the range 450–550 ppm is required to avoid the most serious impacts of climate change. Our target is aligned with a 450 ppm stabilization pathway and assumes that fuel providers, consumers, governments and other energy sectors deliver their contributions.

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Climate Change: Related Commitments and Progress

Commitment	Target	Progress
Products		
Ford U.S. and EU new products	Reduce CO_2 emissions by 30 percent by 2020, relative to a 2006 model year baseline	On track
Australian Industry-wide National Average CO_2 Emissions (NACE), previously known as National Average Fuel Consumption (NAFC) (industry)	Voluntary target to achieve national average CO_2 emissions of 222 g/km for light vehicles under 3.5 metric tons gross vehicle mass by 2010. Requires an overall reduction in average CO_2 emissions of 12 percent between 2002 and 2010	Met in 2009; industry is working on a new target for Australia for 2015 and 2020
Canadian Greenhouse Gas Memorandum of Understanding (industry)	Industry-wide voluntary agreement to reduce GHGs from the Canadian car and truck fleet by 5.3 megatonnes by 2010 compared to projected emissions	First target met in 2007; on track to meet 2010 target
Operations		
Global manufacturing energy efficiency (Ford)	Improve facility energy efficiency by 3 percent during 2010	On track
EU Emission Trading Scheme (Ford)	Ensure compliance with European Union CO_2 Emission Trading Scheme requirements annually, including third-party verification	Met
Chicago Climate Exchange (Ford)	Reduce North American facility emissions by 6 percent between 2000 and 2010, as verified by third-party auditors	Met
Alliance of Automotive Manufacturers (industry)	Reduce U.S. facility GHG emissions by 10 percent per vehicle produced between 2002 and 2012	On track
Voluntary GHG reporting (Ford)	Voluntarily report facility CO_2 emissions to national emissions registries in Australia, Canada, Mexico, the Philippines and the United States	Met; added all of China and Brazil in 2009

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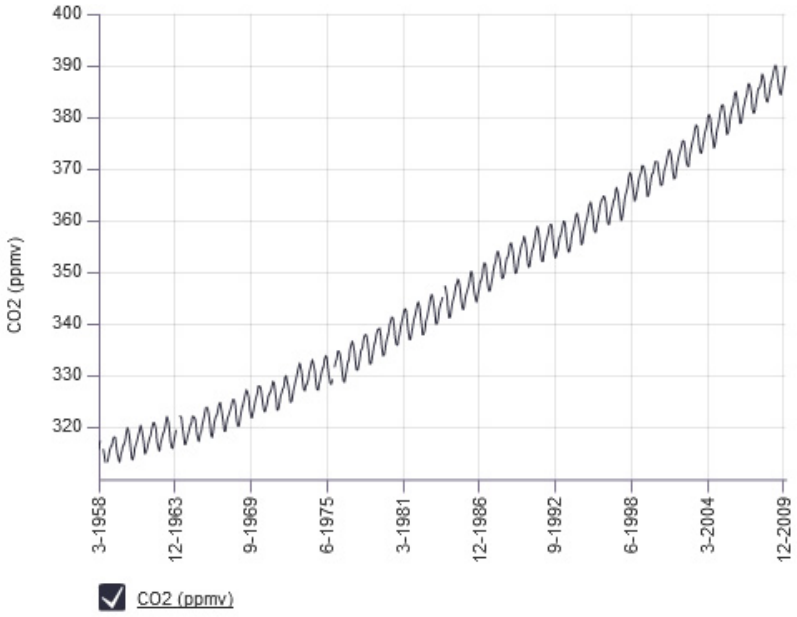
Greenhouse Gas Emissions Overview

Climate change is the result of an increase in heat-trapping (greenhouse) gases in the atmosphere. Carbon dioxide (CO_2) is the major long-lived greenhouse gas (GHG). The burning of fossil fuels (to provide electricity, heat and transportation, and to support industry and agriculture), as well as deforestation, lead to emissions of CO_2 and increased levels of atmospheric CO_2 (see Figure 1).

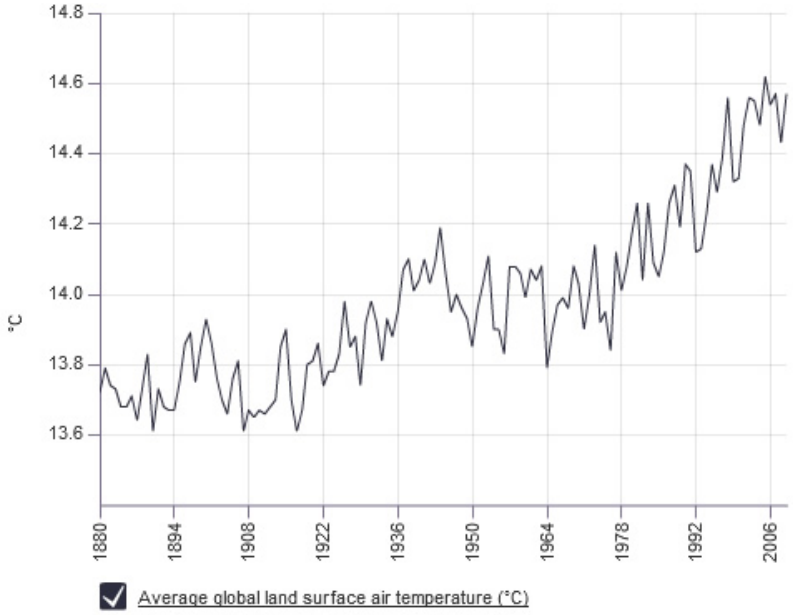
There has been discussion recently in the media regarding the integrity of the temperature record. Specifically, it has been claimed that climate scientists at the Climate Research Unit (CRU) at the University of East Anglia in the UK have misrepresented the instrumental temperature record. This has become known as "Climategate." We do not believe these developments undermine the broad scientific basis for concern about climate change. Indeed, we continue to monitor original research and discussion pertaining to climate change and support the vigorous application of the scientific method in this and other fields of inquiry. We also note that the temperature record independently reported by scientists at the National Aeronautics and Space Administration (NASA) shows a distinct warming trend. As seen in Figure 2, the past decade was the warmest decade in the instrumental temperature record. Moreover, independent measurements of an increase of sea level and ocean acidification are consistent with the impact of rising GHG concentrations and global temperature.

Figure 1: CO_2 concentration measured at the observatory in Mauna Loa, Hawaii



Data source: NOAA (2010)

Figure 2: Global temperature



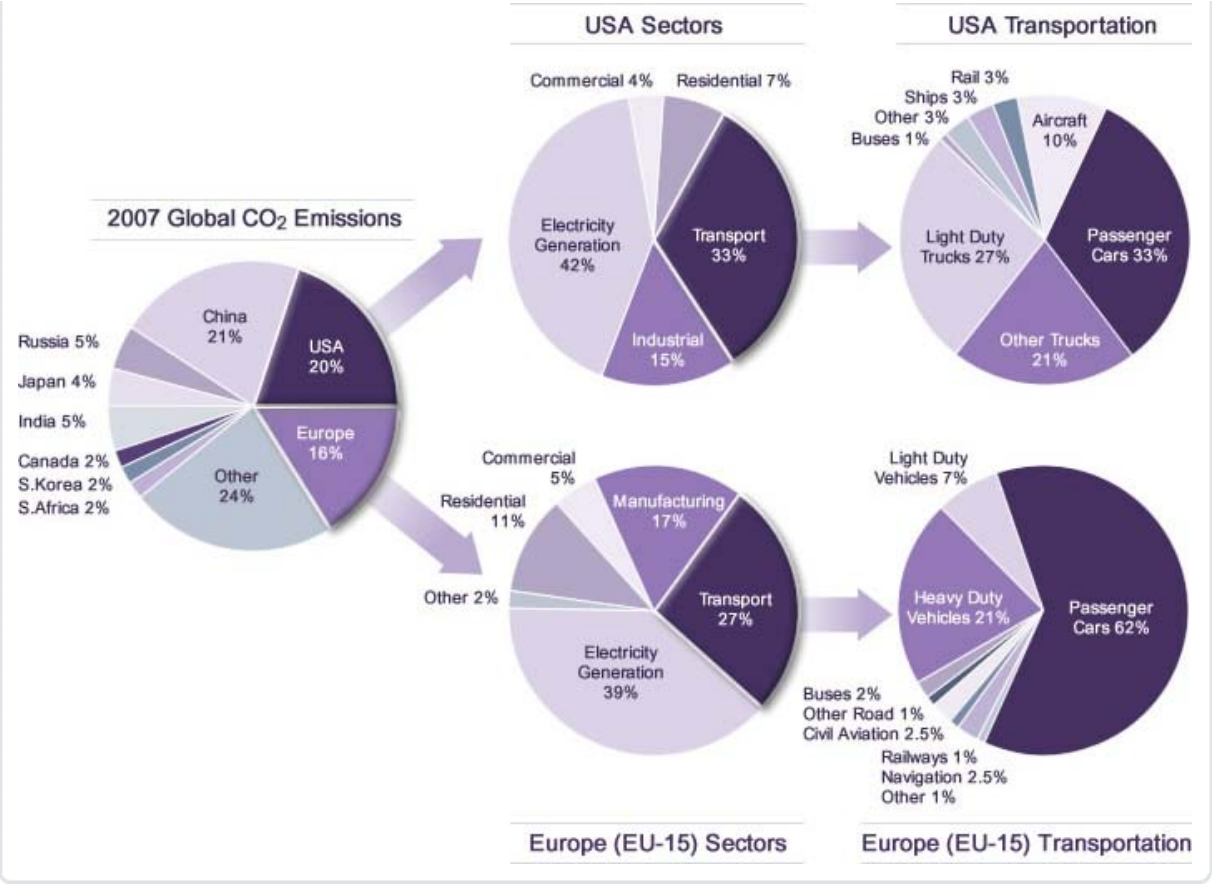
Data source: NASA (2010)

Global CO_2 Emissions

Figure 3 (below) provides a breakdown of estimated 2007 fossil fuel CO_2 emissions by region. For the United States and Europe, the emissions are further broken down by sector and by mode in the transportation sector. The data were taken from reports published by the International Energy Agency, European Environment Agency and U.S. Environmental Protection Agency. Globally, emissions from cars and light-duty trucks comprise about 11 percent of all fossil fuel CO_2 emissions. In the United States, cars and light-duty trucks account for approximately 20 percent of fossil fuel CO_2 emissions, or approximately 4 percent of global fossil fuel CO_2 emissions. In Europe, passenger cars and light-duty trucks account for approximately 19 percent of fossil fuel CO_2 emissions, or about 3 percent of global fossil fuel CO_2 emissions.

Until recently, the United States was the largest CO_2 emitter. In 2007, however, emissions from China surpassed those from the United States. It is expected that the gap between emissions from China and the United States will widen in the future, although per-capita emissions of CO_2 in the U.S. remain higher (by approximately a factor of four) than those in China.

Figure 3: Distribution of Fossil Fuel CO_2 Emissions 2007



Life-Cycle Vehicle Emissions

The GHG emissions attributable to Ford's activities include emissions from our facilities, from the transportation of our products and people, from the vehicles we produce once they are in use by customers, and from our suppliers. In this report, we provide data on CO_2 emissions from our facilities and our U.S. and European new products. Additional information on our GHG footprint is found in the Life-Cycle Vehicle CO_2 Emissions section.

Most of the life-cycle CO_2 emissions from vehicles are released when the vehicles are driven, rather than when they are manufactured, maintained or recycled at end-of-life. As vehicle fuel efficiency improves and lower-carbon fuels are made available, we expect that the relative contribution of CO_2 emissions from the fuel-consumption phase will decrease (see Life-Cycle Vehicle CO_2 Emissions).

Greenhouse Gas Emissions Snapshot

In 2001, we estimated the greenhouse gas emissions from our operations and products as part of an assessment of the impact of the climate change issue on our Company. We updated this estimate for our 2006/7 report. Many assumptions were required to generate the estimate, and we do not control all of the factors that influence its magnitude. Therefore, we do not use this estimate as an ongoing performance measure. We intend to continue to reduce our facility GHG emissions, improve the energy efficiency of our operations and the vehicles we sell, closely track those results and update the estimate in the future.

Supply Chain

We are currently evaluating climate change risks and opportunities across our supply chain and searching for new opportunities and relationships that will enhance supplier environmental performance. (See the Progress and Performance section for details of our participation in initial efforts to assess GHG emissions in our supply chain.) Within the Aligned Business Framework agreement with suppliers, environmental leadership is integral to overall business performance metrics. Climate-change-related activities are highlighted as potential leadership opportunities. In addition, our requirement that suppliers implement robust environmental management systems will better enable them to understand, measure and report their emissions. We also will seek out opportunities to partner with suppliers to improve the greenhouse gas emissions performance of our products and processes, and improve energy efficiency throughout the vehicle life-cycle, including in the supply chain.

Beyond CO_2

We have a holistic view of climate change and have addressed non-CO_2 long-term greenhouse gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), nitrous oxide (N_2O) and sulfur hexafluoride (SF_6). We have prohibited SF_6 in tires and PFCs in open systems since 1999. We have conducted scientific research to determine the relative contribution of a wide range of long-lived greenhouse gases to radiative forcing of climate change and have published our results to reduce uncertainties in the scientific assessments. We are working with our suppliers to optimize air conditioning efficiency, reduce refrigerant leakage rates and investigate alternatives. We are also actively conducting research to evaluate the environmental fates of potential alternative air conditioning refrigerants that may replace HFC-134a and have made our research data available to the scientific community. Scientific reports on the environmental impact of hydrofluoroolefins as potential replacements for HFCs have been published in peer-reviewed scientific literature. We prohibited the use of SF_6 in magnesium casting as of January 2004 through our Restricted Substance Management Standard. Given the impressive reductions in the emission of criteria pollutants (hydrocarbons, NOx, particulate matter and carbon monoxide) enabled by improvements in engine and exhaust after-treatment technology, we believe that the contribution to climate change by such short-lived pollutants from light-duty vehicles will be of relatively minor importance in the future.[1]

While carbon dioxide is by far the most important greenhouse gas associated with the use of motor vehicles, small amounts of other greenhouse gases are also emitted, notably methane (CH_4), N_2O and HFC-134a. A small amount of methane is formed in the engine and emitted into the atmosphere. We have assessed the contribution to climate change made by methane emissions from vehicles as about 0.3 to 0.4 percent of that of the CO_2 emissions from vehicles. We have assessed the contribution to climate change from N_2O emissions from vehicle tailpipes (not including potential emissions associated with fuel production) as about 1 to 3 percent of that of the tailpipe CO_2 emissions from vehicles. Finally, we have estimated that the radiative forcing contribution of HFC-134a leakage from an air-conditioner-equipped vehicle is approximately 3 to 5 percent of that of the CO_2 emitted by the vehicle.[2] When expressed in terms of "CO_2 equivalents," the contribution of vehicle emissions to radiative forcing of climate change is dominated by emissions of CO_2.

1. T.J. Wallington, J.E. Anderson, S.A. Mueller, S. Winkler, and J.M. Ginder, "Emissions omissions," *Science*, 327, 268, (2010).

2. T. J. Wallington, J. L. Sullivan, and M. D. Hurley, "Emissions of CO_2, CO, NOx, HC, PM, HFC-134a, N_2O and CH_4 from the Global Light Duty Vehicle Fleet," *Meteorol. Z.*, 17, 109 (2008).

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Life-Cycle Vehicle CO_2 Emissions

Life-cycle assessment tracks emissions generated and materials consumed for a product system over its entire life-cycle, from cradle to grave, including material production, product manufacture, product use, product maintenance and disposal at end of life. For vehicles, this includes the environmental burdens associated with making materials (e.g., steel, aluminum, brass, copper, plastics, etc.), fabricating them into parts, assembling the parts into a vehicle, operating the vehicle over its entire lifetime, producing fuel for the vehicle, maintaining the vehicle and finally disposing of the vehicle at the end of its life. Life-cycle assessment is an essential tool when thinking about the environmental impacts of complex systems.

The table below details the results of a life-cycle analysis for a representative midsize car and SUV in the United States. At present, life-cycle CO_2 emissions from vehicles are dominated by CO_2 released during fuel consumption. Product disposal has a minor impact on airborne emissions and energy consumption relative to other phases of the product system. As vehicle fuel efficiency improves and lower-carbon fuels are made available, the relative contributions of CO_2 emissions from the fuel-consumption phase will likely decrease. We are working on life-cycle emission estimates for electrified vehicles (i.e., plug-in hybrids and battery electric vehicles).

This analysis incorporates many assumptions, some of which reflect factors over which we have little or no control. Therefore, we do not expect to use the estimate as an ongoing performance measure. The analysis did, however, enable us to gain a better perspective of life-cycle emissions and hence understand the opportunities for reducing emissions.

	Midsize car		Midsize SUV	
	Metric tons of CO_2	% of total	Metric tons of CO_2	% of total
Raw material production (steel, aluminum, plastics, ...)	3.5	5.6%	4.3	5.2%
Manufacturing/assembly	2.6	4.2%	2.6	3.2%
Ford manufacturing logistics	0.3	0.5%	0.3	0.4%
Fuel (120,000 miles [192,000 km]) [well to wheels]	55.1	88.6%	74.6	90.4%
Maintenance and repair	0.6	1.0%	0.6	0.7%
End of life/recycling	0.1	0.2%	0.1	0.1%
Total life-cycle	62.2	100%	82.5	100%

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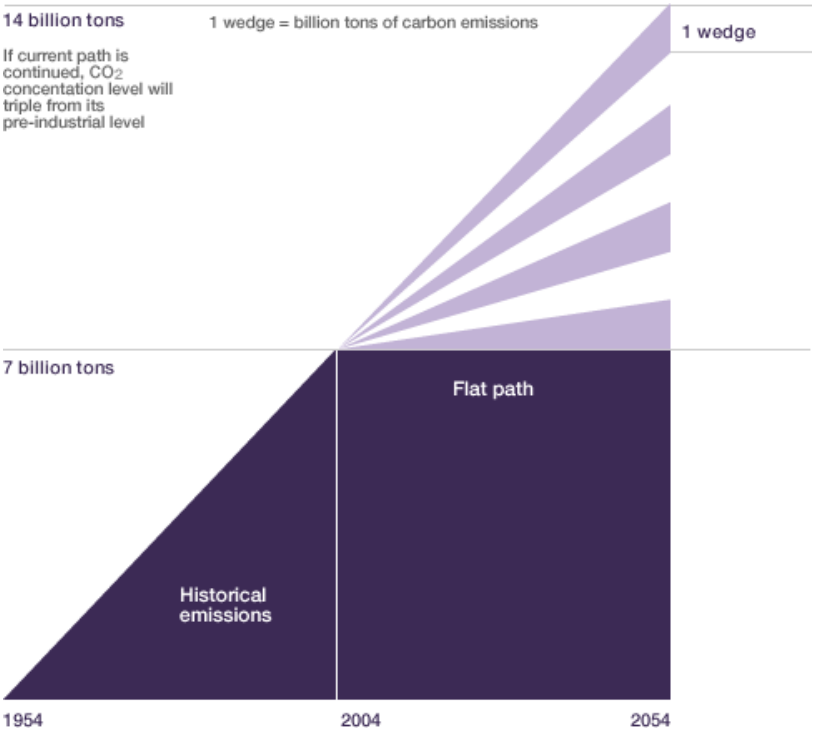
Climate Stabilization

The assessment of the science of global warming issued in February 2007 by the Intergovernmental Panel on Climate Change concluded that, "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas emissions." It also concluded that the effects of this warming, such as melting snow and ice and rising sea levels, are being felt, and that, "Continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century."[1]

Ford researchers have played a leading role in scientific research to understand and quantify the contribution of vehicles to climate change. We have also worked with a variety of partners to understand the current and projected man-made GHG emissions and the steps that can be taken to reduce them. Many scientists, businesses and governmental agencies have concluded that stabilizing the atmospheric concentration of CO_2 at approximately 450 parts per million (ppm) may help to forestall or substantially delay the most serious consequences of climate change.

The Carbon Mitigation Initiative, a research partnership based at Princeton University and supported by BP and Ford, has examined what it would take to stabilize atmospheric CO_2 at 500 ppm compared with the 2010 level of approximately 388 ppm and the pre-industrial level of approximately 270–280 ppm. Researchers broadly identified a set of high-level stabilization strategies they call "wedges."[2] Each wedge represents the implementation of a strategy that could cut global annual carbon emissions by 1 billion metric tons by 2054.[3] The wedges concept is a powerful tool to demonstrate the scale of the climate stabilization challenge, the need for an approach that includes many different economic sectors (power, transportation, agriculture, industry), and the options that are available.



To explore which vehicle and fuel technologies might be most cost-effective to stabilize CO_2 at 450–550 ppm, we have worked with colleagues at Chalmers University in Gothenburg, Sweden, to

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External Web Sites:

- Intergovernmental Panel on Climate Change
- Carbon Mitigation Initiative

include a detailed description of light-duty vehicles in a model of global energy use in 2010 to 2100. Nine technology cost cases were considered. We found that variation of vehicle technology costs over reasonable ranges led to large differences in the vehicle technologies utilized to meet future CO_2 stabilization targets. We concluded that given the large uncertainties in our current knowledge of future vehicle technology costs, it is too early to express any firm opinions about the future cost-effectiveness or optimality of different future fuel and vehicle powertrain technology combinations.[4] This conclusion is reflected in the diversity of fuel and vehicle technologies included in our sustainability strategy.

1. *Climate Change 2007: The Physical Science Basis Summary for Policymakers*, Intergovernmental Panel on Climate Change, February 2007.
2. cmi.princeton.edu/wedges/
3. S. Pacala, R. Socolow, "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies," *Science*, 305, 968 (2004).
4. M. Grahn, M. I. Williander, J. E. Anderson, S. A. Mueller, T. J. Wallington, "Fuel and Vehicle Technology Choices for Passenger Vehicles in Achieving Stringent CO_2 Targets: Connections between Transportation and Other Energy Sectors," *Environ. Sci. Technol.*, 43, 3365 (2009).

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Climate Change Risks and Opportunities

Over the past decade, concerns about climate change, the price of fuel and energy security – along with the global recession – have dramatically reshaped the automotive business. This creates substantial risks for automakers but also opportunities to grow and expand. Below we discuss the general trends driving change in our markets and take a closer look at several key markets. We also discuss the physical and supply chain risks to our business posed by climate change.

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Delivering More Fuel-Efficient Vehicles

Climate Change Policy and Partnerships

Our Markets

During 2009, the global economic recession took its toll on the market for new automobiles, with sales down significantly in the United States, and South America. In Europe, passenger car sales held steady, spurred by government incentives, while commercial vehicle sales declined. In China, sales continued to grow. By the end of the year, China had surpassed the United States as the world's largest market for new automobiles. Other factors influencing our markets included the following:

- The policy landscape is becoming more complex and interconnected with other market forces. The Public Policy section of this report discusses regulatory developments in detail, but in brief, all of our major markets are increasingly shaped by government actions to regulate fuel economy and CO_2 emissions and provide incentives to shift consumer and business behavior. Many governments are also actively involved in promoting research and development into new vehicle and battery technologies.

- Although the cost of gasoline and diesel fuels moderated during 2009, concern about the potential for rising fuel prices and price volatility continues to drive a long-term trend toward smaller and more fuel-efficient vehicles.

- In many markets, governments and consumers are seeking to rely as much as possible on domestic sources of transportation fuel and reduce imports of petroleum products.

- Investors are showing greater concern about climate change as a material risk for many companies. A variety of voluntary public registries and information services (like the Carbon Disclosure Project) are providing information on greenhouse gas emissions to investors, while in some countries companies are required to disclose information about their climate risks. Most recently, the U.S. Securities and Exchange Commission (SEC) issued guidance to help publicly traded companies assess whether climate-related impacts on their businesses will require disclosure to the SEC. Thus, providing climate-change-relevant information to investors and shaping our business strategy with climate change in mind are important elements of maintaining access to capital.

These market shifts are very significant to our Company. Everywhere we operate, the financial health of our Company depends on our ability to predict market shifts of all kinds and to be ready with the products and services our customers demand. Our actions to improve the fuel economy of our vehicles, along with their quality, performance and features, have helped us take advantage of these changes and gain market share in North America, Europe and South America. However, continued uncertainty about the GHG regulatory framework, particularly in the United States, and the possibility that fuel prices could decline mean that there is also a risk that consumer preferences will shift back toward less fuel-efficient vehicles.

Our product globalization strategy is designed to help us respond to changing markets and regional preferences. We are leveraging our best technology from around the world to create global platforms that offer superior fuel economy, safety, driving dynamics and customer features. We then tailor each global platform to national or regional preferences and requirements. New technology is also cutting the time required to bring new vehicles to market, which helps us respond more effectively to the ever-increasing pace of change in our markets.

Please see the Economy section for further discussion of our changing markets and how we are

responding to them, and the Our Strategy: Blueprint for Sustainability section for discussion of Ford's strategic response to the risks and opportunities posed by the climate change issue.

REGIONAL MARKET TRENDS

North America

New regulations (discussed in the Climate Change Policy and Partnerships section) and concerns about fuel prices, energy security and the impacts of climate change are encouraging the sales of more fuel-efficient vehicles. Between 2005 and 2009, the car share of the U.S. market increased from 45.4 percent to 52.5 percent, while truck sales declined from 54.6 percent to 47.5 percent of the market. Sales of small cars increased from 17.1 percent to 23.7 percent of all sales. Hybrid electric vehicles made up about 3 percent of the market in 2009.

Europe

In Europe, the long-term trend of high-priced fuel and more fuel-efficient vehicles has continued the market shift toward diesel-powered vehicles, which now make up more than half of all new vehicle sales. This trend is reinforced by sales incentives in some European countries designed to encourage new vehicle sales, with the aim of reducing carbon dioxide emissions from older, less-efficient vehicles. Some of these incentives are bound to upper limits of CO_2 emissions of 160 g/km and less, which has boosted sales of small cars. Other schemes are linked to regulatory emissions standards (e.g., Euro 4). In addition, tough new CO_2 emission regulations have come into effect, which will continue to drive fuel-economy improvements in new automobiles. Automakers, including Ford, have begun to introduce and announce plans for hybrid electric, battery electric and plug-in hybrid electric vehicles for the European market.

Asia

As auto sales slumped in North America during 2009, the Asian auto market continued to grow, and China surpassed the United States to become the largest single automobile market in the world. Rising incomes are fueling growth in all segments of the market.

The Chinese government is promoting hybrids and electrics and supporting research in those areas, based on an interest in growth balanced with a desire for energy security and a cleaner environment. The government currently provides limited incentives to fleet purchasers of "new energy vehicles" (mostly electric) under local government control through a pilot program in 13 cities. Both domestic and global automakers are considering the introduction of electric vehicles, and some hybrids are currently available.

South America

In Brazil, our largest market in South America, the use of biofuels is widespread as a result of national policy and consumer preference. All gasoline in Brazil is blended with 20 to 25 percent ethanol, and pure ethanol is also widely used. Most new vehicles offered are flexible fuel. While fuel economy and CO_2 emissions are not currently regulated in Brazil, a voluntary fuel-economy labeling program is already in place, along with a star ranking program for light vehicles that favors low-emission, low-CO_2, ethanol, flexible-fuel and hybrid vehicles. Consumers tend to choose vehicles with small engines, and 90 percent of new vehicles purchased have flexible-fuel capabilities. Several hybrid vehicles are currently offered or are planned for introduction to Brazil.

Physical Risks

Global climate change raises the potential for shifting patterns of extreme weather and other risks to our facilities. For insurance purposes, we assess the risks each of our facilities faces (with input from third-party engineers) at least annually. This risk assessment is updated based on new data and takes into account the risk of exposure to hurricanes, tornadoes, other storms, flooding and earthquakes. As a result of this process, we believe we have a good understanding of the physical risks faced by our facilities and how those risks are changing over time.

Extreme weather has the potential to disrupt the production of natural gas, a fuel necessary for the manufacture of vehicles. Supply disruptions raise market rates and jeopardize the consistency of vehicle production. To minimize the risk of production interruptions, Ford has established firm delivery contracts with natural gas suppliers and installed propane tank farms at key manufacturing facilities as a source of backup fuel. Higher utility rates have prompted Ford to revisit and implement energy-efficiency actions that previously did not meet our internal rate of return.

Climate change also has the potential to affect the availability and quality of water. We are examining this issue as part of the development of our water strategy.

Supply Chain Risks

Our suppliers, which are located in more than 60 countries, are subject to market, regulatory and physical risks as a result of GHG regulation and the impacts of climate change. These risks could affect their competitiveness or ability to operate, creating the potential for disruptions to the flow of supplies to Ford. For example, suppliers may be subject to reporting requirements, fees or taxes, depending on where their operations are located. See the Progress and Performance section for a discussion of actions we are taking to better understand the climate risks of our suppliers and promote a competitive supply chain.

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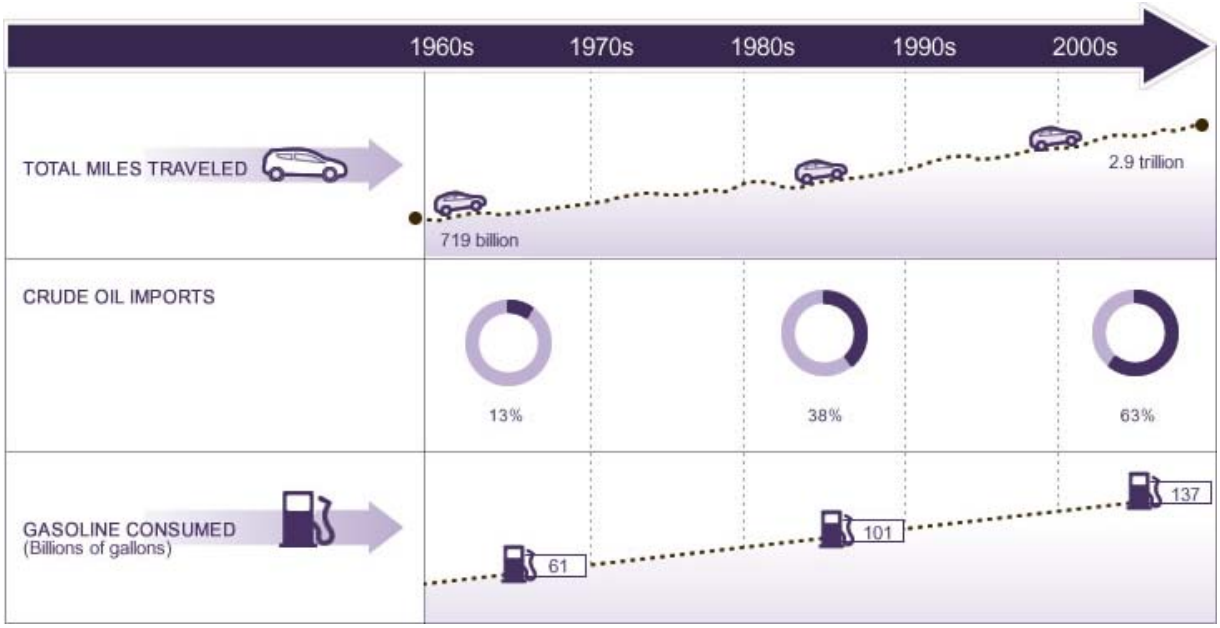
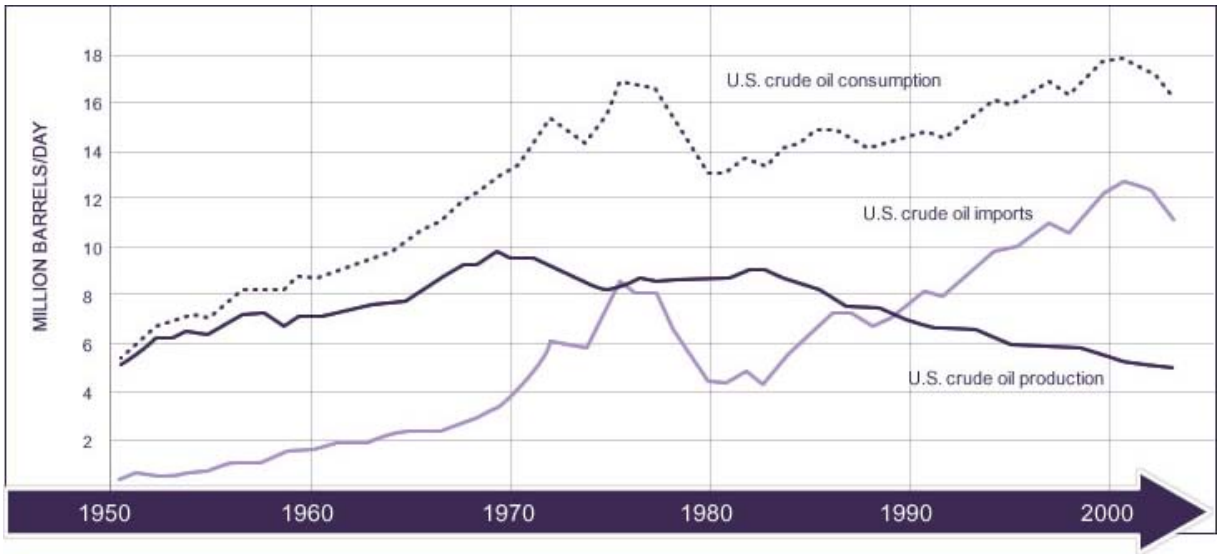
U.S. Energy Security

The following charts illustrate the primary issue underlying concerns about U.S. energy security – crude oil consumption is increasing, while domestic energy production is decreasing. Therefore, the United States is increasingly reliant on imported crude oil. The first chart shows the increase in the number of miles U.S. drivers are traveling, the increasing consumption of gasoline, and the increasing percentage of fuel consumption being filled by imported crude oil. The second chart shows the increase in U.S. demand for crude oil and the simultaneous decrease in U.S. crude oil production.



U.S. Crude Oil Consumption, Imports and Production



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Our Strategy: Blueprint for Sustainability

To respond to the risks and opportunities posed by the climate change issue, our long-term strategy is to contribute to climate stabilization by:

- Continuously reducing the greenhouse gas emissions and energy usage of our operations.
- Developing the flexibility and capability to market more lower-GHG-emission products, in line with evolving market conditions.
- Working with industry partners, energy companies, consumer groups and policy makers to establish an effective and predictable market, policy and technological framework for reducing GHG emissions.

We have set a goal to reduce our U.S. and EU new-vehicle CO_2 emissions by 30 percent by the year 2020, compared to a 2006 model year baseline. Our blueprint for sustainability, which spells out our technology and product strategy to meet this goal, is based on modeling of vehicle and fuel contributions to emission reductions and an analysis of market and regulatory trends (see figure below). The blueprint encompasses a series of commitments the Company has made, or participated in, to reduce the greenhouse gas emissions from our products and operations.

Product Sustainability Process

In addition, we have conducted dialogues with stakeholders, exploring sustainable mobility projects to demonstrate potential approaches to urban mobility that would integrate private and public transportation by multiple modes, enabled by information technology. Please see the Mobility section for more details.

The blueprint's product strategy – called the Sustainable Technologies and Alternative Fuels Plan – details the near-, mid- and long-term steps we are taking to develop and deploy vehicle and fuel technologies. The blueprint is supported by our sustainable mobility governance, which establishes structures and accountability for implementing the strategy.

We believe this strategy is already showing results by positioning our Company to take advantage of opportunities created by shifts in markets. Our commitment to outstanding fuel economy aligns well with consumer interest in fuel-sipping vehicles. During 2009, for example, our U.S. market share grew for the first time since 1995, driven in part by the popularity of several of our vehicles (including the Ford Fusion and Mercury Milan) that achieve best-in-class fuel economy.

For the longer term, we are preparing to provide regionally appropriate approaches based on global platforms to advanced vehicle technologies, including electric vehicles, biofuel vehicles and hydrogen fuel cell vehicles.

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Sustainable Mobility Governance

To plan and implement our blueprint for sustainability, we have established sustainability-related governance systems, which include a strong focus on fuel economy and CO_2 improvements. The strategic direction is provided by a senior executive committee, made up of vice president and executive stakeholders, who guide the development of the vision, policy and business goals. (See Governance and Management Structures.)

Related executive planning teams are responsible for developing detailed and specific policy, product and technical analyses to meet objectives. These teams base their plans on scientific data and promote actions that will help achieve the Company's environmental ambitions, recognizing the need to use a holistic approach to effectively protect the environment. Metrics have been established and are reviewed regularly to ensure satisfactory progress. We have also developed strategic principles to guide our approach.

During 2009, several climate-change-related issues were reviewed at Ford's top-level Special Attention Review and Automotive Strategy meetings, including climate policy and cap-and-trade systems, electrification (including electric vehicle infrastructure), biofuels and global alternative fuels.

During 2009, the senior executive committee reviewed progress on key elements of the climate change strategy.

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Climate Change Strategic Principles

Our approach to GHG stabilization is aligned around the following key strategic principles:

1. Technical, economic and policy approaches to climate change need to recognize that all CO_2 molecules (or GHG equivalents) produced by human activities make the same contribution to the atmosphere's concentration of greenhouse gases. Once those molecules reach the atmosphere, they contribute to the greenhouse effect, regardless of the source. However, the cost of reducing those emissions varies significantly depending on their source, and we should attempt to achieve the most economically efficient solutions possible.
2. The transportation sector represents a closely interdependent system, characterized by the equation: "Vehicle + Fuel + Driver = GHG emissions." Each link in this chain depends on the others. For example, vehicle manufacturers can bring to market flexible-fuel vehicles, but successfully reducing GHG emissions with them will depend on fuel companies providing renewable biofuels, as well as consumer demand for the vehicles and fuels.
3. Future developments in technologies, ever-changing markets, consumer demand and political uncertainties require flexible solutions. The business strategies that Ford implements, and the public policies that we encourage, must have the flexibility to succeed in a range of potential scenarios.
4. Early affordable steps to reduce GHG emissions from our products and processes may delay the need for drastic and costly reductions later. Lack of agreement on long-term solutions cannot be used as an excuse to avoid near-term actions.

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A Look Inside the "Black Box"

In 2004, Ford's internal Climate Change Task Force faced a dilemma. After an extensive study, it was clear to the cross-functional group of senior executives that several forces were converging to fundamentally change vehicle markets, especially in North America and Europe. Current and anticipated climate change and fuel economy regulation, rising fuel prices and growing consumer awareness of the climate change issue all pointed to a shift in sales toward cars rather than trucks and toward smaller and more fuel-efficient vehicles. We needed to rapidly reorient our product offerings.

But what should drive new product goals? As a practical matter, the Company needed to be able to meet new regulatory mandates. Beyond that imperative, we had taken to heart our responsibility to contribute to meeting the challenge of climate change. So, Task Force members decided to base product planning on the goal of climate stabilization, and they asked Ford's in-house scientists to devise a way to test scenarios for meeting that goal.

In 2005, Ford's scientists began development of a CO_2 model. To create it, they modified the Sustainable Mobility Project model (developed by the International Energy Agency) and combined it with global carbon dioxide (CO_2) emission-reduction pathways for varying levels of atmospheric CO_2 stabilization (as described by the Model for the Assessment of Greenhouse-gas Induced Climate Change, developed by the National Center for Atmospheric Research). The scientists then calculated the CO_2 emission reductions required of new light-duty vehicles up to the year 2050 for a range of CO_2 stabilization levels and different regions of the world, using a simplifying assumption that the rates of CO_2 emission reduction should be the same across all sectors.

At the lower CO_2 stabilization levels, the required emission reductions are extremely challenging and cannot be accomplished using vehicle technology alone. Joint investigations with BP provided insight into how the best new vehicle technologies and low-carbon alternative fuels can jointly and realistically fulfill the low-CO_2 emission requirements. Ford's CO_2 model and other modeling tools were combined to explore assumption sensitivities around vehicle technologies, baseline fuels, biofuels, costs and consumer response. The CO_2 model is not intended to provide "the answer," but rather a range of possible vehicle and fuel solutions that contribute to a pathway to CO_2 reductions, and eventually, climate stabilization. Our blueprint for sustainability – and the technology and product actions it spells out – are based on options developed through this modeling exercise.

The model and its results have been a centerpiece of discussions with a variety of stakeholders. Below are some of the questions that have been raised through these discussions, and answers to them.

How does the model account for emissions growth or reduction in developing countries?

We recognize that developing countries generally have relatively low per-capita energy use but high rates of emissions growth, reflecting growing economies. The CO_2 model uses a science-based approach that allows for equitable growth in developing countries, to derive CO_2 reduction targets for light-duty vehicles consistent with 450 parts per million (ppm) to 550 ppm CO_2 stabilization pathways.

Since fuel use is the dominant cause of CO_2 emissions, how does the model account for projected changes in the carbon footprint of automotive fuels?

Ford has studied multiple scenarios in which the auto industry and the energy industry work together to reduce overall well-to-wheels CO_2 emissions from the light-duty transportation sector. These joint strategy scenarios (see figure below) allow us to develop a least-cost vehicle technology roadmap. For the carbon footprint of fuels, we rely on the well-to-tank CO_2 emissions

for different alternative fuels estimated by different region-based models, including the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model for North America, and the EUCAR/JRC/CONCAWE analysis for Europe.

Are you continuing to test alternative scenarios?

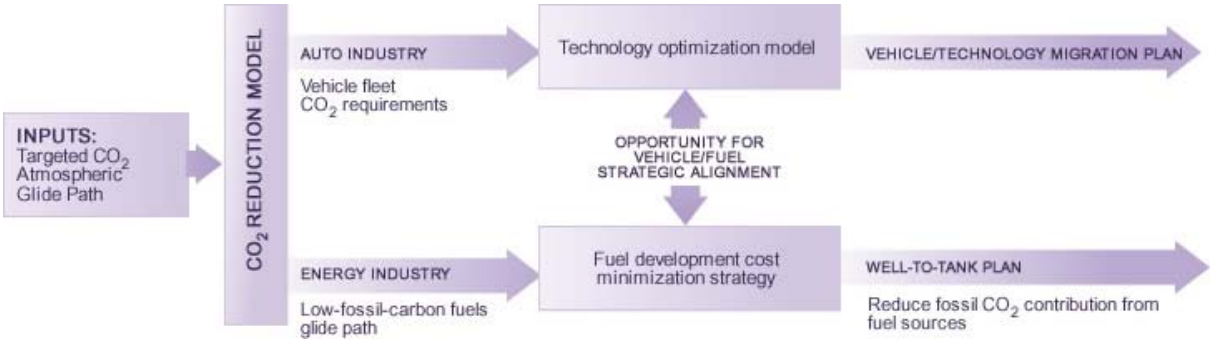
In the long run, the roles of consumers, governments and fuel availability will be pivotal in dictating actual CO_2 emission reductions, and Ford continues to take them into consideration in fine-tuning a truly viable and sustainable CO_2 stabilization pathway.

How does the model consider the cost of technologies and alternative fuels?

The costs of technologies and alternative fuels that are not yet in the market are separately estimated. These estimates obviously have large uncertainties, but are useful for planning purposes. Ford has other models that look into potential market response to fuel/vehicle cost variations.

In a separate study, Ford has developed a model that looks into minimal-cost scenarios across different sectors and explores assumption sensitivities around vehicle technologies, fuel technologies, connections between the different energy sectors, and biofuels. The model provides information on the combinations of options that will yield the required emissions reductions at an affordable cost to consumers. We have used this model to develop scenarios to assess the global lowest-cost vehicle and fuel technology solutions consistent with CO_2 stabilization.

Ford's Sustainability Framework for CO_2 and Technology Migration Development



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Ford's Sustainable Technologies and Alternative Fuels Plan

IN THIS SECTION

Improving Fuel Economy

This section outlines our plans for improving the fuel economy of traditional gas and diesel engines. These actions include implementing advanced engine and powertrain technologies, improving aerodynamics and reducing weight.

Read more

Migration to Alternative Fuels and Powertrains

Our plans for migrating to alternative fuels and powertrains include implementing vehicles that run on renewable biofuels, increasing advanced clean diesel technologies, increasing our hybrid vehicle applications and introducing battery electric vehicles and plug-in hybrids. We are also working to advance hydrogen internal combustion engine and hydrogen fuel cell vehicle technologies.

Read more

Ford's Green Partnerships with the Federal and State Governments

Ford is working with federal and state governments to advance the development and commercial implementation of technologies that improve fuel efficiency and increase the use of alternative fuels and powertrains.

Read more

In the very early years of our industry, automotive engineers experimented with a variety of methods for powering vehicles, including electricity and biofuels. The internal combustion engine using petroleum-based gas and diesel rose to the top fairly quickly and has been the standard vehicle power source for the past hundred years or so. Reminiscent of those early years in the industry, we are now in a period of intense experimentation and adoption of new vehicle technologies and fuels. This time, however, there may be no single winner in the race for the vehicle of the future.

Ford is taking a portfolio approach to developing sustainable technologies and alternative fuel options. Our goals are to diversify the fuels our vehicles can use and to improve their energy efficiency and long-term sustainability. Traditional gasoline- and diesel-powered vehicles based on internal combustion engines will continue to be part of the mix for quite some time. That is why we are working to improve the fuel efficiency of the engines and transmissions of our current vehicles, along with every vehicle subsystem. In fact, in the next two years, we will be implementing 30 new powertrains that will improve the fuel efficiency of internal combustion engines and transmissions, as well as continuing to improve vehicle aerodynamics and reduce weight.

In addition, a variety of alternative powertrain technologies and alternative fuels are currently under

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development. At this point, we do not see a single clear winner. Rather, we believe a wide range of options will be needed to serve different kinds of consumers and different markets, depending on the regional availability of fuels and other factors. For example, biofuels may make sense for consumers in the Midwestern United States and much of South America – where biofuels are widely available – while battery electric vehicles and plug-in hybrids may make sense for urban drivers across the globe who have access to recharging opportunities. Other alternative fuels like compressed natural gas (CNG) and propane or liquid petroleum gas (LPG) may be most appropriate for fleet users who have access to central refueling infrastructure and who have well-defined driving patterns. As refueling infrastructure for these alternative fuels becomes more widespread, these vehicles will be attractive to more and more of our customers.

To prepare for this more complex future for vehicle technologies and fuels, we are developing a range of energy-efficient, alternative fuel and advanced powertrain technologies.

Most importantly, we are developing global vehicle platforms that are compatible with a wide range of fuels and powertrain technologies. This will allow us to offer a portfolio of options to our customers, target options to regions where they make the most sense, and evolve our vehicles as technologies and markets develop. Global platforms that have "plug-and-play" compatibility with a wide range of technologies will also allow us to make the range of fuel and powertrain options available more affordably.

For example, at present we produce 14 flexible-fuel vehicle models across our global markets that can run on either regular gas or E85 (a blend of 85 percent ethanol and 15 percent gasoline). Though biofuels are not available in every market, they are widely available in the Midwestern United States and throughout South America, so it makes sense for us to provide this option to customers who can take advantage of it. In addition, biofuel availability is expected to increase in Europe, as the EU's renewable energy directive mandates that 10 percent of energy in the transportation sector come from renewable fuels by 2020. Ford's flexible-fuel vehicles, which are provided at no or low additional cost, allow consumers to choose fuels based on availability and price.

We are also making CNG- and LPG-ready engines available on select vehicle models, enabling their conversion to run on one of those fuels. And, we are working with qualified vehicle modifiers to ensure that conversion to those fuels meets our quality, reliability and durability requirements. For example, we recently announced that the new Transit Connect, which went on sale in the United States in early 2010, is available with a CNG/LPG conversion-ready engine package. Our F-Series trucks and E-Series vans are also available with a propane-ready engine. In Europe, we recently introduced a Ford Mondeo that can run on regular gasoline, E85 ethanol or LPG.

CNG and LPG are good options for fleet customers, such as taxi companies and delivery services, that use a central refueling system. In addition, CNG and LPG are widely available as vehicle fuels throughout South America and Europe. We are delivering CNG/LPG-ready engines to provide another lower-carbon option to those customers for whom this option makes sense.

We are also developing a range of electrification technologies, including hybrid electric vehicles, battery electric vehicles and plug-in hybrid vehicles. Battery electric and plug-in hybrid vehicles may initially make the most sense for urban drivers and fleet users who have daily commutes under 40 miles. However, as battery and recharging options continue to advance, we expect these vehicles to work for a wider range of our customers. In the longer term, we are working on vehicles that can run on hydrogen fuel cells, as these fuels become available and commercially viable.

This section describes our current actions and future plans to develop a wide range of energy-efficient technologies, alternative fuels and advanced powertrain technologies that will give our customers near-, mid- and longer-term options for more sustainable vehicles.

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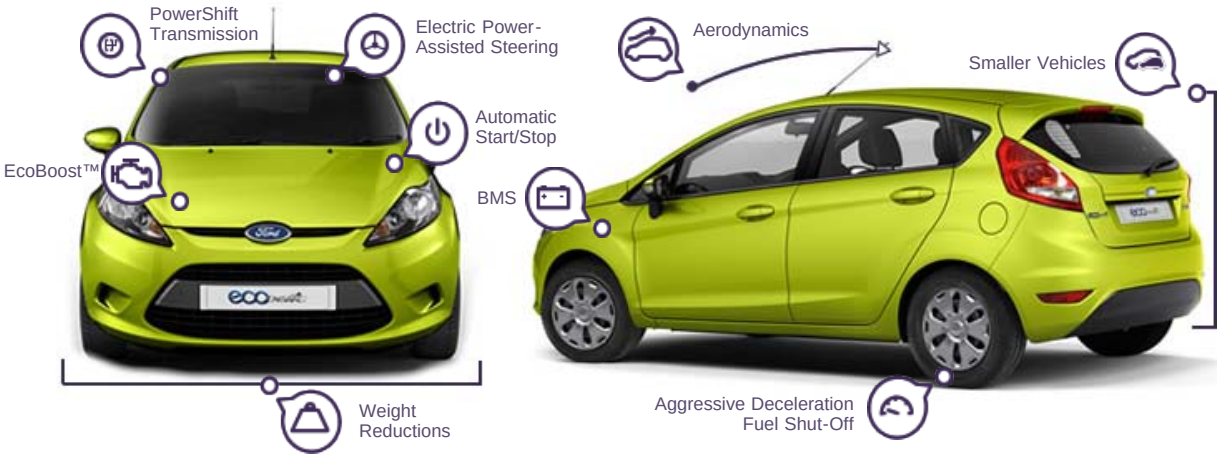
Improving Fuel Economy



This section outlines our plans for improving the fuel economy of traditional gas and diesel engines. These actions include implementing advanced engine and transmission technologies, weight reductions and aerodynamic improvements, as well as increasing the efficiency of vehicle sub-systems.

For more information about each of our fuel efficiency technologies please click on the icons in the graphic above.

EcoBoost™

2007	2011	2020	2030
NEAR TERM	MID TERM	LONG TERM	
Begin migration to advanced technology	Full implementation of known technology	Continue to leverage advanced fuel-efficiency technologies and increase deployment of alternative powertrains and energy sources	
Significant number of vehicles with EcoBoost™ engines	EcoBoost engines available in nearly all vehicles	Increase percentage of internal combustion dependent on renewable fuels	

The centerpiece of our near-term fuel-economy improvement efforts is the EcoBoost engine, which uses turbocharging, direct injection and reduced displacement to deliver significant fuel-efficiency gains without sacrificing engine power or performance. EcoBoost engines improve vehicle fuel economy 10–20 percent and reduce CO_2 emissions up to 15 percent compared to larger-displacement engines.

EcoBoost is also more affordable than many other fuel-efficiency technologies. Due to its affordability relative to competing technologies, and its compatibility with most of the gas-powered vehicles we produce, we will be able to spread EcoBoost's fuel-economy benefits throughout our product lineup and to more of our customers more quickly. Our rapid deployment of EcoBoost in high volumes across a wide array of our vehicle nameplates will also help us make a dramatic step forward in CO_2 emission reductions.

EcoBoost was introduced first in North America as a 3.5-liter V6 engine on the 2010 Lincoln MKS, Lincoln MKT, Ford Taurus SHO and Ford Flex. This engine provides similar performance to a normally aspirated V8 engine, but with the fuel economy of a V6 engine. Thanks largely to EcoBoost technology, the V6, Taurus SHO and Lincoln MKT deliver unsurpassed fuel economy in their respective segments.

EcoBoost has already been a great success in North America. For example:

- EcoBoost is influencing many consumers to consider and buy Ford vehicles who were not previously Ford customers. EcoBoost is proving especially attractive to 35- to 55-year-old males, an important demographic segment that has been less likely to purchase Ford vehicles in past years.
- EcoBoost is also increasing Ford's "conquest rate" – i.e., the number of customers who are switching from other manufacturers to buy Ford vehicles. The Taurus SHO with EcoBoost has the second-highest conquest rate in its segment, and the Flex EcoBoost had a 75 percent conquest rate during its first year on sale.

In addition to these commercial successes, the EcoBoost engine has received multiple awards, including *Popular Mechanics* magazine's Breakthrough award and a "10 Best Engines" award from Ward's Automotive.

We are continuing to expand the application of EcoBoost technology to more engine types and vehicles. For example:

- We have announced plans to make the 3.5-liter V6 EcoBoost available on the Ford F-150. Later this year, Ford will introduce the new 2.0-liter I-4 EcoBoost in the new Edge and the all-new Explorer. In both vehicles, the 2.0-liter I-4 EcoBoost is expected to deliver best-in-class fuel economy, but with the performance feel of a traditional V6. The Explorer will feature fuel economy that is at least 25 percent better than the current model.

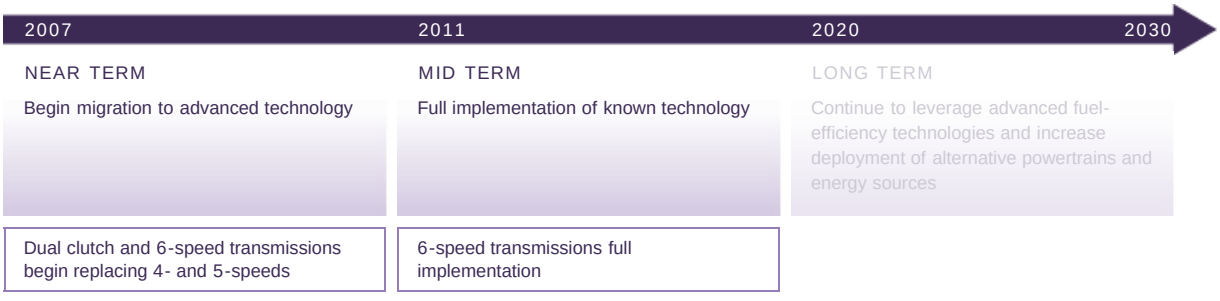
In 2010 we also began taking the EcoBoost engine global:

- In European markets, we have introduced a 2.0-liter I-4 EcoBoost engine on the Ford Galaxy, S-MAX and Mondeo and a 1.6-liter I-4 EcoBoost engine on the Ford C-MAX. We have also announced plans to use the 1.6-liter I-4 EcoBoost engine in the all-new Ford Focus, which will launch in Europe in 2010.
- In 2010, we will also launch the EcoBoost engine in China on the Ford Mondeo.
- In 2011, we will introduce a 2.0-liter I-4 EcoBoost engine to the Australian market on the Ford Falcon.
- Ultimately, we plan to launch an advanced 1.0-liter, three-cylinder EcoBoost engine for use in Europe and other global markets.

These EcoBoost engines illustrate Ford's plans to use smaller, power-boosted engines to deliver improved fuel economy and performance throughout our vehicle lineup.

By 2013, Ford plans to offer EcoBoost engines on 80 percent of our global nameplates, with an annual volume of vehicles with EcoBoost at 1.5 million globally.

PowerShift Transmission



To further improve the fuel economy of our vehicles, we are implementing a dual-clutch transmission system. This technology, called PowerShift, combines manual and automatic transmission technologies to deliver the fuel efficiency of a manual with the driving ease of an automatic. PowerShift uses six speeds instead of the four or five on most automatics, which further increases fuel efficiency. PowerShift technology increases fuel efficiency by up to 9 percent compared to traditional automatic transmissions, depending on the application.

- A "wet clutch" version of this technology has already been implemented in Europe on the Ford Focus, C-MAX, Kuga, S-MAX, Galaxy and Mondeo in combination with a 2.0-liter Duratorq

TDCi diesel and is the standard transmission for the new 2.0-liter EcoBoost engine on the Ford Mondeo, S-MAX and Galaxy.

- A "dry clutch" version was introduced globally in April 2010 on the all-new Ford Fiesta; it will also be introduced globally on the new Ford Focus in November 2010. The dry clutch version gets even better gas mileage. Unlike wet clutch systems, the six-speed dry PowerShift transmission does not use an oil pump, making the system more efficient with the same weight as a traditional four-speed automatic transmission.

We are also introducing regular six-speed transmissions to replace less-efficient four- and five-speed transmissions in a range of vehicles. Six-speed transmissions improve fuel economy by 4 to 6 percent compared to typical four- and five-speed gearboxes; they also provide better acceleration, smoother shifting and a quieter driving experience. By the end of 2012, 98 percent of Ford's North American transmissions will be advanced six-speed gearboxes. And by 2013, we plan to offer advanced six-speed transmissions – both Powershift and regular six-speed technology – on 100 percent of our new, non-hybrid vehicles in Europe and North America and many new vehicles in other regions.

Weight Reductions

2007	2011	2020	2030
NEAR TERM	MID TERM	LONG TERM	
Begin migration to advanced technology	Full implementation of known technology	Continue to leverage advanced fuel-efficiency technologies and increase deployment of alternative powertrains and energy sources	
Increased unibody applications	Weight reduction of 250–750 lbs		

We are also working to improve fuel economy by decreasing the weight of our vehicles by using unibody vehicle designs, lighter-weight components and lighter-weight materials.

- We are increasing our use of unibody vehicle designs, which reduce weight by eliminating the need for the body-on-frame design used in truck-based products. Unibody-based crossover vehicles provide many of the benefits of truck-based SUVs, such as roominess, all-wheel drive and higher stance, with significantly reduced total vehicle weight. The new 2010 Ford Explorer will use a lightweight unibody design, as do the current Ford Edge and Lincoln MKX crossovers.

- We are increasing the use of lighter-weight components. For example, the EcoBoost engine technology allows us to use a smaller, lighter engine system while delivering more power and better fuel economy. Similarly, the dual-clutch PowerShift system weighs up to 30 pounds less than the four-speed automatic transmission it is replacing.

- We are using lighter-weight materials, such as advanced high-strength steel; aluminum; magnesium; natural fibers; and nano-based materials. These "lightweighting" efforts can reduce the weight of our vehicles by 250 to 750 pounds, without compromising vehicle size, safety, performance or customer-desired features. The 2010 Lincoln MKT crossover, for example, has an advanced lightweight magnesium and aluminum liftgate. Also, we use an aluminum hood on the Ford F-150 and high-strength, lighter-weight steels in more than 50 percent of the F-150 cab. We are also expanding our use of aluminum engine parts and all-aluminum engines. For example, the 2011 Mustang will have an aluminum engine. This lighter-weight engine, combined with other fuel-efficiency improvements, is expected to result in class-leading fuel economy at 19 mpg city/30 highway with six-speed automatic transmission, a 25 percent improvement over the 2010 model.

Please see the Environment section for further information on materials-based weight reductions.

Aerodynamics

2007	2011	2020	2030
NEAR TERM	MID TERM	LONG TERM	
Begin migration to advanced technology	Full implementation of known technology	Continue to leverage advanced fuel-efficiency technologies and increase deployment of alternative powertrains and energy sources	
Aerodynamic improvements	Additional aerodynamic improvements		

We are improving vehicle aerodynamics to improve the fuel economy of our global product lineup. Using a systems engineering approach, we combine aerodynamic improvements and other fuel-economy technologies to ensure that we maximize the fuel efficiency of every vehicle we develop. Systems engineering uses interdisciplinary and collaborative design and development processes to ensure that engineers who are developing adjacent areas of the vehicle work together to maximize vehicle attributes like fuel economy. During the development process, we use advanced computer simulations and wind tunnel testing to deliver vehicle designs that deliver up to 5 percent better fuel economy. In addition, we are developing simulation systems that will allow us to replicate on-the-road driving conditions during the virtual design phase of vehicle development, to further improve the real-world benefits of aerodynamic improvements.

Using these approaches, we made significant improvements to the aerodynamics of our 2009 model year vehicles. For example:

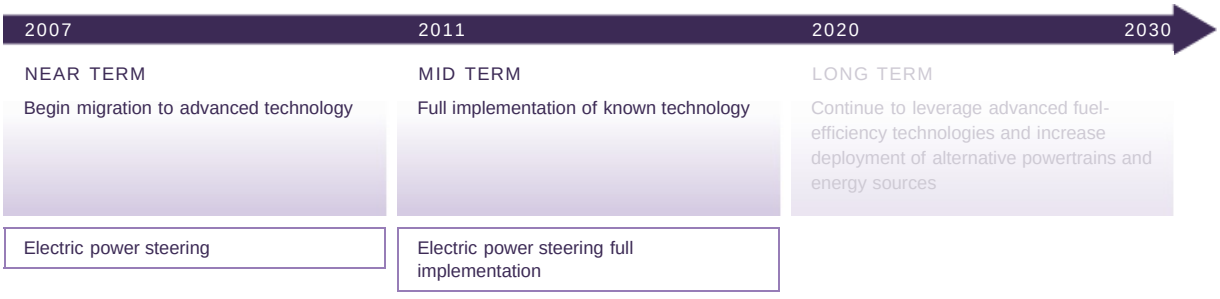
- The 2009 Ford Flex is the most aerodynamic vehicle in its class.
- The 2009 Ford Escape has 6 percent lower aerodynamic drag than previous models.
- The 2009 F-150 has an average of 8 percent better fuel efficiency than previous models due in part to aerodynamic improvements.
- In Europe, we improved the fuel efficiency of the 2009 Ford Focus and Fiesta ECOnetic models through aerodynamic improvements such as lowering the vehicle, adding an aerodynamics kit and using low-rolling-resistance tires.

In 2010 we are continuing to build on these achievements in aerodynamics. In North America, we improved the fuel efficiency of Ford's midsize family sedans, including the 2010 Ford Fusion, Mercury Milan and Lincoln MKZ, by reducing aerodynamic drag by 5 percent. We accomplished this by further streamlining the exterior design and lowering the vehicles' ride height. These aerodynamic improvements were a key enabler for the Ford Fusion Hybrid's 41 mpg rating, which makes it the most fuel-efficient midsize sedan available in North America.[1] We have also reduced the aerodynamic drag of the 2010 Mustang by 4 percent for the V6 model and 7 percent for the V8 model. These aerodynamic improvements resulted in a 0.5 mpg and 1 mpg improvement in fuel economy at 70 mph cruising speeds, for the V6 and V8 models respectively.

For 2011, we have plans to continue to improve vehicle aerodynamics. For example, we are developing an active grille shutter technology that reduces aerodynamic drag by up to 6 percent, thereby increasing fuel economy and reducing CO_2 emissions. This technology will be implemented first on our European vehicles and will be migrated to North American vehicles in future model years.

1. Midsize sedan segment based on the R.L. Polk segment definition.

Electric Power-Assisted Steering



We are phasing in electric power-assisted steering (EPAS) technology, which typically will improve fuel economy by 0.09 to 0.17 gallons per 100 miles and will decrease CO_2 emissions by up to 3.5 percent over traditional hydraulic systems, depending on the vehicle and powertrain application. For example, on the 1.4-liter Duratorq Diesel Fiesta, which is available in Europe, EPAS provides a 3 to 4 percent improvement in fuel efficiency compared with a hydraulic-based power steering system. By combining EPAS with aerodynamic improvements, we improved the gas mileage of this vehicle by approximately 8 percent compared to the previous model year. In addition, EPAS supports other fuel-saving activities we plan to introduce. For example, "automatic start/stop" technology can be introduced without degrading steering assist to the driver. (For details on this technology see "Automatic Start/Stop.")

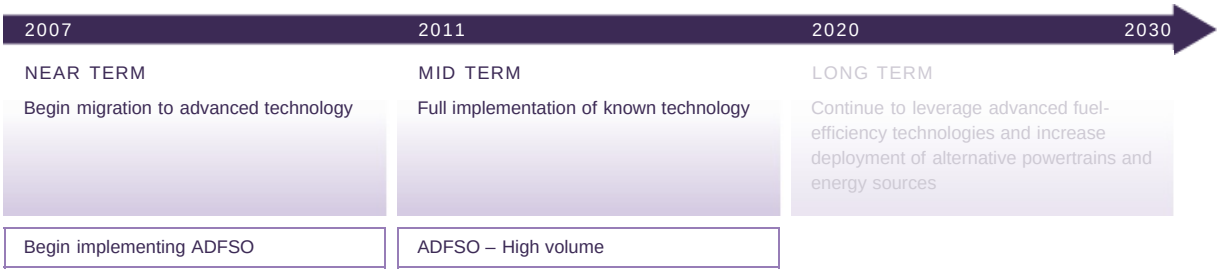
We began implementing EPAS in 2008 in North America on the Ford Escape and Mercury Mariner gasoline and hybrid vehicles. In Europe, we introduced EPAS on the new Ford Fiesta, which launched in the summer of 2008, and will be launched in the United States in 2010. In 2009, we

added EPAS to the North American Ford Fusion, Mercury Milan, Ford Flex and Lincoln MKS with the EcoBoost engine, and in Europe we implemented EPAS on the 2009 Ka. Several additional launches of this technology are planned for 2010, including on the new Ford Mustang and Ford Explorer in North America and the new C-MAX and Focus in Europe. Ultimately, we will introduce EPAS into all of our passenger cars and light-duty vehicles.

Battery Management Systems (BMS)

Electrical systems are another area in which we are making progress. By reducing vehicle electricity loads and increasing the efficiency of vehicle electrical systems, we can improve fuel efficiency. Our Battery Management Systems (BMS), for example, control the power supply system (in particular the alternator) to maximize the overall efficiency of the electrical system and reduce its negative impacts on fuel economy. This is accomplished by maximizing electricity generation during the most fuel-efficient situations, such as during vehicle deceleration. In less fuel-efficient situations, the alternator's electricity generation is minimized to meet in-vehicle electrical requirements (e.g., for entertainment systems). BMS has already been launched in Europe and will be incorporated in the United States beginning with the 2011 Edge. We have also introduced more-efficient alternators, which improve fuel economy.

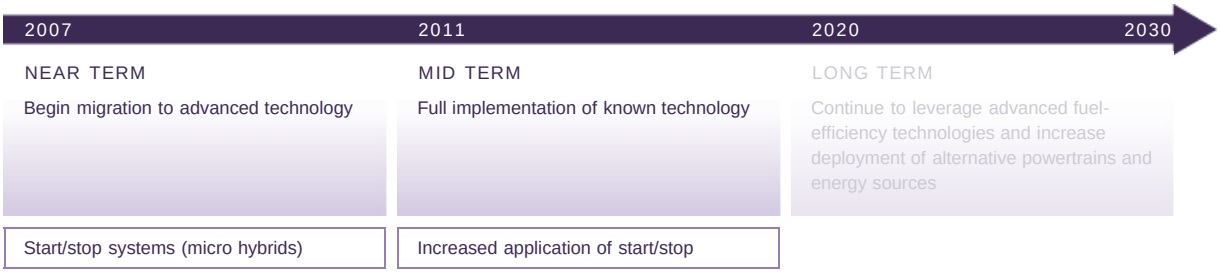
Aggressive Deceleration Fuel Shut-Off



We are deploying Aggressive Deceleration Fuel Shut-Off (ADFSO) technology to improve fuel efficiency. ADFSO allows fuel supply to the engine to be shut off during vehicle deceleration and then automatically restarted when needed for acceleration or when the vehicle's speed approaches zero. This new system builds on the Deceleration Fuel Shut-Off technology available in our existing vehicles by extending the fuel shut-off feature to lower speeds and more types of common driving conditions, without compromising driving performance or non-CO_2 emissions reductions.

This improved fuel shut-off will increase fuel economy by an average of 1 percent. An additional benefit of the ADFSO technology is increased deceleration rates, which should extend brake life and improve speed control on undulating roads. This technology was implemented in mid-2008 on the new Ford Flex and the Lincoln MKS and in late 2008 on the 2009 model year Ford F-150, Ford Expedition and Lincoln Navigator regular and extra-long models, as well as the Ford Escape and Mercury Mariner. In the next two to three years we plan to implement this technology on as many vehicles as possible, beginning with front-wheel-drive, six-speed-transmission vehicles.

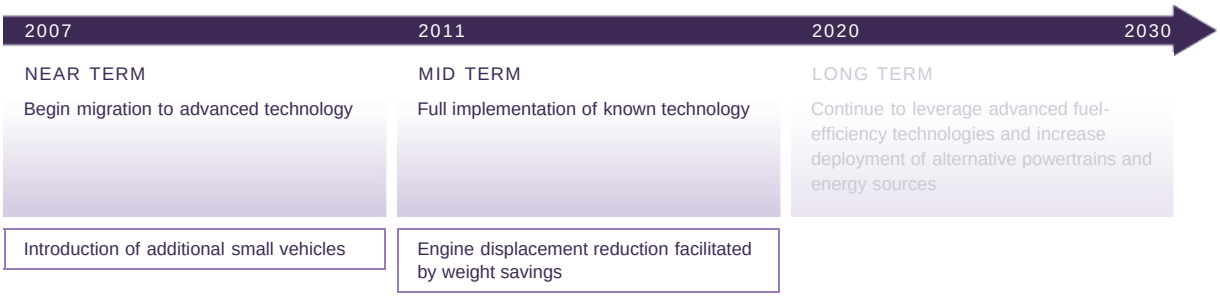
Automatic Start/Stop



We have developed a "start/stop" technology that shuts down the engine when the vehicle is stopped and automatically restarts it before the accelerator pedal is pressed to resume driving. This technology maintains the same vehicle functionality as a vehicle without the technology, but it improves city driving fuel economy by up to 6 percent.

Start/stop technology includes sensors to monitor functions such as cabin temperature, power supply state and steering input, so that vehicle functioning remains exactly the same to the driver as when the engine remains on continuously. If the system senses that a vehicle function has been reduced and will negatively impact the driver's experience, the engine will restart automatically. Start/stop technology is already being used in our hybrid vehicles and will eventually provide a cost-effective way to improve fuel efficiency on a large volume of non-hybrid vehicles. In the United States, we are planning to introduce the technology into non-hybrid, automatic transmission vehicles by the 2013 model year. In Europe, auto start/stop is already available on the Ford Focus ECOnetic. By 2016, 90 percent of our vehicle nameplates will be equipped with start/stop technology.

Smaller Vehicles



Smaller vehicles provide consumers with another way to get better fuel economy. We are planning to launch additional small cars to provide more fuel-efficient options. For example:

- We are introducing subcompact vehicles commonly referred to as "B-cars." These include the all-new Ford Fiesta, which was introduced in Europe in 2008 and in the Asia Pacific region in 2009, and will be available in the Americas in 2010.
- In addition, we brought the European Transit Connect small commercial van to North America. This vehicle fills an unmet need in the U.S. market by offering the large cargo space that small business owners need in a fuel-efficient, maneuverable, durable and flexible vehicle package.
- We have also announced plans to bring the next-generation European Focus to North America. This vehicle, which will be our new global "C-sized" or compact offering, was revealed at the 2010 North American International Auto Show. It includes the first in a series of powertrain technology developments we are introducing that will give our new global C-car segment offerings a combination of power, performance and unsurpassed fuel economy. Ford has disclosed that North American models of the new Focus will be equipped with a responsive, fuel-efficient combination of a 2.0-liter I-4 engine with Twin Independent Variable Camshaft Timing and direct injection plus a dual-clutch PowerShift transmission.

All of these smaller vehicles illustrate Ford's actions to provide consumers with a wider range of fuel-efficient options as well as our efforts to leverage the best of our global products to offer new choices and solutions to customers in all of our global regions.

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Migration to Alternative Fuels and Powertrains

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BEVs


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Renewable Biofueled Vehicles


H_2ICEs


FCVs

Our plans for migrating to alternative fuels and powertrains include implementing vehicles that run on renewable biofuels, increasing advanced clean diesel technologies, increasing our hybrid vehicle applications and introducing battery electric vehicles and plug-in hybrids. We are also working to advance hydrogen internal combustion engine and hydrogen fuel cell vehicle technologies.

For more information on our plans to advance alternative fuels and powertrain technologies, please click on the Ford vehicle for each fuel or technology above.

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Advanced Clean Diesel

Ford Fiesta ECOnetic

Ford offers the ECOnetic line of super-fuel-efficient, low-carbon-emission diesel vehicles in Europe. In the United States, we are introducing advanced clean diesel technologies on our diesel truck engines.

2007 | 2011 | 2020 | 2030

NEAR TERM

Begin migration to advanced technology

MID TERM

Full implementation of known technology

LONG TERM

Continue deploying advanced powertrains and alternative fuels and energy sources

Advanced Clean Diesel

Modern diesels offer some significant advantages over traditional gasoline engines. They consume 30 to 40 percent less fuel, and on a well-to-wheels basis they emit 15 to 30 percent less CO_2[1] . In addition, direct-injection diesel engines provide exceptional power and torque, resulting in better driving performance and towing capabilities.

In Europe, diesel-powered vehicles account for more than 50 percent of new vehicle sales and make up approximately 30 percent of the total vehicle fleet on the road. Ford continues to improve its strong lineup of fuel-efficient and clean diesel vehicles in Europe. For example, we continue to introduce ECOnetic versions of Ford models that deliver improved fuel economy and emissions. The ECOnetic lineup currently includes versions of the Ford Focus, Mondeo, Fiesta and Transit. Several of the ECOnetic models use diesel engines, which meet the stringent EU V emissions standards and achieve less than 100 g/km C02 emissions. For example, the Fiesta ECOnetic has fuel economy of 3.7 liters/100 km and emits just 98 g/km of CO_2. This vehicle is powered by a specially calibrated version of the 90 PowerShift 1.6-liter Duratorq TDCi, combined with a coated diesel particulate (soot) filter.

In North American markets, diesels all but disappeared in the light-duty passenger vehicle market years ago, for a variety of reasons. However, with the introduction of low-sulfur diesel fuels in 2007 and advances in clean diesel technology, there is new opportunity for the expanded use of diesel in North America. Ford engineers are developing next-generation diesel technologies that will maintain the fuel economy advantages of diesels while minimizing emissions to meet strict U.S. air

pollution standards. These technologies include diesel particulate filters and NOx-reduction catalysts, along with advanced combustion systems that will significantly reduce the particulate matter and NOx emissions associated with diesel engines. These advances will provide another route to more fuel-efficient and cleaner mobility.

In the North American medium-duty truck market there is a large demand for diesel products, with diesel engines accounting for more than 50 percent of sales. In response to this demand, Ford will introduce, for the 2011 model year, the next-generation F-Series Super Duty® truck with a new state-of-the-art diesel engine. The 6.7-liter PowerStroke® V8 diesel is cleaner and more powerful than previous engines. As a result of the new engine and a transmission upgrade, the 2011 Super Duty will deliver best-in-class fuel economy and towing capability.

This new diesel engine also meets the Environmental Protection Agency's strict 2010 heavy-duty truck emission regulations, which require 80 percent lower NOx emissions than the 2007 regulations. The new Super Duty uses a range of advanced technologies to meet these new regulations. First, the new 6.7-liter PowerStroke engine employs an innovative exhaust gas recirculation system to efficiently recycle the combustion gases. The system runs the engine with the least amount of oxygen possible, in order to reduce NOx emissions without degrading performance and fuel economy. In addition, the Super Duty uses a three-part "after-treatment" system, including:

- a diesel oxidation catalyst that converts and oxidizes hydrocarbons into water and carbon dioxide;
- a selective catalytic reduction that uses an ammonia and water solution to convert the NOx in the exhaust stream into water and inert nitrogen, which is present in the atmosphere and harmless; and
- a diesel particulate filter that traps any remaining soot and periodically burns it away when sensors detect the trap is full.

The engine will also use a high-precision, common-rail fuel-injection system featuring piezo-electric injectors. This system uses a stack of more than 300 wafer-thin ceramic platelets to control the fuel injector nozzle, allowing it to operate faster than other electro-mechanical fuel injectors, to decrease fuel consumption and reduce emissions.

The 2011 Super Duty will also be Ford's first vehicle in North America that is B20 compatible, meaning it can run on fuel composed of 20 percent biodiesel and 80 percent ultra-low-sulfur diesel. Biodiesel is a renewable fuel made from soybean oil and other fats. We went through extensive testing to ensure that the new Super Duty would meet performance and durability requirements when fueled with B20, including running durability cycles on multiple blends of diesel and biodiesel fuels to ensure the robustness of the system. Previously, Ford Super Duty products in North America were approved to use B5 fuel, which is composed of 5 percent biodiesel and 95 percent petroleum diesel. In Europe, our vehicles are also compatible with B5, and we are working with European fuel standards organizations to establish fuel-quality standards for biodiesel blends greater than B5. The use of biodiesel helps reduce dependence on foreign oil and reduces life-cycle CO_2 emissions. For more information on biofuels, please see the Renewable Biofueled Vehicles section.

1. Values based on J.L. Sullivan, R.E. Baker, B.A. Boyer, R.H. Hammerle, T.E. Kenney, L. Muniz, and T.J. Wallington, 2004,"CO_2 Emission Benefit of Diesel (versus Gasoline) Powered Vehicles," *Environmental Science and Technology*, 38: 3217-3223.

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Migration to Alternative Fuels and Powertrains

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Hybrid Electric Vehicles (HEVs)

Ford Fusion

Ford currently offers four hybrid models in the United States. By 2013, we will offer seven hybrid models in the United States and Europe.

2007 | 2011 | 2020 | 2030

NEAR TERM	MID TERM	LONG TERM
Begin migration to advanced technology	Full implementation of known technology	Continue deploying advanced powertrains and alternative fuels and energy sources

Hybrid Electric Vehicles (HEVs)

In 2004, Ford introduced the world's first hybrid SUV, the Ford Escape Hybrid. We followed up with the Mercury Mariner Hybrid in 2005. In early 2009 we further expanded our hybrid vehicle lineup by introducing the Ford Fusion and Mercury Milan Hybrids. All of these vehicles are full parallel hybrids, meaning they can run exclusively on battery power, exclusively on gas power or on a combination of both to deliver the best overall energy or fuel efficiency. As of early 2010, we had produced more than 125,000 hybrids worldwide. We are currently increasing our hybrid volume, targeting a cost reduction of more than 30 percent in our 2012 next-generation hybrid systems and preparing for hybrid capability across our highest-volume global product platforms.

The Ford Fusion Hybrid has an Environmental Protection Agency fuel economy rating of 41/36 mpg city/highway, making it the most fuel-efficient midsize sedan in the United States today.[1] The Fusion Hybrid's fuel economy significantly exceeds that of its nearest midsize sedan competitor, and it can go more than 700 miles on a single tank of fuel. It includes an innovative new SmartGauge™ with EcoGuide instrument cluster that coaches hybrid drivers to maximize fuel efficiency. With the Fusion and Milan Hybrids, we doubled the number and volume of our hybrid lineup in the United States.

In 2010, we will launch the Lincoln MKZ Hybrid, which is expected to be the most fuel-efficient luxury sedan in America. In 2012 we plan to deliver our next-generation hybrid vehicles, including a hybrid based on a compact or "C-car" platform. The next-generation system, already under development, will be even more efficient and more cost-effective than the current system and will

use lithium-ion battery cells. All of Ford's electrified products, including hybrids, plug-in hybrids and battery electric vehicles, will use lithium-ion battery cells by 2012.

As part of our global electrification plan, we will extend our hybrid vehicle technology to Europe. By 2013, we plan to introduce two next-generation hybrid vehicles and a plug-in hybrid in Europe. The European HEVs will be based on our global "C-car" platform and our "CD-car" (or midsize) sedan. The European PHEV will be based on the all-new C-MAX, a derivative of our global "C-car" platform.

1. Midsize sedan segment based on the R.L. Polk segment definition.

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Battery Electric Vehicles (BEVs)

Transit Connect Electric

Ford will introduce a BEV version of the Transit Connect in the United States in 2010, followed by the Focus Electric in 2011. We will introduce these BEVs in Europe in 2011 and 2012.

2007	2011	2020	2030
NEAR TERM	MID TERM	LONG TERM	
Begin migration to advanced technology	Full implementation of known technology	Continue deploying advanced powertrains and alternative fuels and energy sources	

Battery Electric Vehicles (BEVs)

Ford has announced an expanded, comprehensive electric vehicle strategy aligned with growing public interest in advanced technologies that can help reduce the use of gasoline and diesel. We are employing a comprehensive approach to electrification that will tackle commercial issues such as battery cost, standards development and infrastructure deployment. Strategic partnerships are an important part of this new approach. We are working with partners to develop appropriate battery cells, collaborate on government policy and define the infrastructure needed to speed the commercialization and acceptance of electric vehicles. This global electrification strategy is not a test program. It is a vital element of our business plan going forward and is aimed at making Ford a leader in sustainable transportation. To read more about Ford's approach to vehicle electrification, please see Electrification: a Closer Look.

Battery electric vehicles do not have an internal combustion engine and do not use any on-board gasoline. Instead, they use a high-voltage electric motor, which gets its power from a high-voltage battery pack charged by plugging into a standard 110-volt or 220-volt outlet in the United States, or a 230-volt outlet in Europe. Our early BEV test vehicles charge in six hours when plugged into a 220-volt outlet. The production models will be rechargeable in seven to eight hours from 230- and 220-volt outlets or 14–16 hours from a 110-volt outlet. As fast-charge technology standards are developed, Ford's BEVs will be designed to take advantage of this capability. Ford is actively working to help develop the standards to ensure that plug-in and charge stations work for all BEVs and to also ensure that the technology is reliable and durable for customers.

In 2010, we will deliver a BEV version of our Transit Connect light commercial utility van for use by small business owners and fleet customers in the United States. This vehicle is being developed in partnership with Azure Dynamics, a world leader in the development and production of hybrid electric and battery electric commercial vehicles. In 2011 we will deliver a Focus BEV, called the Focus Electric, which will be aimed at U.S. retail customers. We are working with Magna International for the supply and integration of several of the BEV components for this vehicle. This car will have a driving range of approximately 100 miles on a single charge of its lithium-ion high-voltage battery. We are targeting urban markets with this vehicle and expect to sell between 5,000 and 10,000 units annually to start. We will be ready to ramp up to higher volumes as the infrastructure develops and customer demand grows.

We recently announced plans to expand our BEV lineup to Europe. We will launch the Transit Connect Electric in 2011 followed by the Ford Focus Electric in 2012. The Focus Electric will be based on Ford's next-generation Focus model and is one of up to 10 vehicles that will be developed from the company's new global C-car platform. We also plan to introduce two next-generation hybrid-electric vehicles and a plug-in hybrid in Europe in 2013. In preparation for the launch of these vehicles in Europe, Ford will participate in BEV test trials in the UK and Germany with Transit commercial vehicles equipped with a pure electric powertrain as well as battery electric prototype passenger car vehicles, to test the technology's suitability in real-world situations.

In North America, the Society of Automotive Engineers, with Ford's participation, successfully aligned all major original equipment manufacturers on a standard charge connector and communication protocol that will enable all plug-in vehicles to use common charge points. This will be a key enabler for adoption in North America; the same connector is under consideration in Europe and China. Ford also recently announced it is partnering with Microsoft to deliver a new energy management software program called Microsoft Hohm™ that will help owners of Ford BEVs assess the most efficient times to recharge their vehicles. For more information on this partnership, please see Electrification: a Closer Look.

Ford's aggressive new electrification plan represents the next step in the Company's sustainability plan. The plan includes a commitment to greater vehicle fuel economy and lower CO_2 emissions as part of Ford's longer-term commitment to addressing climate change and energy security.

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FCVs

Plug-in Hybrid Electric Vehicles (PHEVs)

Ford Escape

Ford plans to have a plug-in hybrid vehicle available commercially in North America in 2012 and in Europe by 2013.

2007 | 2011 | 2020 | 2030

NEAR TERM

Begin migration to advanced technology

MID TERM

Full implementation of known technology

LONG TERM

Continue deploying advanced powertrains and alternative fuels and energy sources

Plug-in Hybrid Electric Vehicles (PHEVs)

We are currently developing and testing plug-in hybrids in preparation for bringing them to market in 2012. PHEVs are similar to HEVs in that they are equipped with both an electric battery and a gas-powered engine. Unlike today's hybrids, however, PHEVs are equipped with a high-capacity battery that can be charged from a private household or public electric outlet. In addition, while regular HEVs maintain a roughly constant battery charge, plug-in hybrids discharge the battery while driving to provide additional fuel savings. PHEVs have the potential to reduce tailpipe emissions to near zero when running on battery power. However, the vehicle's overall life-cycle emissions depend on the electrical power source and the performance characteristics of the vehicle. PHEVs could be significantly less expensive for consumers to operate because they allow drivers to travel on grid-based electricity stored in batteries instead of more costly gasoline.

In 2007, Ford committed to a collaborative project with Southern California Edison to develop a fleet of plug-in hybrid Ford Escapes as part of a PHEV demonstration project. The project seeks to provide real-world usage data and to understand critical implementation issues, including the vehicle-utility interface, the impact of plug-ins on utility operations and emissions, and the value to users, utility companies and vehicle manufacturers. Since the project began, numerous organizations have joined the partnership and helped to evaluate our PHEVs in different geographical locations. These partners include the Electric Power Research Institute, the New York State Energy Research and Development Authority, the New York Power Authority, American Electric Power, ConEdison of New York, DTE Energy, National Grid, Progress Energy, Southern Company-Alabama Power, Pepco Holdings and Hydro Quebec. For more information on some of

the key learnings generated by this collaboration so far, please see Electrification: A Closer Look.

In 2008, Ford also announced a program with the U.S. Department of Energy (DOE) to identify a sustainable pathway toward accelerated, successful mass production of plug-in hybrid electric vehicles. The program includes a three-year demonstration project with a vehicle fleet deployed by DOE and energy partners to collect real-world battery performance data and evaluate PHEV and grid performance. Ford was awarded a $10 million contract by DOE in support of this work. In 2008 and 2009, Ford deployed 20 vehicles with its utility partners and DOE.

The PHEV demonstration fleet uses a blended, or parallel, hybrid configuration. Parallel hybrids can be propelled by an electric motor or a gasoline internal combustion engine, or both can work together seamlessly to provide the most efficient combination. This parallel system enables flexibility and efficiency in battery sizing while maximizing battery life and investment.

In early 2010, Ford announced that we are partnering with Microsoft on a new energy management software that will help customers determine when and how to most efficiently and affordably recharge BEVs and PHEVs. For more information on this technology, please see Electrification: A Closer Look.

The Plug-In Hybrid Escapes demonstration vehicles have two distinct operational modes: charge depletion and charge sustaining. In charge depletion mode, which is used when the high-voltage battery is above a predetermined state of charge, the vehicle will draw the majority of the power required for operation from the battery. During normal driving, this usually translates into full-electric operation when the vehicle is traveling less than roughly 40 mph. When the power demand of the driver exceeds the power output capacity of the high-voltage battery, the gasoline engine will automatically start up to provide the difference. However, even when the engine is used to supplement power while in charge depletion mode, the battery still provides the vast majority of the power required to propel the vehicle, giving the driver a sense that the engine is merely idling, even at highway speeds.

In charge sustaining mode, which is used when the high-voltage battery is below a predetermined state of charge, the vehicle will rely mainly on the engine to meet the driver's power demand. The high-voltage battery will be charged during braking events and discharged during acceleration events to improve the overall fuel economy of the vehicle – similar to the operation of today's conventional hybrids.

Initial field data shows significant improvements in fuel economy when operated in charge depleting mode. The data also shows that in city environments, a fully charged Plug-in Escape is capable of an all-electric range in excess of 25 miles when driven below 40 mph and if aggressive acceleration events are avoided.

Ford's PHEV demonstration fleet vehicles use advanced lithium-ion batteries. We plan to have a plug-in hybrid vehicle available commercially in North America in 2012 and in Europe by 2013 as part of our overall plan for vehicle electrification. The European PHEV will be based on the all-new C-MAX and the U.S. PHEV platform is still being determined.

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Ford Galaxy

Ford currently offers 14 vehicle models globally that run on biofuels. We are working to advance the development of next-generation biofuels that will further reduce life-cycle CO_2 emissions.

2007	2011	2020	2030
NEAR TERM	MID TERM	LONG TERM	
Begin migration to advanced technology	Full implementation of known technology	Continue deploying advanced powertrains and alternative fuels and energy sources	

Renewable Biofueled Vehicles

Current Generation Biofuels

Ford has a long history of developing vehicles that run on renewable biofuels. Our founder, Henry Ford, was a strong proponent of biofuels, and we produced our first flexible-fuel vehicle approximately 100 years ago; the Ford Model T was capable of running on gasoline or ethanol.

Biofuels are an important component of our sustainability strategy for three reasons. First, biofuels can help to address economic, social and environmental sustainability as well as helping us meet our CO_2-reduction goals. Second, the use of biofuels requires relatively modest modifications to existing vehicle and fueling technology, which makes them a viable near-term option. Third, biofuels offer synergies with our other strategies. For example, the high octane of ethanol would enable the use of higher compression ratios and higher levels of boost, thereby improving the efficiency of and generating more torque from our future downsized engines, provided this fuel is available. Similarly, we can use biofuels to fuel the internal combustion engine portion of our plug-in hybrid electric vehicles, which will further lower their carbon footprint. We are aware that there are fundamental limitations associated with the scale of biofuel production, and therefore we do not see biofuels as the only solution to providing sustainable mobility. Nonetheless, we do see biofuels as part of the solution.

Ford has taken a leadership position on implementing biofuels. Since 1997, we have offered flexible-fuel vehicles (FFVs) capable of running on gasoline or E85 ethanol – a blended fuel that

contains up to 85 percent ethanol and at least 15 percent petroleum-based gasoline. To date, we have more than 5 million E85-capable vehicles on the road globally, including more than 2.5 million in North America and nearly 2 million in Brazil. In the United States, we have introduced more than 550,000 FFVs over the last two years alone. In Europe, Ford is a market leader and pioneer in bioethanol-powered FFVs, with more than 70,000 vehicles delivered to customers since 2001. Ford FFV models are now available in 17 European markets, with Sweden, Germany, the Netherlands, Spain and France showing the strongest demand.

Ford currently offers 14 vehicle models in the United States, Europe, Asia and South America that can run on E85. These include the Ford Crown Victoria, Mercury Grand Marquis, Lincoln Town Car, Ford Fusion, Mercury Milan, Ford Escape, Mercury Mariner, Lincoln Navigator, Ford Expedition, Ford Econoline and Ford F-150 in North America; the Ford Focus, C-MAX, Mondeo, S-MAX and Galaxy in Europe; the Ford Fiesta, EcoSport and Focus in Brazil; and the Ford Focus in Thailand. In 2009 in Europe we launched a tri-fuel version of the Ford Mondeo capable of running on gasoline, E85 or propane (LPG).

Next-Generation Biofuels

We are continuing to develop the next generation of biofueled vehicles, including vehicles capable of running on advanced biofuels. Our current research focuses on two primary biofuels: bioethanol and biodiesel. Bioethanol (used for example in E85) is a gasoline alternative derived from plant material. Most bioethanol in the United States is made from corn. In other parts of the world it is made from other locally available crops, including sugar cane in Brazil and sugar beets in Europe. All modern gasoline vehicles can run on E10, a gasoline/bioethanol mixture of up to 10 percent by volume bioethanol.

Biodiesel is a diesel alternative made from vegetable oils obtained from oil seeds, including soy, canola, palm and rapeseed, or from animal fat. In the United States, most biodiesel is currently made from soybeans. In the United States and Europe all of our diesel vehicles can run on B5, a blend of 5 percent biodiesel and 95 percent petroleum diesel. We have worked with fuel standards organizations to allow the use of biodiesel blends of greater than B5 in our future products. For example, our 2011 F-Series Super Duty® trucks with a new 6.7-liter diesel engine are compatible with B20, which is 20 percent biodiesel and 80 percent petroleum-based diesel. In addition, the gasoline version of these vehicles will be compatible with gasoline, E85, or any ethanol-gasoline blend between E0 and E85.

Bioethanol, biodiesel and other renewable fuels have significant advantages. They can be made with locally available raw materials, reducing the need for foreign-supplied oil and increasing energy security, and they produce fewer lifetime CO_2 emissions. However, important issues remain regarding biofuels' energy density, the best way to use these fuels to reduce greenhouse gas (GHG) emissions, and their ability to meet fuel needs without diminishing food supplies. (These issues are discussed in more detail later in the Biofuel Challenges section.)

Ford is working to support and promote the next generation of biofuels, including cellulosic biofuels. These are fuels made from plant cellulose – stalks, leaves and woody matter – instead of from sugars, starches or oil seeds. Cellulosic biofuels have many advantages. They minimize possible market competition between food and fuel. They allow the more-efficient use of crops such as corn and soybeans by using more of the plant. In addition, cellulosic biofuels can be made from crops that require less energy-intensive farming, such as switchgrass and wood, further reducing the total CO_2 footprint of fuels used for operating vehicles. We are also investigating the potential for algae-based biofuels to provide another feedstock for future biofuels.

Biofuel Infrastructure

To make an impact on GHG emissions and energy security, biofuels must become more widely available. In the United States, Ford has committed to doubling the number of FFVs in our lineup by 2010. And, if the market dictates and the supporting infrastructure is in place, we have committed to expanding FFV output to 50 percent of total vehicle production by 2012. Despite this commitment, E85 refueling infrastructure remains inadequate. Out of more than 160,000 refueling stations in the United States, approximately 2,200 (or less than 2 percent) offer E85. In order for consumers to have a true transportation fuel choice, increased access to biofuels is necessary.

United States Renewable Fuel Standard and the Future of Biofuels

The Energy Independence and Security Act of 2007 established a new renewable fuel standard (RFS) requiring a significant increase in the use of biofuels – 36 billion gallons per year by 2022. In addition, this law requires that, beginning in 2010, a certain portion of biofuels must be advanced and/or cellulosic-based fuels. Ethanol blended into gasoline is expected to supply a large percentage of this biofuel mandate and could displace nearly 20 percent of U.S. gasoline demand by 2022.[1] The use of biodiesel in the United States is also likely to increase in the coming years. However, it will not likely increase to the same levels as ethanol, because the RFS mandates lower volumes of biomass-based diesel and because a relatively small percentage of light-duty passenger vehicles in the United States use diesel.

Using low-level ethanol blends such as E10, which is the current compatibility limit for all non-FFV light-duty vehicles, would achieve approximately 40 percent of the RFS-mandated biofuel use by 2022. Therefore, meeting the full RFS biofuel requirement will require the use of more E85-capable FFVs and/or the development of vehicles that can use mid-level blends of ethanol (i.e., between E10 and E85). Furthermore, the expanded use of E85-compatible vehicles would require a corresponding increase in the E85 fueling infrastructure in the next 10 to 20 years. An approach using mid-level blends would require that all new vehicles be designed for higher ethanol capability, and the existing fueling infrastructure would need to be redesigned for higher ethanol compatibility. For any of these cases to work in the real world, the new fuels will have to provide value to give consumers a compelling reason to buy ethanol-blend fuels. Regardless of the specific strategy used, coordinated efforts will be required between automakers, fuel suppliers, consumers and the government to meet the RFS mandate while ensuring the compatibility of vehicles and ethanol-blended fuel.

Biofuel Challenges

Much of the interest in biofuels results from their potential to lessen the environmental impacts of transportation fuels while contributing to energy independence. Biofuels are made from domestic and renewable resources, they provide an economic boost to farmers, and they help to reduce greenhouse gas emissions because the plants from which they are made absorb CO_2 while they are growing. But are biofuels the solution to our growing fuel-related environmental, economic and political problems? The issues are complex. We believe biofuels are an important part of the equation for addressing climate change and energy security. We recognize, however, that major advances need to be made in production processes, source materials and fuel types to achieve the full promise of biofuels.

Some of the challenges relating to today's biofuels include the following.

Energy density

The energy density of ethanol is approximately two-thirds that of gasoline.[2] This means there is approximately one-third less energy in a gallon of ethanol than in a gallon of gasoline. As a result, drivers using blends with a high amount of ethanol will have to refuel more frequently to drive the same distance. Biodiesel has approximately the same energy density as conventional diesel.

Life-cycle greenhouse gas emissions

The plants used to produce biofuels capture as much carbon dioxide during their growth as they release when burned. However, current farming and production processes utilize fossil fuels in the production of bioethanol and biodiesel, so the production of these biofuels for use in vehicles results in a release of some fossil-fuel-based GHG emissions on a life-cycle basis. Recent studies have suggested that nitrous oxide (N_2O) emissions from the fertilizers required to grow biofuel feedstocks may have been underestimated, and that these emissions reduce the GHG benefits attributed to biofuels. N_2O emissions from biofuel production need to be carefully considered for all types of biofuel feedstocks and farming techniques on a full life-cycle basis, including allocation of emissions to co-products derived from biofuel production. Government and academic studies suggest that current E85 ethanol from corn results in 20 to 30 percent fewer life-cycle GHG emissions than today's gasoline, on an energy-equivalent basis. In addition, GHG emissions related to petroleum can vary greatly depending on the source. Producing crude oil from tar sands, for example, results in a greater release of GHGs than producing crude oil from conventional sources. The use of renewable energy sources in the production of bioethanol and biodiesel production can reduce their life-cycle GHG emissions further. We believe that developing cellulosic or biomass-based biofuels with next-generation processes will significantly decrease the GHG emissions associated with biofuels, perhaps by up to 90 percent.[3]

Competition with the food supply

Another concern about current corn- and soybean-based biofuels is that they compete in the marketplace with food supplies and are one of the factors that increase food prices. Demand for corn used directly for human food (including high-fructose corn syrup) comprises less than 10 percent of the total corn supply. Approximately 42 percent of the corn produced in the United States is used for animal feed. In 2009, about 32 percent of the corn harvest in the United States was used to produce ethanol. The ethanol process removes only the starch from the corn – the remaining portion is a highly valued feed product (called distiller grains) and a good source of energy and protein for livestock and poultry. If next-generation biofuels can efficiently utilize biomass such as plant stalks, woodchips or grasses and be grown on marginal land with little irrigation, then competition with food crops should be minimized.

Land use conversion for biofuel production

Recent studies have looked at the overall CO_2 and N_2O impacts of converting natural ecosystems to farmland for the production of biofuels. This is an important and complex issue. Converting natural lands to croplands for fuel production can lead to the release of carbon stored in above- and below-ground biomass. Releasing this carbon in the form of CO_2 during land conversion to

energy crops creates a carbon "debt," which may take a very long time to repay through the greenhouse gas benefits of biofuel use. The use of degraded pastures or abandoned farmland, by contrast, rather than natural ecosystems, would incur minimal carbon debt, because there is limited CO_2 storage in these previously altered ecosystems.

At Ford, we are following the debates about biofuels closely. As we proceed, we need to consider how biofuels are derived and carefully review issues such as the potential net greenhouse gas benefits; political, economic, social and environmental concerns related to biofuel and petroleum use; and the management of land, food and water resources. We agree with the general consensus among scholars and industry experts that the current generation of biofuels (e.g., corn-based bioethanol and soybean-based biodiesel) have modest environmental benefits and are a first step toward cleaner vehicles and energy independence. We are actively investigating next-generation biofuels that have greater environmental, energy security and economic benefits. We believe that improvements in the efficiency of farming technologies and biomass production processes, and the development of advanced biofuels, will significantly increase the benefits and long-term sustainability of biofuels. Even with these improvements, solving our climate change and energy security problems will require a multifaceted set of solutions, including new fuels, improvements in vehicle fuel economy and changes in consumer driving patterns and practices.

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Hydrogen Internal Combustion Engines (H_2ICEs)

450 H_2ICE shuttle buses

Ford was the first automaker to develop commercially available hydrogen-powered internal-combustion engines, which virtually eliminate CO_2 emissions.

2007 | 2011 | 2020 | 2030

NEAR TERM

Begin migration to advanced technology

MID TERM

Full implementation of known technology

LONG TERM

Continue deploying advanced powertrains and alternative fuels and energy sources

Hydrogen Internal Combustion Engines (H_2ICEs)

Ford was the first automaker to develop commercially available hydrogen-powered internal combustion engines (H_2ICEs), which use the same basic technology as gasoline-powered engines but run on hydrogen fuel. We view this as a possible bridge technology to hydrogen-powered fuel cells, because it is less expensive than fuel cells and uses existing engine manufacturing capability.

We currently have a fleet of 13 E-450 H_2ICE shuttle buses on the road in North America. These E-450 shuttle buses use a 6.8-liter supercharged Triton V10 engine with a hydrogen storage system equivalent to 29 gallons of gasoline. We have placed 10 of the H_2ICE shuttles with the Canadian government in Vancouver, Prince Edward Island, Ottawa and Toronto in support of their vision for a hydrogen-based economy. We also have buses on the road in California and Pennsylvania. Our H_2ICE buses formerly located in Detroit, Las Vegas, Pennsylvania and Missouri have returned to Ford after successfully completing their fleet evaluations. At year-end 2009, our H_2ICE fleet had successfully logged 332,000 miles in operation.

H_2ICEs still face considerable challenges. Like all hydrogen-powered vehicles, H_2ICEs are limited by fuel storage, fuel infrastructure issues and concerns about hydrogen safety. For example, current H_2ICE vehicles have a driving range of 150 to 200 miles, due to fuel storage limitations. The vehicles are also still very expensive. However, if these problems can be overcome, H_2ICEs have the potential to deliver significant environmental benefits, including near-zero CO_2 and other

tailpipe emissions and 13 percent better fuel economy than traditional vehicles.

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Hydrogen Fuel Cell Vehicles (FCVs)

Ford Focus

Ford has a decade-long history of fuel cell vehicle development and technology demonstration, including a five-year demonstration project with vehicles that accumulated more than a million driving miles without significant technical problems.

2007 | 2011 | 2020 | 2030

NEAR TERM	MID TERM	LONG TERM
Begin migration to advanced technology	Full implementation of known technology	Continue deploying advanced powertrains and alternative fuels and energy sources

Hydrogen Fuel Cell Vehicles (FCVs)

Fuel cell vehicles, like battery electric vehicles, produce zero tailpipe emissions. Unlike BEVs, however, which must be recharged via an external power source, FCVs use an on-board fuel cell to create electrical power through an electro-chemical reaction based on hydrogen fuel and air. Vehicles using fuel cells as the primary source of motive power can also be hybridized with a high-voltage battery, to improve vehicle performance and better optimize the cost and robustness of the fuel cell system. In fact, all of our efforts to improve high-voltage electronics and battery technology on HEVs, BEVs and PHEVs will be applicable to FCVs, if and when these vehicles become more commercially viable.

We believe that hydrogen-powered fuel cell vehicles may be an important long-term solution for reducing GHGs, if hydrogen fuel emerges as a viable low-carbon energy carrier. Therefore, Ford has committed to significant hydrogen fuel cell research and development.

Ford has a decade-long history of fuel cell vehicle development and technology demonstration. The Company developed the first research prototype FCV in 1999. In 2004, we introduced the first production-intended FCV using the Ford Focus as a base vehicle. The Focus FCV uses a Ballard fuel cell technology, called HyWay1. It is one of the industry's first hybridized fuel cell vehicles, meaning it has a battery system as well as a fuel cell system.

From 2004 to 2009, Ford participated in a technology demonstration program, partially funded by the U.S. Department of Energy (DOE), as well as other demonstration programs in Canada and

Europe. A total of 30 Ford Focus FCVs have been in operation in these programs. These vehicles have been tested to demonstrate durability and reliability; for example, they were subjected to driving tests at sub-zero temperatures and high altitudes to prove vehicle performance under a range of customer-encountered driving environments. By 2009, these vehicles had accumulated over a million driving miles without significant technical problems, thereby demonstrating the reliability of fuel cell powertrain systems in real-world driving conditions. The data collected from this fleet is critical for the further development of fuel cell technology. Based on the knowledge gained from the Focus FCV test fleet, we have completed the development and laboratory validation of our new fuel cell technology, called HyWay2/3. This new technology improves the robustness and "freeze start" capability of the fuel cell propulsion system.

Even with the advances we have made in hydrogen technology over the past 10 years, however, we still have many challenges to overcome before hydrogen FCVs can compete in the market with current vehicle technology. The cost and durability of the fuel cell system are the most significant challenges. These challenges remain too significant to allow for the commercialization of FCVs at this point, even with the incremental improvements in current state-of-the-art fuel cell technology. For example, extensive DOE analysis has not yet revealed an automotive fuel cell stack that meets the DOE's cost targets for real-world commercialization, or that maintains proper performance throughout the targeted lifetime while staying within the targeted cost. There are also still significant challenges related to the cost and availability of hydrogen production, hydrogen distribution and on-board hydrogen storage. To overcome these challenges, and to make fuel cell vehicle technology commercially viable, we believe that further scientific breakthroughs are required.

Given these significant challenges to commercialization, we believe that further investment in demonstrating hydrogen FCVs and integrating current FCV technology into existing vehicles are not high-value investments for Ford. Therefore, Ford is now reprioritizing its resources to concentrate on fundamental fuel cell research that will help increase the commercialization potential of FCV technology. For example, Ford is focusing on materials development, basic scientific research into reducing the costs and increasing the durability of the fuel cell stack and system, and the development of improved analytical models. We are working on these critical issues with our alliance partners: Daimler AG and Automotive Fuel Cell Corporation, a Vancouver-based company owned by Ballard, Daimler and Ford.

Our materials research is focused on the membrane electrode assembly (MEA) and bipolar plates, which make up key elements of the fuel cell stack. Currently, these components are made from expensive materials. We are working to find alternatives to replace these materials, such as developing new catalyst membranes and corrosion-resistant bipolar plates. Simultaneously, we are working to increase the density of fuel cell materials, which will improve the utilization of the expensive materials used in the MEA and bipolar plate. Fuel cell catalyst research is also crucial to our ability to optimize fuel cell stack operating conditions and reduce system complexity.

We are also developing advanced computational modeling that will help us understand the mechanisms underlying ideal fuel cell functioning and anticipate failure modes under the real-world usage profiles. These modeling tools will assist with our materials research.

Hydrogen storage on-board the vehicle is another critical challenge to the commercial viability of hydrogen FCVs. We recognize that compressed hydrogen storage, which is currently used in the demonstration vehicles, may not be sufficient to achieve commercialization goals. We are therefore pursuing research on materials-based on-board hydrogen storage technology, including complex hydride and novel hydrogen sorbent technologies, which show technical potential.

Producing and distributing hydrogen fuel is another important hurdle on the road to implementing hydrogen-powered FCVs. The GHG reduction benefits of hydrogen fuel depend on what procedures and feed stocks are used to produce hydrogen. Currently, the most state-of-the-art procedure for producing hydrogen is a distributed natural gas steam reforming process. However, when FCVs are run on hydrogen reformed from natural gas using the current processes, they do not provide significant environmental benefits on a well-to-wheels basis that take into account GHG emissions from the natural gas reformation process. It would be necessary to employ carbon sequestration technologies in hydrogen production from fossil fuels or increase the use of renewable energy sources to make hydrogen for hydrogen-fueled FCVs to provide significant environmental benefits.

Even if the challenges of producing hydrogen can be overcome, there is still no widespread hydrogen fueling system. Therefore, new infrastructure must be designed and executed throughout the country to make hydrogen FCVs feasible.

Working alone, Ford will not be able to overcome all of the challenges hydrogen vehicles face. That is why Ford is collaborating with a wide range of partners on the development of hydrogen vehicles, fuels and fueling systems. In addition to our work with Ballard and Daimler described above, we are working with:

- The Freedom CAR and Fuel Partnership: a partnership between Ford, General Motors, Chrysler, five energy providers and the DOE to develop vehicles and fuels that will provide

freedom from imported oil and carbon-based fuel emissions, and

- The Clean Energy Partnership Berlin: a consortium of 13 corporate partners and the German government that is working to demonstrate the suitability of hydrogen as a fuel for everyday use.

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Ford's Green Partnerships with the Federal and State Governments

The 2007 Energy Independence and Security Act (EISA) continued the effort to transition the interactions between automakers and the government on fuel economy standards from an adversarial relationship to a partnership. EISA authorized tough standards for new vehicle fuel economy while creating the Section 136 Advanced Technology Vehicle Manufacturing Incentive Program. Section 136 authorized the Secretary of Energy to make direct loans to eligible applicants for projects that reequip, expand or establish manufacturing facilities in the United States to produce advanced technology vehicles or qualifying components and also for engineering integration costs associated with such projects.

Last summer, Ford Motor Company was the first automaker deemed by the government to be among the best companies with the best technologies in American manufacturing and fuel efficiency. This green partnership between Ford and the U.S. government will help to accelerate the development of advanced technologies for even better fuel economy while maintaining jobs in the United States.

In total, Ford is investing nearly $14 billion in advanced technology vehicles in the next seven years in the United States, and the advanced technology loans will help Ford achieve its ambitious goals for fuel-efficient vehicles and technologies. We expect to receive a direct loan of up to $5.9 billion through our partnership with the Department of Energy. This loan program was not part of the Troubled Asset Relief Program, the emergency taxpayer assistance provided to prevent ailing U.S. companies from going out of business. Instead it represents an affirmation of Ford's leading fuel-efficiency technologies and the beginning of a partnership with the federal government to advance these technologies more quickly.

An outstanding example of how Section 136 partnership funds are going to be used is the Ford Focus produced at the Michigan Assembly Plant (MAP). MAP is being transformed from a large SUV factory into a modern, flexible small car plant to produce the global Ford Focus. The new Focus will be one of up to ten unique models to be built from Ford's new C-car platform, which is expected to generate total sales in all regions of 2 million units annually by 2012. In addition to beginning production of the Focus this year at MAP, we will also produce the Focus Electric next year and next-generation hybrid and plug-in hybrid vehicles in 2012 at MAP.

The Focus exceeds Section 136's Advanced Technology Vehicle requirements by combining key technologies to achieve class-leading fuel economy, including: an advanced combustion engine, six-speed transmission, deceleration fuel shut-off, electric power-assisted steering, improved aerodynamics and lightweight materials.

Ford is investing approximately $550 million to introduce the North American market to Ford's global C-platform, which underpins the Focus. This investment will support more than 4,000 high-tech manufacturing and engineering jobs, not to mention more than 10,000 supplier jobs and 175,000 dealership positions.

Ford's sustainability commitments have received state government support as well. Working in close partnership with the state of Michigan, Ford received incentives and tax credits totaling $188 million to help in the continuous transformation of MAP. In addition to building the next-generation hybrid in Michigan, the incentives enabled Ford to bring advanced lithium-ion battery system design, development and assembly in house.

Ford also received a $2 million grant from the state of Michigan to install a large stationary battery-based energy storage facility with 750 kw capacity and 2 MWh of storage. This facility will support the state's "smart-grid" development initiatives as well as Ford's efforts to develop battery technology and secondary uses for vehicle batteries. As part of this facility, Ford will demonstrate the possibility for using vehicle batteries as stationary power storage devices after their useful life as vehicle power sources is over. Ford is participating in this project in partnership with DTE Energy, a Michigan-based energy provider. DTE Energy will install a 500 kw solar photovoltaic (PV)

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Ford Focus

electricity generation system at the demonstration facility, which will produce some of the energy to be stored in Ford's stationary battery storage facility. When commissioned at the end of 2010, it is anticipated that it will be the largest PV array in Michigan. This solar PV system, which will feed into the battery facility, is being funded by DTE Energy to support Ford's sustainability efforts and to help the state of Michigan meet its renewable energy production requirements. As part of this project, Ford will also develop 10 electric vehicle charging stations, which will demonstrate advanced battery charging technologies and associated integration with renewable energy and other smart-grid advances.

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Progress and Performance

How is Ford doing in its quest to reduce GHG emissions? Based on analyses of life-cycle vehicle CO_2 emissions, approximately 80 to 90 percent of GHGs are emitted while the vehicle is in use, rather than during its manufacture or disposal. The in-use emissions depend on three major factors:

1. The fuel economy of the vehicles, which in turn depends on many characteristics of the vehicles themselves (such as their weight, powertrain and aerodynamics).
2. The well-to-wheels greenhouse gas profile[1] of the fuels used in the vehicles.
3. How the vehicles are used and maintained by their drivers.

Our shorthand for this is "Vehicle + Fuel + Driver = GHG emissions." This section reviews our progress reducing these emissions, as well as our progress reducing emissions from our facilities, our logistics and our supply chain.

1. In other words, emissions resulting from making, distributing and using the fuel.

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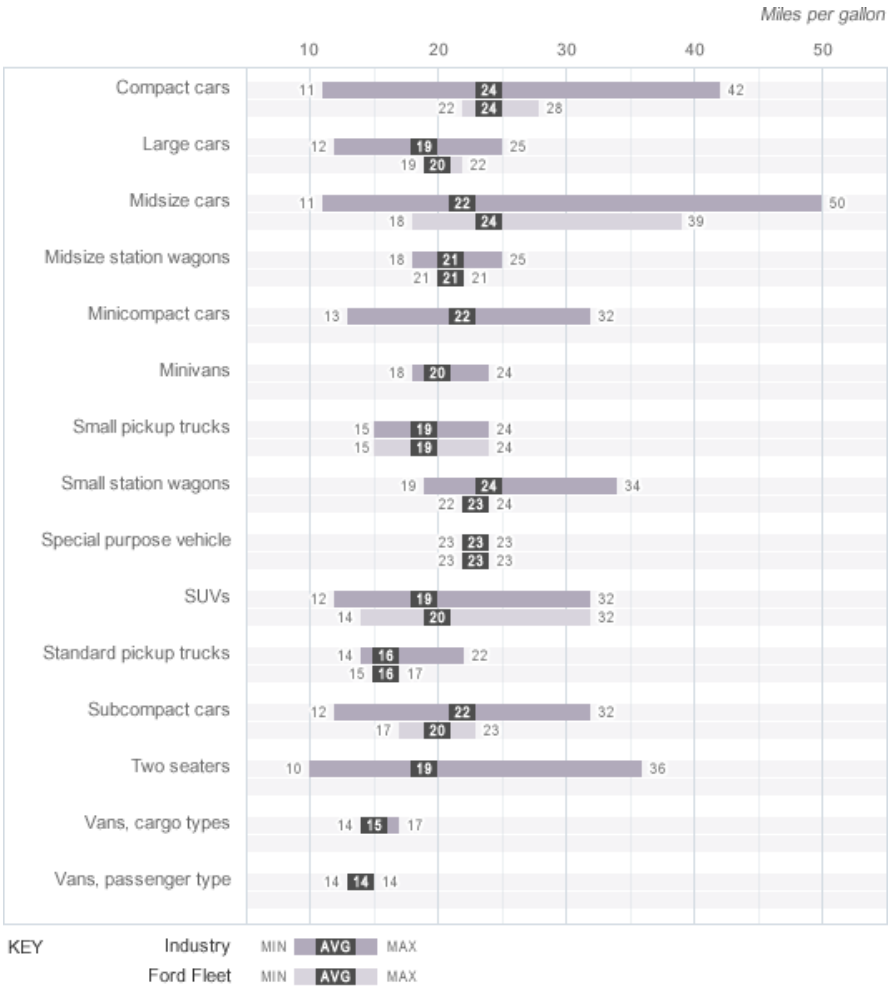
In the United States, for the 2009 model year, our fleet CO_2 emissions decreased (i.e., improved) by approximately 5 percent relative to the 2008 model year and 12 percent compared to the 2006 model year. Preliminary data for the 2010 model year shows a 3.2 percent improvement in Corporate Average Fuel Economy (CAFE) for cars and a slight decline of 2.4 percent in CAFE for trucks as compared to 2009. The increase for cars is due to increased customer demand for the more fuel-efficient medium-sized cars, which rose by 18 percent. This includes increased demand for the newly introduced 2010 Fusion Hybrid. The decrease in truck CAFE can be attributed to increased demand for standard pickup trucks and larger SUVs, which increased by 6 percent and 5 percent respectively.

As seen in the Fuel Economy of U.S. Ford Vehicles by EPA Segment graphic (below), compared to the industry fuel economy average, Ford's 2010 model year U.S. vehicles rank better than average in four of 10 categories, worse in two and the same in four.

In Europe, we achieved a significant reduction in average vehicle CO_2 emissions of 8.1 g/km from 2008 to 2009. This was largely due to changed model mix, or selling a higher proportion of smaller cars, which was likely caused by the economic downturn in 2009. We have reduced the average CO_2 emissions of the vehicles we sell by 27.1 percent compared with a 1995 baseline and 6.7 percent compared to the 2006 model year.[1] 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.

These improvements – and progress in other regions – are the result of delivering on our climate change product strategy by introducing new vehicles and improving existing ones to deliver lower CO_2 emissions, along with better performance and features customers want. Some examples of actions by region are below. (Also see Improving Fuel Economy.)

Fuel Economy of U.S. Ford Vehicles by EPA Segment



Miles per gallon

	Industry			Ford		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Compact cars	11	24	42	22	24	28
Large cars	12	19	25	19	20	22
Midsize cars	11	22	50	18	24	39
Midsize station wagons	18	21	25	21	21	21
Minicompact cars	13	22	32	-	-	-
Minivans	18	20	24	-	-	-
Small pickup trucks	15	19	24	15	19	24
Small station wagons	19	24	34	22	23	24
Special purpose vehicle	23	23	23	23	23	23
SUVs	12	19	32	14	20	32
Standard pickup trucks	14	16	22	15	16	17
Subcompact cars	12	22	32	17	20	23
Two seaters	10	19	36	-	-	-
Vans, cargo types	14	15	17	-	-	-
Vans, passenger type	14	14	14	-	-	-
Total	10	21	50	14	21	39

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North America

In North America, we continued to introduce new vehicles and technologies that offer outstanding

fuel economy. For example, during 2009 and early 2010, we:

- Launched two new hybrid vehicles – the Ford Fusion Hybrid and Mercury Milan Hybrid – and announced the launch in 2010 of the Lincoln MKZ Hybrid, which will be the most fuel-efficient luxury sedan available in North America.
- Introduced the Transit Connect to North America, creating a new class of nimble commercial vans with outstanding fuel economy. The Transit Connect will be the basis for Ford's first 21st century battery electric vehicle.
- Prepared for the launch of our global compact car, the Ford Fiesta. When it launches in the United States in 2010, it is expected to have best-in-class fuel economy in its segment.
- Announced plans for the 2011 Mustang, which will be the first car ever to achieve 300-plus horsepower and 30-plus miles per gallon. The 2011 Ford Mustang equipped with a six-speed transmission and V6 engine is certified by the EPA at 31 mpg on the highway and 19 mpg in the city.
- Announced plans for the all-new Ford Explorer, which will have 25 percent better fuel economy than the previous model.

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Europe

Ford already offers one of the broadest low-CO_2 vehicle portfolios in Europe. With the launch of the new generation of the Focus ECOnetic,[2] we extended the availability of best-in-class or among-best-in-class, extremely low-CO_2 vehicles, which now include the following:

- The all-new Fiesta 1.6-liter 90 PS TDCi, available since January 2009, is the most fuel-efficient five-seat family car in the UK at 63.6 mpg, and it emits only 98 g/km of CO_2.
- The second generation of the Ford Focus ECOnetic, 1.6-liter 109 PS TDCi with conventional technology has class-leading 104 g/km CO_2 emissions (which corresponds to a fuel consumption of 4.0 l / 100 km).
- The second-generation Focus ECOnetic equipped with optional start/stop technology achieves 99 g/km CO_2, corresponding with a fuel consumption of 3.8 l / 100 km.
- A 139 g/km CO_2 Mondeo 1.8- and 2.0-liter TDCi (115–125 PS), since autumn 2008.

After the successful introduction of the new EcoBoost™ gasoline engine family in the United States, Ford will launch 2.0- and 1.6-liter EcoBoost engines in Europe in 2010. These turbocharged, direct-injection gasoline engines will deliver up to 20 percent better fuel economy and fewer CO_2 emissions compared to conventional gasoline engines.

In addition, our global electric vehicles plan is extending to Europe with five full electric or hybrid vehicles. Specifically, Ford will launch two zero-emission full battery electric vehicles, including the Transit Connect Electric light commercial vehicle in 2011 followed by the Ford Focus Electric in 2012. Three other vehicles – two next-generation gasoline hybrid vehicles and a plug-in hybrid – will be introduced in 2013.

Ford of Europe's innovative Product Sustainability Index (PSI) shows how the vision of sustainability can be made operational. By combining comprehensive sustainability criteria into the earliest stages of the product development process, Ford's PSI provides a ground-breaking design-for-sustainability tool. Designers can use it to assess the life-cycle CO_2 emissions of a vehicle, and consumers can use it to understand a vehicle's footprint.

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Asia Pacific

In our Asia Pacific and Africa region we are focusing our near-term fuel efficiency efforts on implementing EcoBoost engines and our PowerShift transmission technology, which we plan to introduce across our vehicle lineup in this region in the next few years. In China we will introduce the Ford Mondeo with an EcoBoost engine and PowerShift transmission in 2010. We expect it to be best in its segment for fuel economy when it launches. We also will be launching the Ford Fiesta with a 1.6-liter Ti-VCT powertrain and six-speed PowerShift transmission throughout our Asian markets. This vehicle will be the first in the "B-car" segment to offer consumers this level of sophistication in powertrain technology, and it will be among the leaders in its segment in fuel economy. In India, we recently introduced the Ford Figo, which has very fuel-efficient 1.4-liter TDCi diesel and 1.2-liter gas engine options. This introduction is highly significant to our success in India, as fuel economy is the most important criteria in purchase consideration in that country.

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South America

In South America, we are improving fuel economy by introducing some of the efficient engine and transmission technologies currently used in North America, and by using technologies specifically relevant to the widespread use of biofuels in Brazil. For example, we have implemented improved engine compression ratios – or the ratio in which the air and fuel mixture is compressed in the engine combustion chamber – on flexible-fuel vehicles in Brazil. This optimizes fuel efficiency in vehicles using biofuels, which have a higher octane rating than petroleum-based gasoline. We have also improved the gearing ratios and aerodynamics of our South American models, further increasing fuel economy, and we will introduce a more fuel-efficient engine in the Focus in 2010.

The figures below show how we are leveraging complementary technologies to cut CO_2 emissions significantly.

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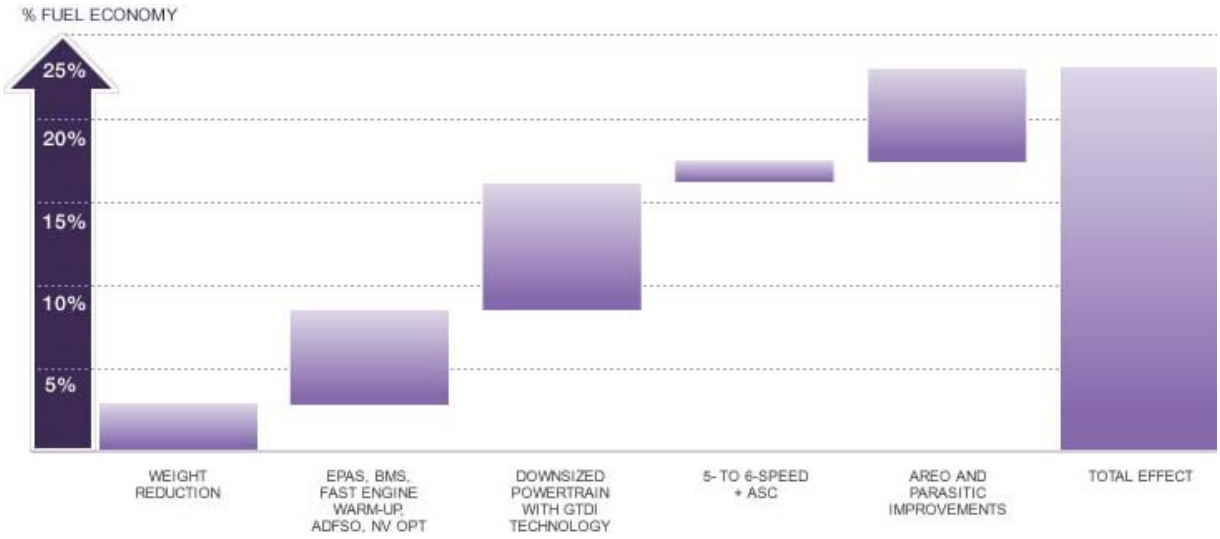
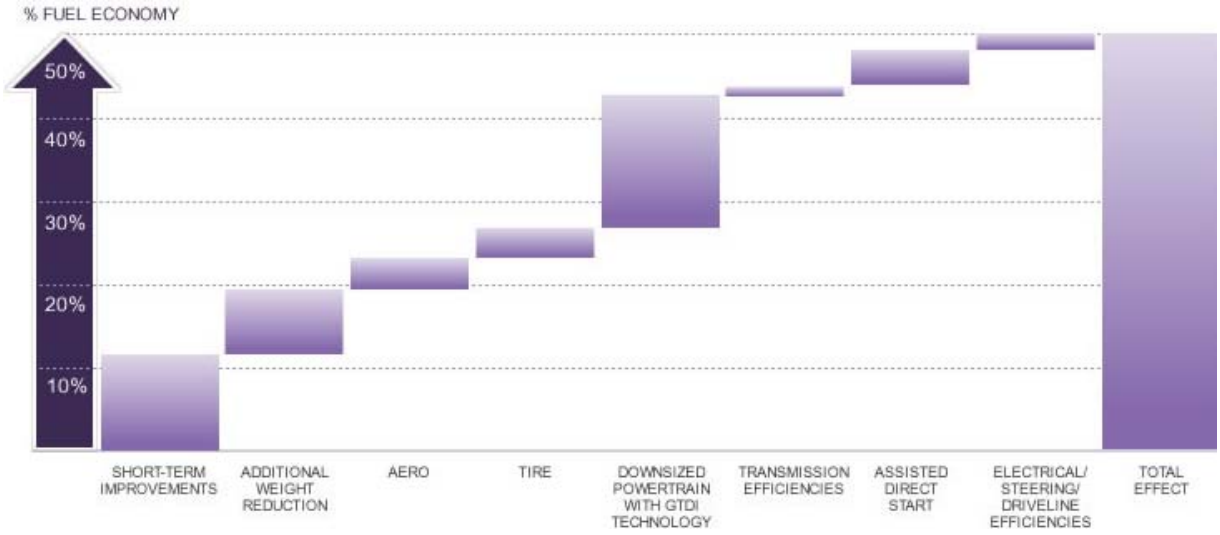
Typical Near-Term Fuel Economy Improvements

Midsize Utility



Small Car



For an explanation of the terms used in these figures, see the glossary.

Please note that improvements in fuel economy resulting from the use of the technologies identified in the above charts are often not additive or linear. The charts depict approximate percentage improvements estimated for particular technologies in a generic vehicle; actual improvements will vary depending on the characteristics of each specific vehicle.

1. These data do not include Volvo.
2. ECOnetic vehicles are only available in Europe. The ECOnetic fuel economy calculations are based on European Fuel Economy Directive EU 93/116/EEC, which uses European drive cycles. They differ from fuel economy calculations developed in the United States and other regions of the world.

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Fuel

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Electrification: A Closer Look

Renewable Biofueled Vehicles

To reduce the life-cycle GHG emissions to the levels required for CO_2 stabilization requires the development of fuels with lower fossil carbon content,[1] in order to augment the improvements in the fuel economy of our vehicles.

Electrification

Running vehicles partly or wholly on electricity reduces or eliminates CO_2 and other emissions from the vehicles and shifts the emissions to the electricity generation facility. The overall emission benefits depend on the fuel or mix of fuels used to make the electricity. Electrification addresses both energy security and climate change concerns because electricity can be made from a wide variety of fuels, including domestic sources and renewable energy. It also offers flexibility in tailoring lower-carbon solutions based on locally available fuels and technology options like carbon capture and storage. Our plans to introduce electric vehicles include the following:

- We will introduce the Transit Connect battery electric vehicle, a compact commercial utility van, for sales to fleets in North America in 2010 and then to Europe in 2011.
- By 2011, we will bring a battery electric Ford Focus to North America and then to Europe in 2012.
- We will introduce our next-generation hybrid technology and plug-in hybrid vehicles in North America in 2012 and in Europe in 2013.

Expanding electrification holds tremendous promise, but a range of implementation challenges must be considered. These challenges relate to cost, battery technology, the development of charging infrastructure, the interface with utilities and how to ensure that potential emissions-reduction benefits are realized. We have partnered with the U.S. Department of Energy, the Electric Power Research Institute, the New York State Energy Research and Development Authority and Southern California Edison to explore these and other issues involved in expanding the use of plug-in hybrid electric vehicles. This partnership was expanded in early 2009, and through it Ford has supplied plug-in vehicles to 10 additional partners for real-world testing:

- Alabama Power of Birmingham, Alabama, and its parent, Atlanta-based Southern Company
- American Electric Power of Columbus, Ohio
- Consolidated Edison of New York
- DTE Energy of Detroit, Michigan
- Hydro Quebec
- National Grid of Waltham, Massachusetts
- New York Power Authority
- New York State Energy and Research Development Authority
- Pepco Holdings
- Progress Energy of Raleigh, North Carolina

Electrification issues and our partnerships are discussed in more detail in the Electrification section.

Biofuels

Biofuel use is expanding globally, with bioethanol made from corn, beets or sugar cane substituting for gasoline, and biodiesel derived from plant oils substituting for diesel fuel. In the United States, 2007 legislation expanded the Renewable Fuel Standard (RFS), mandating a significant increase in the use of biofuels by 2022.

While current corn-based bioethanol production in the United States is estimated to provide a modest reduction in vehicle GHG emissions on a well-to-wheels basis, next-generation biofuels

such as lignocellulosic bioethanol could offer up to a 90 percent GHG reduction benefit. Building a substantial fleet of flexible-fuel vehicles (FFVs) provides a bridge to the widespread use of lower-carbon biofuels in the future.

Ford has a long history of developing vehicles that run on renewable biofuels. We produced the first flexible-fuel vehicle approximately 100 years ago: a Model T capable of running on gasoline or ethanol. Globally, Ford offers 14 models in the United States, Europe, Asia and South America that can run on E85, a blend of up to 85 percent bioethanol mixed with gasoline. Ford has manufactured more than five million FFVs, including 2.5 million in the United States and nearly 2 million in Brazil.

In Europe, Ford is a market leader and pioneer in bioethanol-powered FFVs, with more than 70,000 vehicles delivered to customers since 2001. Ford FFV models are now available in 17 European markets, with Sweden, Germany, the Netherlands, Spain and France showing the strongest demand.

In the United States, we have committed to doubling the number of FFVs in our lineup by 2010. Assuming continuing incentives that encourage the manufacture, distribution and availability of renewable fuels and the production of FFVs, we stand ready to expand FFV output to 50 percent of total vehicle production by 2012.

Alternative fuels pose a classic chicken-and-egg problem – automakers can produce a range of products capable of running on fuels with varying carbon content, but the benefits are only realized if energy providers bring the fuels to market and consumers demand both the vehicle and the fuel.

In the long term, we believe that next-generation biofuels made from a variety of feedstocks, including agricultural wastes (particularly lignocellulosic material) will be an important part of the GHG emission-reduction equation and will help address concerns about current-generation biofuels, including the potential competition between food and fuel crops and the conversion of natural lands to fuel production. These issues are explored in more detail in the Sustainable Technologies and Alternative Fuels Plan.

1. Of course, there is not only a need to reduce the fossil carbon content of the fuel itself, but to reduce any fossil-based CO_2 emitted during feed-stock excavation, fuel production and distribution.
2. *Ethanol: The Complete Lifecycle Picture*, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, March 2007.

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Driver

Paradoxically, the "driver" portion of the GHG emissions equation holds the potential for substantial emission reductions at minimal cost, but it is often overlooked. Ultimately, drivers decide which vehicles and fuels they will purchase and how those vehicles will be driven. While our major focus is on the vehicles we make, we have also reached out to drivers around the world to promote the practice of "eco-driving." We do this by providing training, information and vehicle technology that helps drivers learn how to drive using the least fuel possible.

Information Technology

The Ford Fusion Hybrid and Mercury Milan Hybrid come equipped with Ford's award-winning SmartGauge™ with EcoGuide digital instrument cluster. SmartGauge is designed to coach Ford hybrid owners to maximize fuel efficiency. High-resolution, full-color LCD screens can be configured by the driver to show different levels of information, including fuel and battery power levels, as well as average and instant miles per gallon. The technology gives the customer real-world feedback to make the most of their hybrid, acting as a good "coach" and engaging drivers in real time to help them achieve maximum fuel economy.

In Europe, the Ford EcoMode system that was first presented in the new Focus ECOnetic has been made available in a wider range of vehicles. Like SmartGauge, Ford EcoMode is an all-new driver information system that helps to educate the driver to achieve improved real-world fuel economy. The system will be implemented as an option in more European Ford models in the future.

In early 2010, Ford announced that its new in-vehicle system – MyFord Touch™ – will offer an array of real-time information on fuel-economy performance that can coach drivers to get more miles to the gallon and save on fuel costs. In addition, MyFord Touch's map-based navigation system offers an Eco-Route option that quickly calculates the most fuel-efficient route a driver can take to get from A to B. Ford testing shows that Eco-Route can help achieve fuel economy gains of up to 15 percent. MyFord Touch launches this summer on the 2011 Ford Edge and will be available globally on the 2012 Ford Focus. MyLincoln Touch will be standard equipment on new Lincoln vehicles beginning with the 2011 Lincoln MKX.

Eco-Driving Information and Training

Ford has demonstrated that drivers who practice "eco-driving" can improve their fuel economy by an average of 24 percent. Eco-driving tips are available to the public on Ford's website, and online training is available through the Ford Driving Skills for Life (FDSFL) program. In addition, a web-based eco-driving program has been available to all U.S. salaried Ford employees since 2006.

Ford began work on the eco-driving concept in 2000, when we first offered an eco-driving program through our German dealerships, in partnership with the German Federation of Driving Instructor Associations and the German Road Safety Council. That program trains drivers in conservation-minded driving and vehicle maintenance habits. It uses specially trained and certified instructors to run programs for several target groups, including fleet drivers and customers. By the end of 2009, more than 16,000 German drivers had been "eco-trained" under real-world conditions.

In Asia, Ford launched the FDSFL driver training program in 2008 with a "train-the-trainers" workshop in Bangkok, Thailand, in March. At the workshop, Ford professionals from Germany trained two to three representatives from the Philippines, Vietnam, Thailand and Indonesia. The FDSFL program was customized to address the higher average age of beginner drivers in the region, as well as the unique driving environments within each market. It places equal emphasis on safe driving and eco-driving, as customers in the region are interested in both.

In 2009, we continued with the successful roll-out of the program to additional markets. FDSFL is now in Indonesia, the Philippines, Thailand, Vietnam, China, Taiwan and India. During 2009 in

RELATED LINKS

Fordmotorcompany.com:

Eco-Driving: Ten Easy Tips for Saving Fuel

External Web Sites:

Driving Skills for Life: Eco-Driving

these markets, Ford provided training for roughly 11,000 licensed drivers and several thousand Ford India employees.

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Facilities

Ford has been a leader in facilities-related GHG and energy-use reductions, public reporting of our GHG emissions, and participation in GHG reduction and trading programs. Between 2000 and 2009, we:

- Reduced global energy consumption by 44 percent
- Reduced energy consumption per vehicle by 17.7 percent
- Reduced our total facilities-related carbon dioxide emissions by approximately 50 percent, or 4.8 million metric tons
- Reduced facilities-related CO_2 emissions per vehicle by 27 percent

In 2009, Ford improved energy efficiency in its North American operations by 4.6 percent, resulting in savings of approximately $15 million. To drive continued progress, we have set targets to improve our facility energy efficiency by 3 percent globally and 3 percent in North America in 2010.

These improvements have resulted from a sustained focus on improving energy efficiency. In early 2010, for example, we implemented a PC power management system to power down all of our desktop and notebook computers at night. We expect the program to reduce our annual energy costs by $1.2 million and our annual CO_2 emissions by 16,000 to 25,000 metric tons.

In several locations, we are using renewable energy to provide power and cut CO_2 emissions. Ford's Dagenham Diesel Centre in the UK, for example, was the first automotive plant in the world to obtain all of its electrical power needs from two on-site wind turbines, which have been in operation since 2004. A third two-megawatt wind turbine will be installed at Dagenham in 2010. In November 2009, we began powering the Genk, Belgium, plant with two wind turbines which will provide a significant portion of the plant's electrical power needs.

The U.S. Environmental Protection Agency and U.S. Department of Energy awarded Ford a 2010 Energy Star Sustained Excellence Award, which recognizes Ford's continued leadership and commitment to protecting the environment through energy efficiency. This is Ford's fifth consecutive year winning this prestigious award. For more information on our energy efficiency and renewable energy programs, please see the Environment section.

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Operational Energy Use and Greenhouse Gas Emissions

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Logistics

Our logistics operations provide for the safe and efficient transport of parts from our supply base to our manufacturing plants and of finished vehicles from the end of our assembly lines to our dealerships. Though logistics accounts for a relatively small percentage of total vehicle life-cycle emissions, we are working hard to maximize the efficiency of these operations to reduce costs and environmental impacts. We have taken steps to quantify the CO_2 footprint of our logistics operations and reduce it through a variety of measures, such as shifting to rail and sea shipping and other efficiency measures. Please see the Environment section for more details.

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Supply Chain: Logistics

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Supply Chain

In 2009 and early 2010, we took significant steps to better understand the risks and opportunities of GHG regulation and climate change for our suppliers and, by extension, for Ford. We have worked hard to reduce GHG emissions from our products and operations, which enhances our competitiveness, and we hope to help promote similar competitiveness throughout the automotive supply chain.

Ford has signed on to be a "road tester" of the World Resources Institute/World Business Council for Sustainable Development's Scope 3 Greenhouse Gas Reporting Protocol. Ford road tested the widely used and respected Scope 1 (direct GHG emissions) and Scope 2 (indirect emissions, e.g., from electricity production) protocols. The Scope 3 protocol covers outsourced activities, supplier manufacturing and product use. The draft standards were developed through a global, collaborative multi-stakeholder process, with participation from over 1,000 volunteer representatives from industry, government, academia and nongovernmental organizations. The road testing process will provide real-world feedback to ensure the standards can be practically implemented by companies and organizations from a variety of sectors, sizes and geographic areas around the world. The final standards are scheduled to be published in December 2010. Ford's contribution will be to request data from selected Tier 1 production suppliers, representing close to 30 percent of Ford's $65 billion in annual procurement spending, and to provide feedback on practical aspects of using the protocol.

Ford has also joined the Carbon Disclosure Project's Supply Chain initiative. Through this effort, Ford is working with selected suppliers to gather qualitative as well as quantitative information about the suppliers' climate risks and emissions and how they are managing them.

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External Web Sites:

WRI/WBCSD Greenhouse Gas Protocol

Carbon Disclosure Project Supply Chain Initiative

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Climate Change Policy and Partnerships

During 2009, the climate change policy landscape continued to evolve. The recession put economic issues at the top of government and public agendas. The Copenhagen summit fell short of producing a binding global agreement, and climate change legislation did not pass the U.S. Congress.

In the United States and elsewhere, we continue to actively advocate for comprehensive policy approaches that will provide a coherent framework for greenhouse gas (GHG) emission reductions, so that companies can move forward in transforming their businesses with a clear understanding of their obligations. GHG regulations can have a critical impact on an automaker's business, because they can have the effect of regulating what vehicles we are allowed to build and sell. Carbon dioxide (CO_2) emissions standards for motor vehicles are functionally equivalent to fuel economy standards, because the amount of CO_2 produced by a vehicle is proportional to the amount of fuel used.

Our global approach to product planning and policy participation is based on the science of climate stabilization. We accept that simply "not getting worse" is not good enough. The auto industry must work together with suppliers, government, the fuel industry and consumers to reduce CO_2 levels from transportation so we can help stabilize atmospheric CO_2 concentrations. Accomplishing this goal will require that all sectors of the economy, including the transportation sector, do their share. To achieve real and lasting results, all global stakeholders must make long-term commitments for a sustainable future.

In our major markets, the regulation of fuel economy and/or vehicle CO_2 emissions is becoming increasingly complex. In addition to competing federal and regional regulations, governments are taking diverse approaches to incentives for emission reduction through rebates, fees, "feebates," privileges for low-emitting vehicles and penalties for high-emitting vehicles. This creates a very complex policy environment, and it is one important driver of our strategy to develop fuel-efficient and advanced technology platforms that can be shared globally and tailored to the needs of our customers.

We hope that the information that follows helps to illustrate the diverse array of GHG and fuel economy regulations and incentives that are now shaping our markets. This section provides more detail on developments and Ford's involvement in:

- U.S. policy
  - Climate change legislation
  - Greenhouse gas and fuel economy regulation
  - Incentives and market-based mechanisms
- European policy
- Canadian policy
- Asia Pacific policy
- South American policy
- Renewable fuel policy
- Partnerships and collaboration
- Emissions trading

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U.S. Policy

RELATED LINKS

External Web Sites:

U.S. Climate Action Partnership

National Highway Traffic Safety Administration

California Air Resources Board

Climate Change Legislation

In the United States, the policy debate surrounding climate change intensified in 2009, particularly at the end of the year. Among other developments: the U.S. government took an active role in the Copenhagen climate negotiations; Senator Cantwell introduced legislation that would cap greenhouse gases (GHGs) and return revenues from the program back to U.S. citizens; Senator Murkowski introduced an amendment that would have prevented the U.S. Environmental Protection Agency (EPA) from regulating greenhouse gases under the Clean Air Act; and Senators Kerry, Lieberman and Graham proposed a framework outlining principles for a comprehensive approach to climate and energy legislation.

Ford has been one of the more supportive companies on climate policy for some time. In 1999, we discussed greenhouse gases in our first corporate citizenship report. In late 2005, we published a special report on the Business Impact of Climate Change, and in 2007 we joined the United States Climate Action Partnership (USCAP) to support the prompt enactment of climate legislation.

These experiences, as well as our participation in carbon markets globally, have helped to shape Ford's position on climate policy. The linked issues of climate change and energy security create an urgent need to transform the country's economy into one with lower greenhouse gas emissions, higher energy efficiency and less dependence on fossil fuels and foreign oil. This transformation will require changes in all sectors of the economy and society. A comprehensive legislative framework is needed to spur these changes.

We believe we need a national, market-based approach to reducing GHG emissions if the United States is going to reduce emissions at the lowest cost per ton. Thus, we support the creation of an efficient, economy-wide cap-and-trade framework with mechanisms to avoid unintended adverse effects on the economy. An economy-wide cap-and-trade program would provide flexibility to regulated entities while allowing market mechanisms to determine where GHG reductions can be achieved at the lowest cost. The environment doesn't care where reductions occur, but the economy does, and given the potentially high cost of abatement, it is important to achieve the lowest cost possible.

This position is consistent with that of USCAP, a group of businesses and leading environmental organizations that have come together to call on the federal government to quickly enact strong national legislation to require significant reductions of GHG emissions.

Ford has been criticized for taking this position. On one side of the argument, some stakeholders do not think Ford should be supporting climate legislation and question our membership in groups like USCAP. To those, we say that without a cohesive national energy and climate policy that places a price on carbon, we could be caught in a cycle of starting and stopping technology development. That is simply not good policy or good business, particularly when the technology development requires billions of dollars of investment. We need predictability in order to plan our products.

On the other side are stakeholders who urge Ford to be more aggressive and want us to drop out of groups like the U.S. Chamber of Commerce that may have views and actions on climate change that potentially conflict with Ford's position. To them we say that despite differences on this specific issue, Ford has not changed its position on climate change.

The Chamber has been a critical ally on a broad range of business and environmental issues important to Ford and the global auto industry, including the One National Program, vehicle scrappage program, trade issues, anti-counterfeiting parts actions and legal reforms. It is important to our business, our customers and other stakeholders that we remain a member of the Chamber.

Yet Ford will always speak with its own voice. We will do so on climate change (and other issues, for that matter) where it is essential to our business that we articulate our position separately from that of any association of which we are a member.

We believe our position on climate change is very clear. You know it by our actions. You see it in our commitment to reduce the CO_2 emissions from both our products and facilities. Bottom line – we are doing what's right for our customers and the environment.

We will continue to advocate for effective climate change policies that drive down GHG emissions and provide a framework for sound business and product planning.

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Greenhouse Gas and Fuel Economy Regulation

Since our last report, a number of significant developments have taken place in the United States with respect to regulatory programs that would set greenhouse gas emissions or fuel economy standards for motor vehicles.

- In May 2009, President Obama announced an agreement in principle among the EPA, the National Highway Traffic Safety Administration (NHTSA), the state of California and the automotive industry to implement a National Program for motor vehicle greenhouse gas and fuel economy standards.
- In September 2009, the EPA issued a final rule mandating greenhouse gas reporting. The rule requires facilities that emit 25,000 metric tons or more carbon dioxide equivalent per year to submit annual reports to the EPA. It also imposes new reporting requirements on heavy-duty engine and vehicle manufacturers, who must measure and report CO_2 beginning in the 2011 model year, methane in the 2012 model year, and N_2O in the 2013 model year.
- In December 2009, the EPA finalized its endangerment finding that greenhouse gas concentrations in the atmosphere threaten public health and the welfare of current and future generations. This finding is a prerequisite to establishing federal regulations for greenhouse gas emissions.
- On April 1, 2010, the EPA and NHTSA published a joint final rule that implements the National Program agreement by establishing harmonized Corporate Average Fuel Economy and greenhouse gas emissions standards for the 2012 to 2016 model years. The standards target an overall industry fleet-wide average for fuel economy of 35.5 mpg (250 g/mi CO_2). After the 2016 model year, the standards are expected to increase year-over-year, approaching 40 mpg by 2020.
- The EPA and NHTSA are planning to set greenhouse gas and fuel economy standards for medium- and heavy-duty trucks. The EPA plans to publish draft greenhouse gas regulations for these vehicles in mid-2010, with a phase-in beginning in 2014 model year, while NHTSA's fuel economy standards are not expected to take effect until the 2016 model year. The focus will be on complete vehicles with 8,500–14,000 lb. gross vehicle weight rating.

The finalization of the National Program for fuel economy and greenhouse gas emissions sets the regulatory path forward that we need to carry out our plans and achieve the goals of improved fuel efficiency, increased energy security and reduced GHG emissions. The National Program will employ an attribute-based vehicle target-setting methodology, which allows manufacturers to build a single light-duty fleet that would satisfy all of the requirements under both programs.

From an environmental standpoint, the National Program avoids a patchwork of competing state and federal regulations that would have led to unnecessary duplication, market disruption and increased compliance costs. This program addresses our concerns about state-by-state overlapping and competing regulations.

The National Program also gives us flexibility to meet the final standards by making the progression toward the 2016 goal more linear, allowing us the time needed to phase in advanced technology on future models. The National Program also allows for fleet averaging on a nationwide basis, which is critical to vehicle manufacturers. Since a manufacturer's fleet mix at the state level can vary considerably from its overall national fleet mix, state-specific standards would likely lead to product restrictions and reduced consumer choice in some states. Nationwide fleet averaging avoids this problem with no loss of environmental benefits.

We support the manner in which President Obama and the federal agencies have harmonized fuel economy and greenhouse gas emissions rules into a single National Program. Ford views the One

National Program as a significant and positive step for all stakeholders toward our common goals of energy security and reduced greenhouse gas emissions. We are committed to working constructively with the Obama administration, Congress and federal regulators at NHTSA and EPA toward the implementation of One National Program beyond the 2016 model year.

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Incentives and Market-Based Mechanisms

In June 2009, the U.S. Congress passed and the President approved a "Cash for Clunkers" program. For two months over the summer, the program provided a popular consumer incentive for trading in a less fuel-efficient vehicle for a new, more fuel-efficient one. The Ford Focus and Ford Escape were among the top new vehicles purchased in the Cash for Clunkers program. Ford increased production to meet demand and saw sales rise significantly during those months. Ford supported the legislation, as did several associations of which it is a member, including the Alliance of Automobile Manufacturers and the U.S. Chamber of Commerce. The benefits of this program in terms of reduced fuel consumption and lower carbon emissions from the vehicle fleet have been significant and will be realized over the coming years as these more-efficient vehicles continue to operate.

Ford also supports comprehensive legislation that will create a price signal for consumers. Thoughtful and comprehensive national energy and climate policy that places a price on carbon is needed to support the billions of dollars being invested into low-carbon and fuel-efficient vehicle technologies. Without a cohesive policy that includes a price signal, we could be caught in a cycle where development of the advanced technologies needed to help address climate change and energy security is sporadic.

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European Policy

During 2009, the EU finalized CO_2 car targets based on car weight, part of an ambitious European energy and climate change package to which the industry will continue to contribute. The European auto industry is ready to meet the new law's standards for passenger cars, despite the sudden dramatic economic downturn that has severely limited the resources available to respond.

Under the new rules, manufacturers are required to ensure that the industry average fleet CO_2 emissions – for all the vehicles they make that are registered in the EU – are below 130 g/km. In 2012, 65 percent of each manufacturer's fleet must comply with this target. The percentage increases to 75 percent in 2013, 80 percent in 2014 and 100 percent in 2015. The long-term target for CO_2 emissions is set to 95 g/km; it will be reviewed again in 2013.

This approach gives the auto industry the necessary lead-time to adjust its development and production cycles to the legal requirements and to limit the financial risks caused by largely unpredictable factors, including consumer preferences, market trends, economic developments and legal requirements in different fields.

In some member states, CO_2 taxation is in place to encourage the early introduction of low-CO_2 vehicles with major tax break points, often around 100 g/km, 120 g/km and 160g/km. Unfortunately, these tax break points are not harmonized between the European countries.

Commercial vehicle targets have also been proposed of 175 g CO_2/km (with phase in during 2014 to 2016, with 75 percent of the fleet to comply in 2014, 80 percent in 2015 and 100 percent in 2016) and 135 g CO_2/km in 2020 for commercial vehicles. European policy makers are now urged to perform a thorough analysis of the proposal's impact on the economy, employment and the environment, in particular with regard to the long-term target.

The industry will continue to invest heavily in research and development and new product programs in order to reach the short-term targets. The long-term target will require technological breakthroughs, new refuelling infrastructure and a swift renewal of the car fleet on Europe's roads.

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Canadian Policy

In April 2010, Environment Canada released a draft greenhouse gas emissions regulation for 2011 to 2016 model year passenger automobiles and light trucks. This proposal attempts to align emission standards and test procedures with those of the United States. The proposal provides companies with similar compliance flexibilities to those available under the EPA's GHG proposal, including advanced technology credits, air conditioning leakage and efficiency credits, flexible-fuel vehicle credits through the 2015 model year, and credit transfer among fleets. A final rule is expected to be published in 2010.

The Provinces of Quebec and British Columbia are participants in the Western Climate Change Initiative and have committed to follow California's lead on vehicle CO_2 regulation. Quebec has adopted a GHG regulation based on the California standards, but California has agreed to defer to the U.S. federal program for the 2012 to 2016 model years. We are hopeful that, like California, the provinces will see the benefit of a single continental standard that includes the United States and Canada. Ford has participated in regulatory discussions on this issue, providing technical expertise and supporting a tough aligned standard.

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Asia Pacific Policy

In Ford's Asia Pacific and Africa region, sales in China are growing rapidly. Economic growth is a key priority of the Chinese government, to be balanced with energy security and a cleaner environment.

The China Automotive Technology and Research Center released for comment a draft national standard on the Stage III fuel economy limits for passenger cars, with phase-in of implementation targeted for the 2012 model year. During the phase-in period, the ratio of the Corporate Average Fuel Consumption to the Target Corporate Average Fuel Consumption must meet a declining ratio from 109 percent in 2012 to 100 percent in 2015.

The Chinese government provides limited incentives for electric vehicle fleet purchasers under local government control in 13 cities initially, with plans to expand to others up to 2012. Diesel use is discouraged in passenger car applications in the near term, due to fuel availability concerns.

Japan, South Korea and Taiwan have released new or modified fuel economy limits, while Hong Kong, South Korea and Taiwan have linked tax incentives to fuel economy and CO_2 targets.

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South American Policy

In Brazil, our largest South American market, the use of biofuels is a national policy, with 100 percent of gasoline blended with 20 to 25 percent ethanol, and extensive use of pure ethanol as motor fuel. Most new vehicles are designed to accommodate varying amounts of ethanol. A minimum of 5 percent biodiesel must be added to diesel. Emission requirements are periodically updated by an emissions-control program. A voluntary fuel economy labeling program is also in place. A star ranking for light vehicles was recently introduced, favoring low-emission, low-CO_2, ethanol, flexible-fuel or hybrid vehicles. Diesel use in light vehicles under 1.0 ton payload is not allowed, except for combined usage vehicles with special off-road characteristics. The government is also studying incentives for hybrids and electric vehicles.

Ford has supported the region's biofuels initiatives since the 1970s and offers a wide range of vehicles capable of running on 100 percent ethanol. We also provide light- and heavy-duty vehicles that meet biodiesel requirements.

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Renewable Fuel Policies

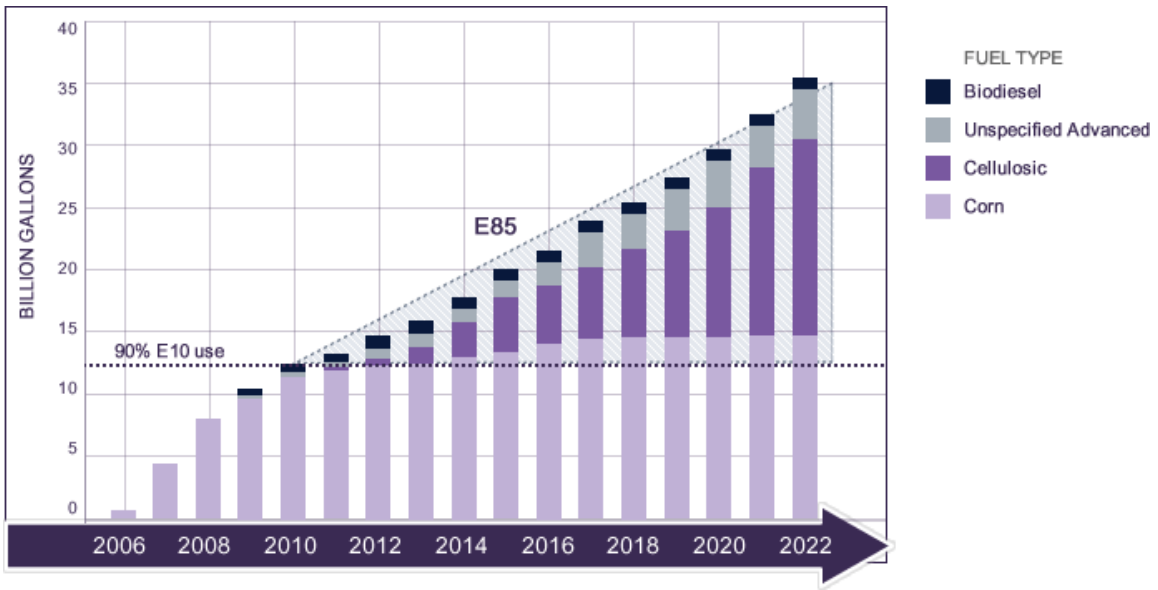
Today, more than 80 percent of global oil reserves are limited to 10 countries, while biofuels made from sugarcane can be produced in more than 100 countries. First-generation biofuels are playing an important role in building consumer awareness and spurring capital investment in infrastructure and facilities that can be used for more promising second-generation biofuels.

Policies across the globe are aimed at increasing the use and availability of biofuels. The United States adopted the Renewable Fuel Standard requiring 36 billion gallons of biofuels by 2022, including more than 20 billion gallons of low-carbon advanced biofuels. The EU Renewable Energy Directive establishes a 10 percent renewable energy target for transportation energy in 2020. And Brazil has had a very aggressive domestic ethanol program for years.

But these policies aren't enough. Providing value is critical to engage consumers and get them to use alternative energy sources. Hundreds of millions of vehicles in operation today were designed to use ethanol blends containing less than 10 percent ethanol, and our transportation energy infrastructure was set up to deliver petroleum-based fuels.

Ford is a leader in providing vehicles that can operate on biofuels. We are expanding our offerings of flexible-fuel vehicles because of the tremendous opportunities with biofuels. Ford's vision for biofuels is for them to be an alternative to gasoline rather than simply a gasoline additive – where accelerated use of renewable fuels delivers increased energy security, enhances economic development and helps to address climate change. This vision will require rapidly expanding the number of vehicles that can operate on biofuels, increasing the number of stations offering biofuels, developing the fuel distribution network to support customer choice and value, and achieving technology breakthroughs to commercialize advanced biofuels.

U.S. Renewable Fuel Standard



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Partnerships and Collaboration

Addressing the linked issues of climate change and energy security requires an integrated approach – a partnership of all stakeholders, including the automotive industry, the fuel industry, other industries and enterprises, governments and consumers. It will also require the best thinking from all of these sectors.

Ford is involved in numerous partnerships and alliances with universities, coalitions, nongovernmental organizations and other companies to improve our understanding of climate change. For example, Ford is:

- A member of USCAP, an alliance of major businesses and leading climate and environmental groups that have come together to develop an economy-wide, market-driven approach to reduce greenhouse gas emissions, as discussed in the U.S. Climate Change Legislation section.
- Working closely with BP to explore vehicle technologies and low-carbon fuel technologies.
- A founding member of the Carbon Mitigation Initiative at Princeton University to study the fundamental scientific, environmental and technical issues related to carbon management.
- A charter member of the Sustainable Transportation Energy Pathways Program at the University of California, Davis Institute of Transportation Studies, which aims to compare the societal and technical benefits of alternative sustainable fuel pathways.
- A member of the Massachusetts Institute of Technology's Joint Program on the Science and Policy of Global Climate Change.

Our participation in these and other partnerships helps us to formulate improved strategies for products and policies that will in turn help to address climate change and energy security. The following are links to the above organizations and others with which we cooperate on climate change issues:

- 25x'25 (Energy Future Coalition)
- BP
- Center for Clean Air Policy's Climate Policy Initiative
- Diesel Technology Forum
- Governors' Ethanol Coalition
- Harvard University, Belfer Center for Science and International Affairs
- MIT Joint Program on the Science and Policy of Global Change
- Growth Energy
- Princeton University's Carbon Mitigation Initiative
- United States Climate Action Partnership
- University of California at Davis, Institute of Transportation Studies Sustainable Transportation Energy Pathways Program
- Worldwide Business Council for Sustainable Development
- World Resources Institute

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Emissions Trading

Emissions trading is a key tool in both voluntary and mandatory greenhouse gas emissions-reduction programs. Ford was an early participant in carbon markets, with a goal of gaining experience that will be valuable in an increasingly carbon-constrained world.

For example, Ford, along with 11 other companies and the City of Chicago, founded the Chicago Climate Exchange (CCX) in 2003. The CCX is a GHG emissions-reduction and trading program for emission sources and projects in North America. It is a self-regulated, rules-based exchange designed and governed by CCX members. Ford is the first and only auto manufacturing participant in the Exchange.

Through the CCX, we committed to reducing our North American facility emissions by 6 percent between 2000 and 2010. The Exchange marks the first time in the United States that major companies in multiple industries have made a voluntary binding commitment to use emissions trading to reduce their North American GHG emissions. The Exchange enables participants to receive credit for their reductions and to buy and sell credits to find the most cost-effective way of achieving reductions.

Ford was also one of the original companies to join the UK Emissions Trading Scheme, the first government-sponsored, economy-wide, cross-industry GHG trading program. Ford Motor Company Limited (UK) entered the program in March 2002, committing to and achieving a 5 percent CO_2 reduction for eligible plants and facilities over five years.

Ford now participates in the EU Emission Trading Scheme, which commenced in January 2005 and is one of the policies being introduced across Europe to reduce emissions of carbon dioxide and other greenhouse gases. The second phase of this program runs from 2008 to 2012 and coincides with the first Kyoto Commitment Period. Additional five-year phases are expected to follow.

Despite Ford facilities' low-to-moderate CO_2 emissions (compared to other industry sectors), the EU Emission Trading Scheme regulations apply to eight Ford and Volvo facilities in the UK, Belgium, Sweden and Spain. The trading scheme requires us to apply for emissions permits, meet rigid emissions monitoring and reporting plans, arrange for third-party verification audits and manage tax and accounting issues related to emissions transactions.

Ford is actively involved in an ongoing evaluation of the EU Emission Trading Scheme at both EU and member-state levels. We have used the experience gained from participating in the market-based mechanisms described above to ensure that we operate in compliance with the scheme's regulatory framework. Ford anticipated the start of the EU Emission Trading Scheme and established internal business plans and objectives to maintain compliance with the new regulatory requirements.

Comprehensive reporting forms the foundation for all emissions trading. We voluntarily report GHG emissions in Australia, Canada, China, Mexico and the Philippines. This reporting, which has won several awards, is discussed in the Environment section.

RELATED LINKS

External Web Sites:

- Chicago Climate Exchange
- EU Emissions Trading Scheme

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Electrification: A Closer Look

During 2009, most major global automakers, including Ford, announced plans to make all-electric vehicles. Utilities are also working to understand how to provide power to plug-in electric vehicles in a way that is effective in meeting consumer needs, efficient for electricity providers and environmentally sound.

Why the rise in interest and activity? The electrification of vehicles could cut greenhouse gas (GHG) emissions from vehicles, increase the use of domestic energy sources, decrease pressure on petroleum stocks and reduce urban air pollution. With the benefit of information technologies and "smart grids," electrified automobiles could also improve the efficiency of the power grid – thereby lowering electricity costs – and facilitate the use of renewable energy sources, such as wind and solar.

But many challenges remain. For example, to fulfil their potential to cut lifecycle GHG emissions from automobiles, low-carbon electric generation must make up a greater part of the total supply, and electric vehicles must become functioning parts of "smart grids." Battery technologies are still evolving, and the cost of new-generation batteries remains high. Securing adequate supplies of lithium, rare earth metals and other materials may also pose social and environmental challenges.

This section provides an overview of Ford's electrification strategy. It also explores electrification technologies and their environmental benefits, and discusses how Ford is addressing key challenges and opportunities related to vehicle electrification. For more details on our electric vehicle technologies and other fuel-efficiency, advanced powertrain and alternative fuels technologies, please see the Sustainable Technologies and Alternative Fuels Plan.

RELATED LINKS

This Report:

Ford's Sustainable Technologies and Alternative Fuels Plan

Increasing Global Integration

New Global C-Car Platform Illustrates ONE Ford Plan in Action

Vehicle Web Sites:

Ford Fusion

Ford Escape

Ford Focus

Ford Transit Connect

Mercury Milan

Mercury Mariner

Ford's Electrification Strategy

Ford's electrification strategy foresees a future that includes different types of electrified vehicles, depending on customers' needs. There will not be a one-size-fits-all approach, but a more diverse, smart application of different types of electrified vehicle technologies. Our strategy includes the following.

Bring a Range of Electric Vehicles to Market

Ford already offers four hybrid electric vehicles (HEVs): The Ford Escape Hybrid, Mercury Mariner Hybrid, Ford Fusion Hybrid and Mercury Milan Hybrid. These HEVs are ideal for customers who drive a range of distances in varied driving conditions. Their most significant benefits come under urban stop-and-go driving conditions.

In 2009, we announced plans to introduce two battery electric vehicles (BEVs) in North America. We will introduce a BEV version of the Transit Connect utility van, targeted at commercial markets, in 2010. We are developing this vehicle in partnership with Azure Dynamics Vehicles, a leading electric adapter of commercial vehicles. In 2011, we will introduce a Focus BEV, called the Focus Electric, developed with our strategic supplier Magna International. Both of these BEVs will be ideal for customers who routinely travel relatively short distances (e.g., 80–100 miles) between charges.

Below is a detailed look at the components that will make up the new electrified vehicles.

FORD ALL-ELECTRIC VEHICLE

1. Motor Controller and Inverter
2. High Voltage Electric HVAC Compressor
3. Electric Water Pump
4. Traction Motor
5. Electric Power Steering

6. Gearbox
7. Modular Powertrain Candle
8. Electric Vacuum Pump
9. High Voltage PTC Electric Coolant Heater and Controller
10. Vehicle Control Unit
11. Battery Pack and Battery Cells
12. AC Charger
13. DC-DC Converter

* Image based on prototype, not production vehicle.

1 Motor Controller and Inverter

The motor controller monitors the motor's position, speed, power consumption and temperature. Using this information and the throttle command by the driver, the motor controller and inverter convert the DC voltage supplied by the battery to three precisely timed signals used to drive the motor.

2 High Voltage Electric HVAC Compressor

The high voltage air conditioning system is specifically designed for hybrid vehicle applications, drawing electrical energy directly from the main battery pack. An inverter is included in the compressor.

3 Electric Water Pump

The electric drive water pump circulates coolant for the traction motor, inverters, battery and heater.

4 Traction Motor

The traction motor performs the conversion between electrical and mechanical power. Electric motors also have efficiencies three times higher than that of a standard gasoline engine, minimizing energy loss and heat generation.

5 Electric Power Steering

Electro-hydraulic steering pump was installed to assist a retuned steering rack. A production vehicle would be designed with electric power steering.

6 Gearbox

The transmission has the identical role as in a conventional vehicle; however, it has different design considerations due to the higher RPM range available from the electric motor and increased emphasis on efficient and silent operation. The transmission is a single-speed unit with a 5.4:1 reduction.

7 Modular Powertrain Cradle

A structure for monitoring all engine compartment EV components and providing isolation from the vehicle body through traditional engine mounts.

8 Electric Vacuum Pump

The vacuum pump supplies vacuum to the brake system for power assist.

9 High Voltage PTC Electric Coolant Heater and Controller

Heating systems are specifically designed for hybrid vehicle applications. Energy efficient PTC technology is used to heat the coolant that circulates to the passenger car heater. Heat also may be circulated to the battery.

10 Vehicle Control Unit

The VCU communicates with the driver as well as each individual vehicle system to monitor and control the vehicle according to the algorithms developed by the vehicle integration team. The VCU manages the different energy sources available and the mechanical power being delivered to the wheels to maximize range.

11 Battery Pack and Battery Cells

The battery pack is made up of 7 battery modules of 14 cells, 98 cells total for 23 kWh of power. The batteries are air cooled using existing vehicle cabin air. The pack includes an electronic monitoring system known as the BMS that manages temperature and state of charge of each of the cells.

12 AC Charger

Power electronics are used to convert the off-vehicle AC source from the electrical grid to the DC voltage required by the

battery, thus charging the battery to its full state of charge in a matter of hours. The current charger is air cooled. The production design will accommodate both 110 and 220 voltage sources.

13 DC-DC Converter

A DC-DC converter allows the vehicle's main battery pack to charge the on-board 12V battery, which powers the vehicle's various accessories, headlights, etc.

In North America, we are also planning to introduce a Plug-in Hybrid Electric Vehicle (PHEV) commercially in 2012, along with our next-generation HEV technology. All of these will use lithium-ion batteries. We already have a test fleet of Ford Escape PHEVs on the road in partnership with a number of utility companies.

We recently announced plans to expand our electrified vehicle lineup to Europe. We will launch the Transit Connect Electric light commercial utility van in 2011 followed by the Ford Focus Electric in 2012. We also plan to introduce two next-generation gasoline HEVs and a PHEV in Europe in 2013. In preparation for the launch of these vehicles, Ford will participate in BEV test trials in the UK and Germany with Transit commercial vehicles equipped with a pure electric powertrain, as well as battery electric prototype passenger cars, to test the technology's suitability in real-world situations.

Use Global Platforms

Because the platforms on which these future Ford products will be based are our highest-volume global platforms, they offer tremendous opportunities for production economies of scale. The Focus Electric, for example, will be based on Ford's next-generation Focus model. It is one of up to 10 vehicles that will be developed from the Company's new global "C-car" platform, which is expected to deliver as many as 2 million vehicles annually. We will be producing the vehicles on flexible manufacturing lines capable of producing a BEV, HEV, PHEV or efficient gasoline- or diesel-powered vehicle. We also share many of the electrified components between the different vehicles. These strategies are key to making electrified vehicles affordable.

Collaborate

Gearing up for the development and diffusion of these new technologies will be a global challenge. Major advances have already been made on the electrical technology at the core of the next-generation electrified vehicles, and there's more to come. In Ford's vision, a coalition of automotive manufacturers and other stakeholders will work together to develop technologies, standards and cost efficiencies to commercialize electrified vehicles. It will take a collaborative approach of automakers, battery producers, suppliers, fuel producers, utilities, educators and researchers, as well as policy makers and opinion shapers, to help us make the transition and realize the full benefits of electrification.

Traditional automotive suppliers transforming themselves for electrification are being joined by new suppliers adapting electronics to the automotive environment. Significant possibilities exist for innovation in battery technology, power electronics and the development of motors, generators, high-voltage systems and other components.

Ford's plan calls for strategic partnering with key suppliers who bring technical expertise, financial solidity and collaborative spirit. We believe that working with a range of partners will allow us to gain greater understanding of the connectivity of vehicles to the electric grid, promote the necessary infrastructure and bring down the costs of the technology to make it more accessible for consumers.

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Comparing Electrification Technologies

Electricity plays a role in all current vehicle technologies. In the early 1900s, for example, conventional gasoline and diesel vehicles began using a lead-acid battery to provide power to start the vehicle instead of a hand crank. Recently, in the quest for better fuel economy and lower greenhouse gas emissions, automakers have begun to design a variety of vehicles that use electric power for more functions, including providing some or all of the power necessary to move the vehicle.

A range of vehicle types, from conventional gasoline to pure electric, is shown in the table below. In the near- and mid-term, the largest volume of electrified vehicles will likely be hybrid electric vehicles, which use both a gas engine and a battery electric motor but do not plug into the electric grid. In 2009, approximately 700,000 HEVs were sold globally. In the United States, HEVs make up approximately 3 percent of the market for new vehicles.

In the longer term, electrified vehicles that get some or all of their energy directly from the electric grid, including plug-in hybrid electric vehicles and battery electric vehicles, are likely to play an increasingly significant role. The table below provides a generalized overview of the relative benefits and impacts of these different electrified vehicle technologies, based on an average compact or "C-car" sedan like the Ford Focus. The numbers in the table represent approximations based on Ford's testing and modeling research; they are not precisely representative of any current or future Ford products.

RELATED LINKS

This Report:

Ford's Sustainable Technologies and Alternative Fuels Plan

	Internal Combustion Engine	Micro-Hybrid[1]	HEV	PHEV	BEV
Technology Overview	Traditional gas or diesel engine.	Traditional gas or diesel engine and powertrain with stop/start capability, which shuts down the engine when the vehicle is stopped and automatically restarts it before the accelerator pedal is pressed to resume driving. Regenerative brake recharging improves fuel economy.	Uses both a gas or diesel engine and an electric motor. Can run exclusively on battery power, exclusively on gas power or on a combination of both. Also has stop/start capability and regenerative braking – a key to efficiently recharging the battery.	Uses a high-capacity battery that can be charged from an ordinary household 110 volt outlet. When the battery is depleted, the PHEV runs like a regular HEV[2].	Uses only a battery-powered electric motor, no gas or diesel engine. Runs entirely on electricity from batteries, which can be charged from household outlets or specialized charging stations.
Ideal Driving Conditions	Flexible for a wide range of uses.	Flexible for a wide range of uses. Improved fuel economy in urban driving.	Flexible for a wide range of uses. Excellent urban fuel economy. Improved highway fuel economy.	Flexible for a wide range of uses. Dramatically improved fuel economy in city driving. Suitable for customers who have access to a plug for overnight recharging and drive a combination of urban and longer commute distances.	Ideal for customers with access to a plug at home or work who have shorter, predictable daily trips of less than 80 miles total.
Technology Benefits/Costs based on Compact or "C-sized" Sedan[3]					
Fuel Economy[4] (Roughly real-world fuel economy for a compact sedan)	~ 30 mpg	~31–32 mpg	~45 mpg[5]	Not applicable. Similar to HEV when running on gasoline. No gasoline used when running on electricity from the grid.	Not applicable.

Range on Tank/Charge[6]	~405 miles/tank	~425 miles/tank	~610 miles/tank	An all-electric equivalent operating range of 10–40 miles, depending on battery size. A minimum 800-mile range when combining electric and gas. Range could be much greater than 600 miles/tank based on the number of times the battery is charged.	Up to 80 miles on a charge.
Fueling/Charging Time	Minutes	Minutes	Minutes	2–4 hours with a 220-volt outlet and 4–8 hours with a 110-volt outlet.	6–8 hours with a 220-volt outlet and 12–16 hours with a 110-volt outlet.
CO_2 emissions[7]					
Well to Tank	~35 g/km		~23 g/km	Current Grid:[8] ~91 g/km	Current Grid:[8] ~114 g/km
Tank to Wheels	~150 g/km		~101 g/km	Current Grid:[8] ~26 g/km	Current Grid:[8] 0 g/km
Well to Wheels[9]	~185 g/km		~124 g/km[10]	Current Grid:[8] ~117 g/km[11]	Current Grid:[8] ~114 g/km[12]
Purchase Price Premium	$0	$300–$500	$2,500 to $5,000	$10,000 to $20,000	$15,000 to $25,000
Annual Fuel Cost	~$1,200 annual fuel costs[13]	~$1,150 annual fuel costs[14]	~$800 annual fuel costs[15]	~$450 annual fuel costs[16]	~$350 annual fuel costs[17]
Payback Period[18]	NA	~4 to 7 years	~9 to 12 years	~19 to 26 years	~28 to 34 years

1. Some automakers consider this a form of hybrid vehicle. However, Ford views and is implementing these technologies as part of our strategy to improve the fuel economy of conventional internal combustion engine vehicles.
2. Another type of PHEV, often called an Extended Range Electric Vehicle, runs entirely on battery power until the battery is depleted, and then the onboard gas-powered engine runs to recharge the battery. The wheels are driven only by the electric motor, and the engine's sole purpose is to recharge the battery.
3. These numbers are for comparison purposes only. They are based on modeling and testing calculations and do not necessarily represent the numbers that would be achieved in real-world driving conditions, nor do they represent actual products that Ford currently makes or may produce.
4. The internal-combustion engine fuel economy estimate is based on the calculation used by the U.S. Environmental Protection Agency to develop Combined Fuel Economy (city/highway) values for the labels affixed to new vehicles. The Combined Fuel Economy value is intended to represent the approximate fuel economy that most consumers can expect based on a typical mix of city and highway driving. Estimates for the other technologies are based on the metro-highway drive cycle used for the U.S. fuel-economy regulations. Fuel economy calculations for all of the technologies are based in U.S. gallons and on U.S. drive cycles.
5. In general, HEVs deliver approximately 40–50 percent better fuel economy than comparably sized non-hybrids.
6. All estimates are based on a 13.5-gallon tank except for the BEV, which has no fuel tank.
7. In vehicles using internal combustion engines, the fuel feedstock is assumed to be petroleum. In micro-hybrid vehicles, the fuel feedstock is also assumed to be petroleum.
8. "Current grid" assumes average current emissions from U.S. power generation.
9. "Well to wheels" carbon dioxide (CO_2) includes all CO_2 emissions generated in the process of producing the fuel or electricity as well as the CO_2 emissions created by burning the fuel in the vehicle itself. It is useful to break this down into "well to tank" emissions, which measure the CO_2 emissions generated by excavating the feedstocks and producing and distributing the fuel or electricity, and "tank to wheels" emissions, which include the CO_2 generated by burning the fuel in the vehicle. "Well to tank" emissions are based on the GREET v. 1.8a model developed by the Argonne National Lab. "Tank to wheels" calculations are based on Ford's own calculations using the metro-highway drive cycle and energy use for electric vehicles. However, official methods for calculating CO_2 emissions from PHEVs and BEVs have not yet been defined.
10. In HEVs, the fuel feedstock is assumed to be petroleum.
11. In PHEVs, the "well to tank" emissions are based on the percentage of emissions from petroleum fuel production and distribution and electric power generation, and the "tank to wheels" emissions are based on the percentage of time the vehicle is driven using petroleum-based fuel.
12. In BEVs, "well to tank" emissions include emissions related to electric-power generation, and "tank to wheels" emissions are zero, because no CO_2 is produced by running the vehicle on batteries charged with electrical power.
13. Based on 12,000 miles/year, 30 mpg and $3/gallon.
14. Based on 12,000 miles/year, 32 mpg and $3/gallon.

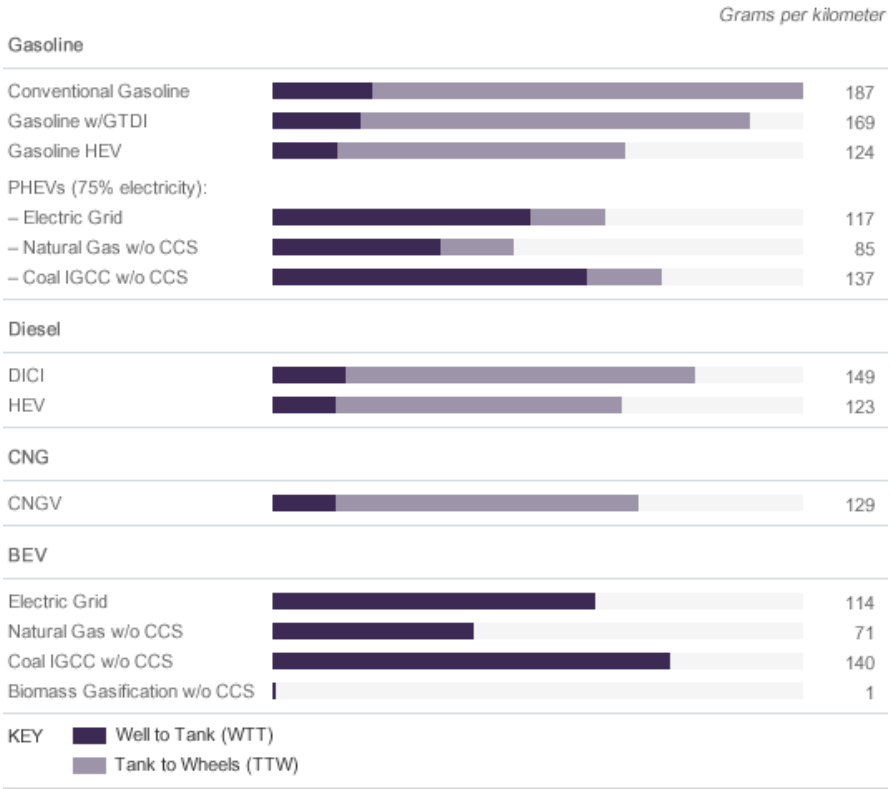
15. Based on 12,000 miles/year, 45 mpg and $3/gallon.
16. Based on 12,000 miles/year, 75 percent in electric mode at 3.6 miles/kWh and 10 cents/kWh, and 25 percent in gasoline-engine mode at 45 mpg and $3/gallon.
17. Based on 12,000 miles/year, 3.6 miles/kWh and 10 cents/kWh.
18. Based on the purchase price without any possible government incentives such as tax credits.

Environmental Benefits of Electrified Vehicles

Full BEVs are considered "zero emission" because they don't release greenhouse gases or other pollutants during use. But that term can be misleading. Operating an electric vehicle can cause emissions, but the location of the emissions is shifted from the vehicle to the power plant. Electric vehicles do reduce pollutants generated by burning petroleum fuel in the vehicle in proportion to the reduction in vehicle fuel consumption. However, replacing gasoline with electricity generated from coal, for example, could result in emissions at the power plant, including carbon dioxide, nitrous oxides, sulfur dioxide, volatile organic compounds, carbon monoxide and particulate matter. As a result, the environmental benefits of PHEVs and BEVs depend largely on the fuels used to power the electrical grid. Operating a PHEV or BEV on the current average U.S. electrical grid, which relies heavily on coal power, has only a small emissions advantage over an HEV.

Plug-in vehicles could help reduce overall CO_2 and other emissions if the electricity used to charge them was generated from cleaner fuels, and ideally renewable resources, which produce significantly fewer emissions than the coal or natural gas that are often used for power generation. In addition, "smart grids" that include grid-to-vehicle communications would enable utilities to make more efficient use of electricity supplies, thereby potentially reducing emissions and electricity costs.

WTW Fossil CO_2 Emissions for 2010 Compact-Size Vehicle



Grams per kilometer

	WTT	TTW	WTW
Gasoline			
Conventional Gasoline	35	152	187

Gasoline w/GTDI	31	137	169
Gasoline HEV	23	101	124
PHEVs (75% electricity)			
– Electric Grid	91	26	117
– Natural Gas w/o CCS	59	26	85
– Coal IGCC w/o CCS	111	26	137
Diesel			
DICI	26	123	149
HEV	22	101	123
CNG			
CNGV	22	107	129
BEV			
Electric Grid	114	0	114
Natural Gas w/o CCS	71	0	71
Coal IGCC w/o CCS	140	0	140
Biomass Gasification w/o CCS	1	0	1

Note that the numbers are not precise and are shown for directional purposes only.

Abbreviations: GTDI – gasoline turbo with direct injection, or EcoBoost™; CCS – carbon capture and storage; IGCC – integrated gasification combined cycle; DICI – direct injection and compression ignition; CNGV – compressed natural-gas vehicle; HEV – hybrid electric vehicle; PHEV – plug-in hybrid electric vehicle; BEV – battery electric vehicle. In this table, "well to tank" CO_2 emissions are based on the GREET v. 1.8a model developed by the Argonne National Lab. "Tank to wheels" calculations are based on Ford's own calculations using the metro-highway drive cycle and energy use for electric vehicles, However, official methods for calculating CO_2 emissions from PHEVs and BEVs have not yet been defined.

Using renewable energy: Recharging using electricity generated by renewable energy sources (such as solar, wind, hydropower or biomass) can cut CO_2 emissions dramatically, but production from these sources can be variable and unpredictable. Smart vehicle-to-grid communication can help utilities better use renewable energy sources. For example, it can allow vehicles to recharge at times that wind power is most available (usually at night) or during the day from solar arrays, depending on the renewable source available and its output. As the power-generation sector continues to improve its fuel mix and explore technologies such as carbon sequestration (i.e., collecting CO_2 emissions from power generation and storing them), the environmental impact of driving a plug-in vehicle will diminish substantially – perhaps even toward zero.

"Smart grids:" The development of "smart grid" technologies, which can provide utilities and customers with real-time information on energy use and energy prices, is a key enabler of efficient integration of electric vehicles and grids.

Smart charging would allow utilities to control the current going into the vehicle battery and thereby help to ensure that electric vehicles generate as little incremental CO_2 as possible. Armed with the knowledge of how much energy is needed and by when, a smart grid would be able to use the batteries in electric vehicles to store excess electricity or to shut off the current when there is a sudden demand elsewhere. This control would help to smooth the peaks and valleys of supply and demand at both the micro and macro level. Vehicles could also be taken off the grid completely, by charging with electricity from small individual generation units, such as household solar electric and wind power systems.

Smart grids will also help make the electrical grid and electrical vehicle charging more efficient by channelling vehicle recharging to times when electrical grid resources are currently underutilized. Since demand for electricity fluctuates (generally peaking in the afternoon and dropping off at night), utilities typically use a mix of fuels and power plant types to meet demand. That means that the environmental impacts of electric vehicle use will vary depending on where and when the vehicles are charged. During certain seasons and particularly at night, utilities generally have excess generation capacity – unused resources that create financial inefficiency. Charging PHEVs and BEVs during these off-peak hours, when this excess capacity is available, can increase the overall efficiency of the electric grid – potentially reducing CO_2 emissions, as well as the cost of electricity. But if PHEVs and BEVs are charged at peak times, that could create increased CO_2 emissions from power generation and also create demand for additional power plants. Utilities have a role to play in educating electrified-vehicle users and providing them with incentives to charge their vehicles at the most beneficial time.

With all these variables, utilities will be key partners in defining and developing electricity supply systems for electric vehicles that are efficient, affordable and environmentally sound. That's why Ford has partnered with several utilities throughout the United States and Canada, as well as the U.S. Department of Energy for its PHEV pilot program.

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Electrification Challenges and Opportunities and Ford's Response

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Ford's Sustainable Technologies and Alternative Fuels Plan

Ford's Green Energy Partnerships with Federal and State Governments

Vehicle Web Sites:

Ford Focus

To realize the potential benefits of vehicle electrification, a range of issues must be addressed, including the significant issues of cost and customer convenience. Vehicle and fuel technologies interact in a complex system that includes vehicle technologies, battery technologies, fuel types and energy-generation technologies, all of which determine potential impacts on the environment and energy security.

Costs and Savings

The current cost to make plug-in vehicles is substantially higher than that of conventional vehicles, largely due to the cost of batteries. Depending on electricity costs, however, the energy cost to operate an all-electric car is in the range of 2 to 3 cents per mile, compared to about 8 to 10 cents[1] per mile for a conventional gasoline-powered vehicle. So, lower operating costs can help offset the higher initial purchase costs of electric vehicles (EVs).

Automakers will need to invest billions of dollars to develop next-generation electrification technologies and electrified vehicles. Utilities will need to invest to increase electricity generation and transmission capacity, with generally higher costs for green electricity sources. Governments will also need to invest by encouraging and facilitating the development of technology and infrastructure and providing incentives for consumers to buy EVs.

FORD'S RESPONSE

Ford is working with a range of battery suppliers and other partners to develop next-generation battery technologies that will help to bring costs down. In addition, we have been working with utilities and other partners to understand how to make vehicle recharging as efficient as possible.

For example, we recently announced that we are collaborating with Microsoft on new energy-management software that will help customers determine when and how to most efficiently and affordably recharge battery electric and plug-in hybrid vehicles, while giving utilities better tools for managing the expected changes in energy demand. Ford is the first automaker to announce the use of this new technology, called Hohm™, which will be used in the Focus Electric starting next year. Hohm is an Internet-based service designed to help customers avoid unnecessary expense by providing insight into their energy usage patterns and suggesting ways to increase conservation. With Ford electric vehicles, Hohm also will help drivers to determine the best time to charge their vehicle and help prevent the need for infrastructure upgrades to support the added energy demand. Ford and Microsoft plan to continue to work with utility partners and municipalities to help further develop systems to maximize the effectiveness of electric vehicles and their interaction with the electricity grid.

In addition to this work with partners, we are also planning our electric vehicle strategy based on our highest-volume, global platforms, which could also help reduce the costs of electric vehicles by creating economies of scale.

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Battery Technology

Current-generation HEVs run on nickel metal hydride batteries, which offer significant improvements over traditional lead-acid batteries. For example, nickel metal hydride batteries deliver twice the power output for the weight (energy density) compared to lead-acid batteries. Nickel metal hydride batteries have worked well in non-plug-in hybrids, which are designed to allow for constant discharging and recharging and are not expected to store and provide large amounts of energy. These batteries are reaching the end of their advancement potential, however, and new battery technologies are needed to improve on the current generation of HEVs.

PHEVs and BEVs make significant additional demands on battery technology. Unlike HEVs, which maintain a relatively constant state of charge, PHEV batteries are to be depleted to a low level when they are the primary energy source for the vehicle. And BEVs are designed to run solely on battery power. The batteries used in PHEVs and BEVs must function well in a wide range of conditions; tolerate running until nearly depleted and then being fully charged; store and provide a lot of power; last a minimum of 10 years or 150,000 miles; and, ideally, be compact and lightweight.

Automakers are moving toward lithium-ion batteries for next-generation HEVs and for PHEVs and BEVs. These batteries have greater energy density and are lighter than nickel metal hydride batteries. However, the technology is still evolving, and costs must drop considerably before they can be widely used (see section on Battery Evolution below).

It is also important to have a plan for recycling batteries at the end of their useful lives to minimize the material going to landfill, and to ensure that critical elements, such as rare earth metals and lithium, are recovered and reused in new batteries.

Battery Evolution

Battery technology is evolving. The following table shows how new battery technology, such as the nickel metal hydride batteries used in today's HEVs and the lithium-ion battery technology of next-generation electrified vehicles compare to the traditional 12-volt lead-acid battery.

	Lead-Acid	Nickel Metal Hydride (Ni-MH)	Lithium-Ion (Li-ion)
First Commercial Use	1859	1989	1991
Current Automotive Use	Traditional 12-volt batteries	Battery technology developed for today's generation of hybrid vehicles	Under development for future hybrid electric and battery electric vehicles; some manufacturers launching in limited volumes in 2010
Strengths	• Long proven in automotive use	• Twice the energy for the weight as compared to lead-acid • Proven robustness	• About twice the energy content of Ni-MH and better suited to future plug-in electrified vehicle applications • By taking up less space in the vehicle, provides far greater flexibility for automotive designers
Weaknesses	• Heavy; its lower energy-to-weight ratio makes it unsuitable for electrified vehicle usage	• High cost (four times the cost of lead-acid); limited potential for further development	• Although proven in consumer electronics, this technology is still under development for automotive applications • Will remain relatively expensive until volume production is reached

Specific Energy (Watt hours per kilogram)	30–40	65–70	100–150
Recyclability	Excellent	Good	Very Good

FORD'S RESPONSE

Ford has been working with battery supplier partners to develop next-generation battery technologies that can improve HEV performance and stand up to the new challenges presented by BEVs and PHEVs. For example, the performance of batteries varies with weather conditions. We are conducting tests of the effects of temperatures and other conditions so we understand and can communicate to customers the impacts on expected range between rechargings.

Ford is also working with researchers at the University of Michigan and the Massachusetts Institute of Technology to develop and test improved lithium-ion battery technology. This research is funded in part by a $55 million tax credit incentive Ford received from the Michigan Economic Development Corporation.

All of Ford's electrified products, including HEVs, PHEVs and BEVs, will use lithium-ion battery cells by 2012.

Ford is also developing a comprehensive strategy to address batteries that can no longer be used in vehicles. Ford engages with all the parties that handle end-of-life batteries, including customers, local authorities, emergency services (e.g., tow trucks), dealerships, independent workshops and garages, and vehicle recyclers. Customers can recycle their batteries with local recyclers or bring them to any Ford or Lincoln dealer for no-cost recycling.

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Recharging

To realize their full all-electric range, plug-in vehicles must be charged regularly. They can be charged using a standard household electric current (e.g., 110 volts in the United States), but they will recharge faster when using a higher-voltage electric service. Since electricity supplies are ubiquitous in developed countries, much of the needed infrastructure already exists, but new charging facilities will be required in public places as well as apartments and homes that lack accessible places to plug in. Other future recharging options, being considered by various entities, might include battery swap stations and inductive charging where batteries are charged without a plug through "wireless recharge." This latter type of recharging could occur in special parking spots or even in "charging lanes" that could be included in roadways in the future.

Another focus of research is rapid-charging technologies. Ideally, an electric vehicle could be charged in the same amount of time it takes to fill a fuel tank, though the electric power needed to perform a rapid charge – and the bulky additional charging infrastructure required to deliver it – remain challenges. In addition, with existing technology, rapid charging typically shortens the life of batteries, but efforts are underway to develop cell technologies capable of rapid recharge without battery degradation in the future.

Developing and agreeing on standard charging connectors between vehicles and the grid and vehicle-to-grid communication protocol are another key challenge. These will be necessary to allow all plug-in vehicles to use a common charging point when they need to recharge.

These and other charging options are all under consideration. Having an understanding of these technologies and how they may develop will be important in making electrified vehicles practical and affordable.

FORD'S RESPONSE

In North America, Ford participated with the Society of Automotive Engineers to successfully align all original equipment manufacturers (OEMs) on a standard charge connector and communication protocol that will enable all plug-in vehicles to use common charge points. This will be a key enabler for adoption in North America; the same connector is under consideration in Europe and China. Further standardization initiatives that will be helpful include fast-charge standards (for DC charging) and vehicle-to-grid standards. Global commonality for these systems will also be needed. Ford is also working with other OEMs and suppliers to provide a common database of charge point locations for display within vehicles' navigation systems.

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Supply Chain Issues

As widespread electrification of automobiles moves closer to reality, a new set of concerns is emerging over the environmental and social impacts of extracting and processing key materials needed to make electric vehicles. In particular, there are concerns about lithium (used to make the lithium-ion batteries that are widely used in consumer electronics and will be used in BEV and PHEV vehicles) and rare earth metals (which are used in electric motors for vehicles, wind turbines and other advanced technologies).

Significantly accelerating the production of electric vehicles is likely to require the use of much greater quantities of lithium and rare earth metals. Production of these resources is concentrated in a few countries, including Chile, Bolivia and China, which has led to questions about the adequacy of the supply of these resources and the potential for rising and volatile prices as demand puts pressure on existing supplies. In addition, there are concerns about geopolitical risks posed by the limited availability of these materials. Could we be trading dependence on one limited resource (petroleum) for another? Attention is also focusing on the possibility of risks such as bribery and corruption and the potential for environmental and human rights abuses. Finally, the processing of lithium, in particular, uses large quantities of water.

FORD'S RESPONSE

We take these concerns very seriously. Ford generally does not purchase raw materials such as lithium and rare earth metals directly – they are purchased by our suppliers (or their suppliers) and provided to us in parts for our vehicles. As described in the Human Rights section of this report, our contracts with suppliers require compliance with the legal requirements of Ford's Code of Basic Working Conditions and the adoption of a certified environmental management system (ISO 14001). We are working in our supply chain to build the capability of our suppliers to provide sound working conditions in their operations, and we assess compliance with our Code of Basic Working Conditions in target markets. We ask the suppliers we work with to take similar steps with their suppliers. We are also working cooperatively with other automakers to extend this approach through the entire automotive supply chain.

As part of our water strategy, we are evaluating the water requirements and impacts of powering vehicles by conventional fuels, biofuels and electricity. This work includes a study of the water requirements of lithium extraction and processing.

We will continue to monitor and assess these issues for their potential impact on our electrification strategy and our sustainability commitments.

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Electric Vehicle–Utility Interaction

Clearly, electric vehicles – which plug into the grid for some or all of their power – will have an impact on electric utilities. If electric vehicles are charged during times of peak electricity demand, they may overstress the current grid and require the construction of additional electricity supply. Furthermore, recharging vehicles during peak demand would significantly reduce the operating cost benefits expected from electric vehicles. In addition, "smart grid" technology that allows communication between recharging vehicles and the electrical grid will be required to maximize recharging efficiency and minimize stress to the grid. Automakers and utilities will have to work together to develop this "smart" vehicle-to-grid communication system. Overcoming these challenges will require significant collaboration between automakers, electric utilities and governmental regulatory agencies and legislators.

Because utilities and automakers have not had to work together in the past, effective collaboration requires developing new relationships and learning about each other's business and regulatory challenges. For example, utilities and automakers have very different business models: utilities operate regionally and have little to no direct competition within their markets, while automakers operate and compete globally. Further, automakers are primarily regulated at the national level, while utilities face more local and state regulations, which increases the difficulty of establishing a national strategy for vehicle-to-grid interaction. It will be important for automakers and utilities to understand and address these kinds of differences as they work together on vehicle electrification issues.

FORD'S RESPONSE

In 2007, we initiated the Ford Plug-in Project, a collaborative project with the U.S. Department of Energy, the Electric Power Research Institute, the New York State Energy Research and Development Authority, and 10 utilities (Southern California Edison, American Electric Power, ConEdison of New York, DTE Energy, National Grid, New York Power Authority, Progress Energy, Southern Company-Alabama Power, Pepco Holdings and Hydro Quebec). In this project we are road testing our Escape PHEV prototypes that are equipped with vehicle-to-electric "smart grid" communications and control systems that will enable plug-in electric vehicles to interface with the electric grid, and will allow the vehicle operator to determine when and for how long to recharge the vehicle. This will potentially enable the user to take advantage of lower, off-peak utility rates.

Ford is also working with DTE Energy on a solar energy and battery energy storage project, using vehicle batteries to store energy from a solar array. For more information on this project, please see Ford's Green Energy Partnerships with Federal and State Governments.

This collaboration continues to yield important lessons for both automakers and utilities. Some of the key learnings we have gained so far include the following:

- Electric vehicles provide additional impetus to develop smart communication systems between the vehicle and the grid. This communication will allow the consumer to know if and when lower electricity rates are available (as some utilities will offer lower rates during the night when energy demand is low), and help prevent additional loads on the infrastructure. Providing utilities the ability to control when vehicles are charged, or assurances that vehicles will not be charged during peak demand time, could prevent costly infrastructure upgrades, some of which may be passed back to the customer by the utility (e.g., if a transformer needs to be upgraded).
- Smart vehicle charging will require that utilities and automakers develop a common standard for vehicle-to-grid and grid-to-home meter communications. Currently, utilities tend to operate regionally, but electric vehicles will increase the need for common national and even international standards.
- Widespread use of electric vehicles will likely require that vehicle power consumption be measured separately from home electricity use, requiring either additional meters or "smart" meters. Additionally, the pooling of electrified vehicles in a particular region may require upgrades to the transformers and/or substations that form the electrical grid in that area.
- There are interesting possibilities for vehicle-to-grid and vehicle-to-home power flow. However, there are significant challenges to making these possibilities a reality. For example, technical, safety, codes/standards compliance, legal, robustness and business case issues need further study prior to commercialization.
- Vehicle owners will likely want to be able to charge their vehicles at any geographic location and – in those cases where another payment method isn't used – have the cost applied to their home energy bill. In addition, vehicle identification and home meter association must be seamless for the customer. This kind of mobile or remote billing for vehicle charging services will require a paradigm shift in the utility industry's current billing processes and tools.
- Automakers and utilities both benefit from working together on outreach to local, state and federal regulators and legislators. Ford and our utility partners are already working with legislators and regulators on national standards for vehicle charging infrastructure and incentives and strategies to bring costs down.
- Utilities and automakers need to work together to educate consumers about the differences between electric vehicles and traditional vehicles so that consumers understand how to make the most of electric vehicles and charging infrastructure.

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1. Assuming an energy consumption of about 3 to 4 miles/kWh at 10 cents/kWh for the electric vehicle, and a fuel economy of 30–40 miles/gallon at $3/gallon for the gasoline vehicle.

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Mobility

2009 HIGHLIGHTS:

- Helped to catalyze urban mobility collaborations in Richmond, Virginia; Seattle, Washington; Portland, Oregon; and Los Angeles, California, while continuing our work in Atlanta

By providing affordable transportation and applying emerging information technologies, we believe Ford can contribute to addressing mobility challenges.

Most automakers define *sustainable mobility* as reducing the environmental impacts of the vehicles they offer by cutting the vehicles' lifecycle greenhouse gases and other emissions. At Ford, we see this as an important piece of the picture – and we're working hard to achieve it.

But there are other important pieces as well. Consider this: today, there are 6.7 billion people in the world. By 2050, there will be 9 billion, 75 percent of whom will live in urban areas. Putting 9 billion people into private automobiles is neither practical nor desirable. The Earth lacks the resources to make and fuel those autos and to provide infrastructure to accommodate them. And with congestion already choking many urban areas, adding more vehicles – however clean – onto already-stressed roads will threaten to overwhelm them (see Mega-Cities: the Icon of Personal Mobility Challenges).

Yet mobility is a critical enabler of economic growth and human potential. As the Earth's population grows, so does its need for mobility. That mobility must be based on new, more sustainable models. This doesn't mean giving up the freedom afforded by private automobiles. It means including them as one of many options in an integrated system that harnesses the power of information and communication technologies to tie together diverse, appealing modes of travel. It also means building and redeveloping communities with sustainable mobility in mind.

At Ford, our goal is to make mobility affordable in every sense of the word – economically, environmentally and socially. We believe that creative collaboration and innovative technologies and services can yield new solutions, and that these solutions can harness the benefits of mobility while reducing its environmental and social impacts. We aim to be a trusted partner with the many institutions that must cooperate to implement new mobility models. Not only will we be ready with low-carbon vehicles, but also with expertise, insight and mobility solutions.

Electric Vehicles Play a Role

Electric vehicles could play an important role in more sustainable, integrated, urban mobility systems. But a wholesale shift to electric vehicles will also require systemic change. Charging infrastructure needs to be developed, electric vehicles must be integrated with electric utilities, and vehicles and grids must be knit together into an efficient system. The technologies that enable these shifts – universal connectivity, in-vehicle information systems, cloud computing – are becoming widely available. For example, our newest-generation SYNC® system makes automobiles rolling communication and information platforms, which will help them to integrate seamlessly with "smart" electric grids and mobility systems.

PERSPECTIVES ON SUSTAINABILITY

Steve Marshall

Senior Fellow, Cascadia Center for Regional Development

Read more

Progress in 2009

During 2009, Ford continued to catalyze and conduct dialogues with key regional stakeholders, exploring sustainable mobility projects in Atlanta, Georgia; Richmond, Virginia; Seattle, Washington; Portland, Oregon; and Los Angeles, California. These efforts brought together a range of parties – including municipal and state government officials, utilities, transportation planners and nongovernmental organizations – to envision solutions and pursue the funding needed to implement them. Ford's role in these projects built on its experience catalyzing mobility projects in India, South Africa and Brazil.

This section describes the actions Ford is taking to deepen our understanding of the future of mobility and to develop and test sustainable mobility solutions for all of our global customers.

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Ford's Approach to Urban Mobility: Catalyst for Learning, Collaboration, and Action

As mobility models change, so do the needs of our customers and potential customers. For several years, Ford has worked with a wide range of academic and public- and private-sector partners to explore sustainable mobility issues, advance thinking and catalyze on-the-ground projects to test new approaches to urban mobility (see What Is New Mobility?). Our first such projects were in Cape Town, South Africa; Chennai, India; and Atlanta, Georgia.

The insights we've gained from this work have helped us to understand the forces that are shaping our markets, our role in addressing mobility challenges and the opportunities these trends present for us (see Mobility Challenges and Opportunities). In particular, we have gained insight into the mobility needs of urban residents, the institutions that must work together to forge solutions and the range of technical solutions and their strengths and weaknesses. These lessons are reflected in our urban mobility methodology, which can be applied to a variety of settings and challenges. This equips us as a company to respond to rapidly changing needs for mobility by offering new products and services.

RELATED LINKS

This Report:

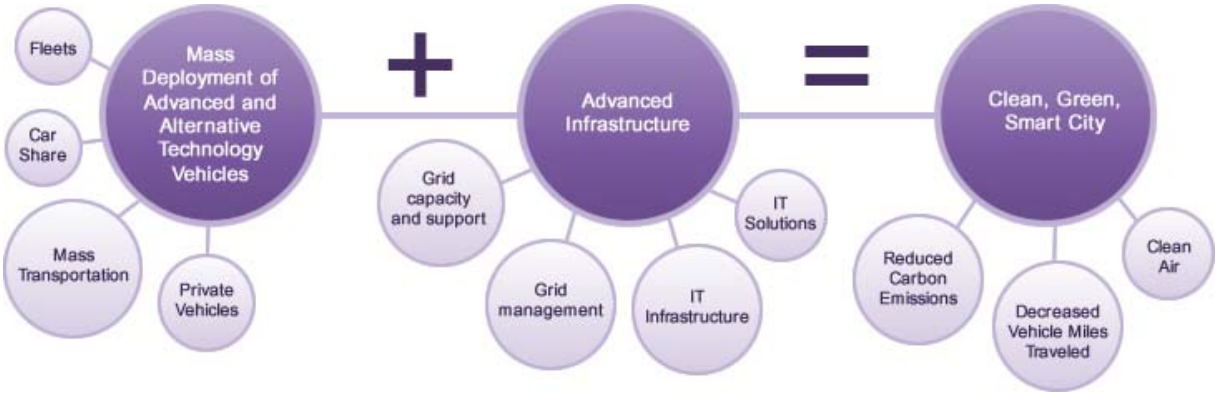
- What is New Mobility?
- Mobility Challenges and Opportunities
- Electrification: A Closer Look

External Web Sites:

- Cascadia Center for Regional Development
- Georgia Tech

Collaboration to Support Electrification

We are using what we've learned to support the effort to build markets for electric vehicles in the United States. These vehicles will play an important role in reducing carbon dioxide (CO_2) emissions from the transportation sector. They can be deployed in various ways as part of urban mobility solutions. But, like the creation of integrated mobility systems, the manufacturing, distribution and sales of electric vehicles will require new business models. Multiple technologies and industries will need to converge to marry vehicles and infrastructure, utility services and information technology. Transportation and utilities will become interdependent. City leaders will need to take a system-wide approach to develop clean, green, "smart" and sustainable cities (see figure below).



With rising concern over carbon emissions from private vehicles and renewed emphasis on green transportation and infrastructure, urban leaders are looking for creative solutions to enhance transit use and reduce car use by linking bicycles, electric bikes and scooters, car sharing, car rental and ridesharing. With help from economic stimulus funds, they are poised to increase investment in electric and plug-in hybrid electric vehicles, including cars, trucks, conventional buses, trolley buses, express buses and all forms of rail, including streetcars, light rail and heavy rail.

We are poised to work with these leaders by providing technology as well as experience catalyzing mobility partnerships. On the technology side, Ford will launch its first 21st century electric vehicle, the electric Transit Connect targeted at commercial markets, in 2010. We are developing this battery electric vehicle (BEV) in partnership with Azure Dynamics Vehicles, a leading electric adapter of commercial vehicles. In 2011, we will introduce a Focus BEV, called the Focus Electric,

developed in collaboration with Magna International. Both of these BEVs will be ideal for customers who routinely travel relatively short distances (e.g., 80–100 miles) between charges. In North America, we are also planning to introduce a plug-in hybrid electric vehicle (PHEV) commercially in 2012, along with our next-generation hybrid electric vehicle (HEV) technology. We already have a test fleet of PHEVs on the road in partnership with more than a dozen utility companies and other collaborators. These vehicles will also be introduced in Europe by 2013.

Ford has also been a leader in deploying vehicle communication and connectivity technologies, beginning with the SYNC® system. These technologies provide a platform for future communication between electric vehicles and "smart" electric grids and mobility information systems. In early 2010, we announced that we are collaborating with Microsoft on new energy-management software that will help customers determine when and how to most efficiently and affordably recharge BEVs and PHEVs, while giving utilities better tools for managing the expected changes in energy demand. Ford is the first automaker to announce the use of this new technology, called Hohm™, which will be used in the Focus Electric starting next year.

Several Ford functions – including the Sustainability and Environmental Policy group, Fleet Sales and Sustainable Mobility Technologies – are working together with a range of partners to deploy fleets of electric vehicles over the next five years. Our aim is not only to provide vehicles but to serve as a trusted partner in developing integrated solutions.

During 2009, we helped to catalyze urban mobility collaborations in Richmond, Virginia; Seattle, Washington; Portland, Oregon; and Los Angeles, California, while continuing our work in Atlanta. These collaborations focused on developing proposals for integrated urban mobility demonstration projects that incorporate electric vehicles as one of multiple transportation options. The organizations involved have included city and state agencies, utilities, transportation providers and others. These efforts will help to build the critical mass of electric vehicle sales that will be needed to help overcome a range of challenges to widespread electric vehicle use, including infrastructure, affordability, battery technology and public policy (see Electrification: A Closer Look for more discussion of challenges and solutions).

In Seattle, Washington, for example, we were a sponsor of a major conference called "Beyond Oil: The Sustainable Communities Initiative," organized by the Cascadia Center for Regional Development, a Seattle organization focused on regional transportation and sustainable development issues. The forum brought together city leaders, academic institutions, information technology providers and others to focus on solutions for more sustainable mobility in the Seattle region.

We also continue to support research into and development of mobility technologies. In Atlanta, for example, we supported students at Georgia Tech who developed technology that allows users to unlock shared bikes on the Georgia Tech campus using a cell phone. This technology adds flexibility and convenience to the bike-share concept.

In 2010 and beyond, we will continue to collaborate with our key partners (see Key Partners) as well as organizations in several U.S. cities that are committed to pursuing new mobility solutions.

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Mobility Challenges and Opportunities

Mobility is a basic human need. Developed and emerging economies alike require transportation systems to get goods to market and people to the places where they work, shop, dine, gather and have fun.

Automobiles have provided personal mobility for more than 100 years. There are currently 900 million vehicles in the world, and that number is increasing rapidly as individuals in developing markets reach new levels of prosperity; it could reach two billion by the middle of this century.

This sounds like good news for an automotive company, and to some extent, it is. Our most rapid sales growth is taking place in emerging markets. But a business model built on private ownership of automobiles comes with inherent challenges, which are related directly to the following current and emerging mega-trends:

Urbanization

By 2015, it is projected that at least 35 mega-cities will have a population of more than 10 million. The migration of rural populations to urban areas often outpaces infrastructure development, leading to overcrowded, substandard living conditions and inconvenient, congested transportation systems.

Congestion

Each year, traffic congestion is estimated to cost the United States $67.6 billion, and the average metropolitan driver endures 27 hours of traffic delays. In many places, especially developing countries, traffic delays are considerably worse, and are increasing at an alarming pace. As more vehicles crowd limited road networks, congestion increases. This, in turn, creates pollution, reduces fuel efficiency and wastes travelers' time.

Climate Change

The transportation of people and goods accounts for about a third of global human-caused greenhouse gas emissions. Stabilizing greenhouse gas emissions in the atmosphere will require a concerted effort on the part of the private and public sectors to achieve significant cuts in transport-related emissions, at a time when rapid growth in the transportation sector is anticipated.

Shifting Demographics

Different regions of the world are experiencing opposing population trends. Among the more developed countries, only the United States is growing in population; Europe, Russia and Japan are all shrinking. Regions of Africa and Asia are growing in population and will have large numbers of young people. But by the middle of this century, most of the world will be much older on average. With most people living in urban areas, more and different forms of mobility will be needed to support independent living for seniors, the disabled and young people.

Social Inequality

The growing gap between rich and poor creates enormous needs for innovative, affordable mobility solutions that meet human needs and help people build a better way of life. Unequal access to transportation often limits the opportunities available to those most in need. Better mobility is part of the solution to unemployment and income disparities.

Taken together, these trends point to increasingly diverse and fragmented markets for traditional automobile sales. They also point to significant opportunities for companies that are able to respond to mobility needs creatively.

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Climate Change

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Key Partners

Mobility issues are complex and rapidly changing. Developing solutions to mobility challenges requires innovative, systems thinking. That's why we've developed sustained relationships with organizations including the following that give us access to the latest research, insights and integrative ability.

RELATED LINKS

External Web Sites:

SMART

Georgia Tech

Sustainable Mobility and Accessibility Research and Transformation (SMART)

Ford has been working with the University of Michigan on the SMART project since April 2005. SMART takes a collaborative, systems approach to developing innovative, sustainable and connected mobility and accessibility solutions in urban regions around the globe. Building on the seminal work of Moving the Economy in Toronto, SMART has pioneered new thinking, new partnerships and pilot projects related to emerging New Mobility markets and industry development.

SMART has provided the empirical research and inspiration for Ford's mega-city mobility projects. The insights of the SMART leadership team have served as a foundation for our innovative approach to business opportunities related to New Mobility and for our work with other key sectors, including manufacturing, IT, logistics, tourism, real estate, design and more. In addition to developing New Mobility business opportunities and markets, SMART and Ford are seeking to improve quality of life, employment and other community benefits in cities all over the world over the long term. We are convinced that our partnership with SMART will produce a new systems approach for addressing the increasingly complex challenges to achieving sustainable mobility and accessibility globally, while at the same time transforming the transportation industry into a more sustainable and equitable New Mobility industry. (See What Is New Mobility?)

Georgia Tech Joint Research Projects

Ford and Georgia Tech have a strong cooperative relationship, focused particularly on sustainability. Our present joint research projects are funded under a multi-year agreement to partner in design, manufacturing and logistics, and in mega-city mobility research. Our collaborative approach has been effective in developing talent among students, faculty and Ford professionals, as knowledge is transferred between the university and company settings. For instance, the students develop enthusiasm for the contributions of engineering in the realms of manufacturing and sustainability, and they gain valuable work experience during summer internships. At present, Georgia Tech is assisting Ford by:

- Developing the business case for urban mobility, especially pertaining to finance, information technology and vehicles (including fuels, design, carbon and powertrains)
- Building on the results of Ford's prototype projects, particularly with regard to software device connections

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Mega-Cities: The Icon of Personal Mobility Challenges

Mega-cities are urban areas with more than 10 million residents. At least 25 mega-cities already exist worldwide. Twenty are located in the developing world, as are seven of the nine most populous. By 2015, there are projected to be at least 35 mega-cities, with virtually all the growth in developing countries. Mega-cities experience a wide range of social and environmental problems, many of them related to mobility.

All of the mega-trends we have identified, as well as other challenges to sustainable mobility, are at their worst in mega-cities, and engender paralyzing traffic congestion, air pollution, vehicle-related injuries and fatalities, and health problems. Furthermore, social inequality and the dislocation of families and communities are increasing as people move from rural areas to mega-cities seeking economic opportunities. To develop mega-city mobility strategies will require addressing the mobility needs of rural as well as urban residents, as many mega-city problems could be improved by developing new approaches to the transportation of people and goods between rural and urban areas, and by reducing the need for rural–urban migration.

TOOLBOX

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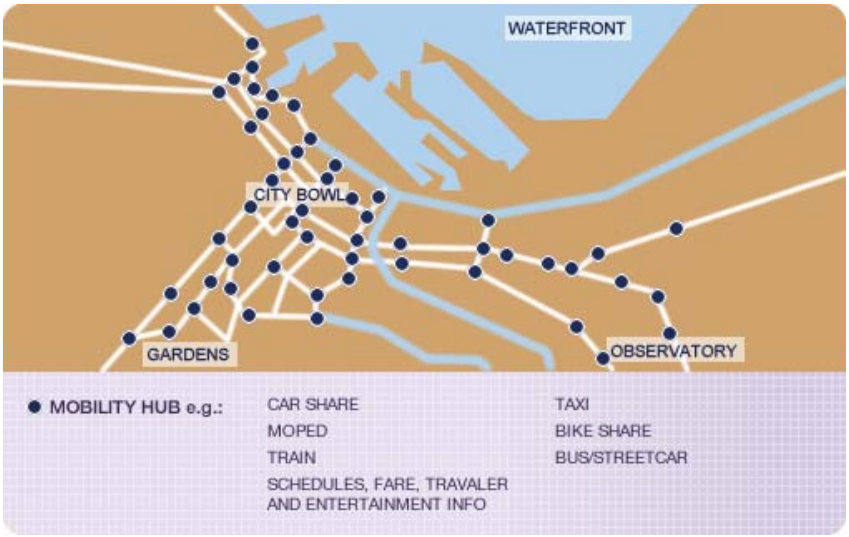
What Is New Mobility?

As we reach the limits of conventional models of mobility, "New Mobility" offers a practical route forward. New Mobility approaches transportation needs and options from a systems perspective. It relies on collaborative partnerships and information technology to bring existing services, products, technologies, infrastructure and design together into something that is greater than the sum of its parts – smarter, more sustainable, more convenient, more equitable and better connected.

Examples of New Mobility systems already exist, notably Hong Kong's "Octopus" system, which uses a "smart card" to provide travelers with access to multiple transit services as well as ferries, parking and retail outlets. Other examples exist in Bremen, Germany; Bogotá, Colombia; Paris, France; Curitiba, Brazil; Portland, Oregon; and more. Key features of New Mobility systems include the innovative use of technology to link diverse transportation systems such as rail, bus and subway with car sharing, bike sharing and other options, to provide flexible, seamless, door-to-door trips. Technologies can also enable distance working, learning, medicine and shopping, thereby reducing the need for some trips altogether. And still other information technologies support the sustainable and efficient movement of goods in urban regions, a growing area of concern and opportunity for innovation.

New Mobility also depends on something more old-fashioned: collaboration and partnership. Technology can "connect the dots," but only humans can get the varied institutions and interests involved in urban mobility to work toward a common end. Thus, New Mobility projects like those described in this section require extensive stakeholder engagement and establishment of trust between the many partners with a role to play.

NEW MOBILITY



Mobility Options

Urban commuters would be able to "connect the dots" using PDAs or cell phones, on which they could get scheduling, navigation, and congestion identification and avoidance information, as well as pay fares as needed.

Benefits

High-quality, safe, clean transportation that is widely accessible in crowded urban areas can reduce congestion, fuel consumption, pollution and carbon emissions.

TOOLBOX

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Human Rights

2009 HIGHLIGHTS:

- Trained more than 180,000 of our suppliers' workers in human rights through outreach programs
- Our human rights efforts were ranked first in *CRO* magazine's 100 Best Corporate Citizens list

We understand the positive impact our actions can have on our 176,000 employees and the million people who work for companies in our supply chain.

In 2000, Ford held a meeting with several prominent thought leaders from key stakeholder groups, as part of the development of our corporate citizenship strategy. The stakeholders identified several issues as the most important focus for Ford's strategy. Some issues, such as climate change, were not unexpected. More surprising was the issue of human rights. The stakeholders were asking Ford to take a leadership role in the industry by developing systems and programs to ensure sound working conditions in Ford facilities and our supply chain.

Despite the relative obscurity of the issue (at the time, working conditions in the automotive industry were not in the public eye), we recognized compelling business reasons to take up the cause. We believed then, and we still believe, that people are most likely to excel in an environment that aims for excellence. A safe workplace in which people are treated with respect promotes increased quality, productivity, employee retention and morale. It can also decrease quality problems and health care costs. This is true in our own facilities and in those of our suppliers. Indeed, we think a supplier company's efforts to address working conditions, environmental challenges and other sustainability issues are good indicators of its management's leadership capabilities.

Fast forward 10 years. Ford's Code of Basic Working Conditions (CBWC), adopted in 2003, applies throughout our global operations and $65 billion supply chain. We require our suppliers to ensure that our products – no matter where they are made – are manufactured under conditions that demonstrate respect for the people who make them. This is just as important to us as quality, cost competitiveness and timeliness of delivery. In early 2008, Ford joined the United Nations Global Compact (UNGC), a framework for businesses that are committed to aligning their operations and strategies with 10 universally accepted principles in the areas of human rights, labor, the environment and anti-corruption. This action reinforces our commitment to outstanding performance and transparency in these areas. We also actively participate by invitation in both the Human Rights and Supply Chain Sustainability Advisory Groups convened by the Global Compact. And we are leading an initiative through the Automotive Industry Action Group (AIAG) to develop a common approach to working conditions in the automotive supply chain. We have set goals that reflect our three-pronged approach to the issue:

- Engagement with Individual Supplier Facilities: Training and capability building form the basis of Ford's supply chain working conditions program, supported by assessments of individual factories (totaling more than 600 to date). Through Ford-administered programs and those conducted in conjunction with other automakers and the AIAG, we have trained 1,773 managers from 1,478 supplier companies on systemic solutions to working conditions

PERSPECTIVES ON SUSTAINABILITY

Timothy Fort

Executive Director and Professor of Ethics, Institute for Corporate Responsibility, George Washington University

Read more

RELATED LINKS

This Report:

Code of Basic Working Conditions

External Web Sites:

United Nations Global Compact

The Labour Principles of the United Nations Global Compact: A Guide for Business

DOWNLOADS

UN Global Compact Letter from Alan Mulally (pdf, 126kb)

challenges. Training participants are required, in turn, to cascade the training to their own management and employees as well as to clearly communicate expectations to their suppliers, thereby expanding the impact significantly.

- Engagement with Key Suppliers' Corporate Management: Ford is working with its strategic production suppliers at the corporate level to enhance their policies, verification systems and ability to influence their own supply chains. Our 90 Aligned Business Framework suppliers commit to manage and assure proper working and environmental conditions in their facilities and supply chains, and we are measuring their progress in doing so.

- Collaboration within the Automotive Industry: Ford is driving collaboration between automakers and supply chain companies on global working conditions issues through the AIAG.

The following are among the lessons we've learned in our decade of work in this area.

- Almost without exception, the systems and processes in place at Ford-owned facilities and joint ventures – from health and safety management to collective bargaining agreements – are sufficient to ensure compliance with the CBWC. In 2009, we conducted assessments at older facilities with "legacy" practices put in place by the prior owners. We have worked hard to modify and align those practices to achieve compliance with our Code.

- Our concern for human rights does not end at the factory fenceline. Issues ranging from environmental pollution to economic conditions in the local communities can affect the human rights of individuals. That's why our CBWC addresses community engagement and indigenous populations, bribery and corruption, and environment and sustainability.

- Assessing working conditions at supplier factories is necessary but not sufficient to ensure alignment with our CBWC. Through our efforts, we have learned the importance of helping suppliers build the capability to manage working conditions, rather than simply assessing their compliance with Ford and legal requirements (though assessments continue to provide important learnings).

- Due to the complex and overlapping nature of the automotive supply chain, action on the part of a single original equipment manufacturer (OEM) is less effective than OEMs working together toward a shared vision through joint programs. We see significant potential for collaborative action by automakers to establish a common, effective and efficient approach to ensuring sound working conditions in the automotive supply chain.

- Affecting the furthest reaches of our supply chain can be challenging. We have set the expectation that our direct (Tier 1) suppliers will not only provide sound working conditions in their own operations, but will expect the same of their suppliers, who in turn are to encourage their own suppliers to do the same. We work very closely with our strategic suppliers to cascade this approach through their supply chains. The further removed the supplier is from Ford, the harder it is to determine our influence on working conditions, and so our dialogue with our Tier 1 suppliers is critical.

We continue to adapt our approach as new opportunities and challenges emerge. Some of the issues we are currently evaluating and responding to include the following.

- As the widespread electrification of automobiles moves closer to reality, concerns are emerging over the environmental and social impacts of extracting and processing lithium (which is needed to make the lithium-ion batteries that will be used in battery electric and plug-in hybrid electric vehicles) and rare earth elements (which are used in electric motors for vehicles, wind turbines and other advanced technologies). We are exploring these issues as part of our approach to vehicle electrification. We are also looking at the raw materials used in information technology components, as we increase the capabilities of our SYNC® system.

- We believe that government can play a role in encouraging companies to manage human rights responsibly in their operations and supply chains. We are working with the U.S. Departments of State and Labor to explore this potential. (See the Public Policy section for more on this topic.)

- The availability and quality of freshwater is an issue of increasing global importance. Through work on our water strategy, we are exploring the human rights implications of increasing scarcity of and competition for water.

We are proud of our record on human rights and our leadership in the automotive industry. We will continue to deal with emerging issues responsibly, in line with our commitment to human rights, and to learn from our experience.

This section of our report covers the systems and initiatives we have established to communicate

our expectations throughout our own operations and to our suppliers, to assess alignment with the CBWC, to encourage our suppliers to implement similar approaches and to promote a coordinated, industry-based approach to working conditions in the automotive supply chain.

FORD ASSISTS WITH U.N. GLOBAL COMPACT STRATEGY

Ford was one of approximately 20 companies invited to join the UNGC's Supply Chain Sustainability Advisory Group – and the only North American automotive company invited to participate. The objective of the group is to produce guidance for Global Compact participants on how to develop more sustainable supply chain practices. The group's work stream will link with the Global Compact's issue working groups on human rights, labor, environment and anti-corruption. The advisory group will be asked to provide input to the overall strategy of the Global Compact on this issue and to the development of guidance material and other outputs. The resulting guidance documents and resources will be launched at the U.N. Global Compact Leaders Summit in June 2010 in New York.

Human rights refers to basic standards of treatment to which all people are entitled. It is a broad concept, with economic, social, cultural, political and civil dimensions. For Ford, this means ensuring that our products, no matter where they are made, are manufactured under conditions that demonstrate respect for the people who make them. It also means respecting the rights of people living in the communities around our facilities, and those of our suppliers, who may be affected by these operations.

Working conditions refers to aspects of human rights in the workplace, as governed by local laws and affected by international standards pertaining to workplace issues such as child labor, harassment and discrimination, health and safety, wages and benefits, freedom of association, working hours and forced labor.

THE 10 PRINCIPLES OF THE U.N. GLOBAL COMPACT

Human Rights

- Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
- Principle 2: make sure that they are not complicit in human rights abuses.

Labor Standards

- Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
- Principle 4: the elimination of all forms of forced and compulsory labor;
- Principle 5: the effective abolition of child labor; and
- Principle 6: the elimination of discrimination in respect of employment and occupation.

Environment

- Principle 7: Businesses should support a precautionary approach to environmental challenges;
- Principle 8: undertake initiatives to promote greater environmental responsibility; and
- Principle 9: encourage the development and diffusion of environmentally friendly technologies.

Anti-Corruption

- Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

TOOLBOX

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Ford's Commitment to Human Rights

Ford's commitment to human rights is embodied in our Code of Basic Working Conditions (CBWC), which forms the foundation of our work in our own operations and supply chain and our collaboration with others in the industry. The CBWC articulates our commitments on key human and labor rights issues. In effect since 2003, it was more formally adopted as a Policy Letter in 2007. The CBWC is based on fundamental elements of internationally recognized labor standards, including the Universal Declaration of Human Rights, International Labour Organization Covenants, the Organisation for Economic Co-operation and Development's Guidelines for Multinational Enterprises, the United Nations' Global Compact Principles, the Global Sullivan Principles, and standards of the Fair Labor Association and International Metalworkers' Federation. Ford encourages businesses throughout our supply chain to adopt and enforce similar policies, and seeks to identify and do business with organizations that conduct their businesses to standards that are consistent with the CBWC.

The CBWC covers workplace issues such as working hours, child labor and forced labor. It also reflects our increasingly integrated approach to managing human rights and community issues by articulating our commitments on several key issues that extend beyond the fencelines of our facilities, including community engagement and indigenous populations, bribery and corruption, and environment and sustainability.

We encourage employees who have a good-faith belief that there may have been a violation of this Code to report it through established channels, which vary by region, or to Ford's Office of the General Counsel.

These reports are then forwarded to the Manager of Human Rights, who takes action to clarify, validate and correct the situation, if necessary. No retaliatory actions are taken against employees who report concerns about violations of the CBWC.

RELATED LINKS

This Report:

- Code of Basic Working Conditions
- Community

TOOLBOX

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Code of Basic Working Conditions

This Code of Basic Working Conditions represents the commitment of Ford and its worldwide subsidiaries. The diverse group of men and women who work for Ford are our most important resource. In recognition of their contributions, we have developed policies and programs designed to ensure that our employees enjoy the protection afforded by the principles articulated today in this Code. While these principles are not new to Ford, they are vitally important to what we stand for as a company. Consequently, we have chosen to summarize them here in an expression of our global commitment.

While this Code of Conduct serves to detail, specifically, our standards for labor and environmental standards throughout our global operations, it also stands as a general endorsement of the following human rights frameworks and charters:

- The UN Universal Declaration of Human Rights
- The ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy
- OECD Guidelines for Multinational Enterprises
- The Global Sullivan Principles of Social Responsibility

The diverse universe in which Ford operates requires that a Code such as this be general in nature. In certain situations, local legal requirements, collective bargaining agreements and agreements freely entered into by employees may supersede portions of this Code. Nevertheless, we believe this Code affirms important, universal values that serve as the cornerstone of our relationship with employees.

Child Labor

We will not use child labor. In no event will we employ any person below the age of 15, unless this is part of a government-authorized job training or apprenticeship program that would clearly be beneficial to the persons participating.

Compensation

We will promote our employees' material well-being by providing compensation and benefits that are competitive and comply with applicable law.

Forced Labor

We will not use forced labor, regardless of its form. We will not tolerate physically abusive disciplinary practices.

Freedom of Association and Collective Bargaining

We recognize and respect our employees' right to associate freely and bargain collectively. We will work constructively with recognized representatives to promote the interests of our employees. In locations where employees are not represented by unions, we will seek to provide opportunities for employee concerns to be heard.

Harassment and Discrimination

We will not tolerate harassment or discrimination on the basis of sex, race, color, creed, religion, age, ethnic or national origin, marital/parental status, pregnancy, disability, sexual orientation or veteran status.

Health and Safety

We will provide and maintain for all employees a safe and healthy working environment that meets or exceeds applicable standards for occupational safety and health.

Work Hours

We will comply with applicable law regulating hours of work.

Community Engagement & Indigenous Populations

We shall consider indigenous peoples among our primary stakeholders in all projects we consider undertaking. We will openly and honestly engage all recognized members of our stakeholder community who have an interest in our activities.

Bribery and Corruption

We will under no circumstances tolerate the giving or receiving of undue reward to influence the behavior of another individual, organization, politician or government body, so as to acquire a commercial advantage; this extends to all of our regional operations, regardless of whether bribery is officially tolerated and condoned.

Environment and Sustainability

We will conduct business in an environmentally friendly and responsible manner. We will seek to reduce and minimize the environmental impact of all of our operations in the short term, as we seek to become an environmentally restorative and truly sustainable company in the long term.

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Working Conditions in Ford Plants

Ford's Code of Basic Working Conditions applies to our own facilities as well as those of our joint venture companies and suppliers. Since 2004, we have conducted 47 formal assessments of Ford facilities, six of which were joint-venture facilities.

During 2009, we conducted assessments at our Oakville plant in Ontario; our Valencia plant in Venezuela; our recently acquired plants – Troeller in Horizonte, Brazil, and Craiova in Craiova, Romania – and our joint-venture plants in Pleukdang, Thailand, and Chongqing, China. These sites were selected by Ford's Sustainability and Environmental Policy and Supply Chain Sustainability functions based on the sites' impact on our supply chain, emerging issues and the views of thought leaders, nongovernmental organization representatives and human rights activists.

The process for assessing Ford facilities includes a questionnaire to be completed by facility management and a detailed review of documents related to the full range of working conditions issues (e.g., collective bargaining agreements, grievance procedure logs, employee hotline records and health and safety audit reports).

The findings of the questionnaire and document review serve as the basis for interviews with facility management. Where procedures and/or documentation are lacking, or where we feel it would otherwise be valuable, the assessments also include facility visits.

The findings of the assessments are initially shared with human rights organizations with which Ford works and then published on our Web site. We have sought the opinions of neutral third parties who have visited plants and/or reviewed the assessment process, and they have agreed that the process is robust and has integrity.

The findings of the 2009 assessments were generally consistent with those of previous assessments. That is, they confirmed that Ford's wholly and majority-owned facilities are operating in compliance with our CBWC. Reflecting the expanded scope of the CBWC, the assessments also discuss and document community engagement efforts, effects on indigenous populations and environmental initiatives. However, we observed the impact that operating in countries with less-stable governments can make on our own CBWC elements and work rules. We took great care to ensure that these obstacles did not prevent us from achieving our objectives, and we plan to continue to monitor the facilities to detect and address any potential concerns.

We have received considerable and consistent positive feedback from external stakeholders about the policies and systems in place at Ford facilities. While we and our stakeholders have confidence in our systems, we nonetheless believe it is important to continue conducting the assessments given that conditions can change and new issues emerge.

DOWNLOADS

- Santa Rosa Human Rights Assessment (pdf, 61kb)
- Camacari Human Rights Assessment (pdf, 111kb)
- Ford Motor Company of Southern Africa Human Rights Assessment (pdf, 85kb)
- Vsevolozshk Human Rights Assessment (pdf, 85kb)
- Chicago Human Rights Assessment (pdf, 79kb)
- Hermosillo Human Rights Assessment (pdf, 152kb)
- Michigan Human Rights Assessment (pdf, 106kb)
- Broad Meadows Human Rights Assessment (pdf, 133kb)
- Lio Ho Human Rights Assessment (pdf, 103kb)
- Pacheco Human Rights Assessment (pdf, 1.45Mb)
- Changan Human Rights Assessment (October 10, 2006) (pdf, 56kb)
- Changan Human Rights Assessment (June 10, 2009) (pdf, 54kb)
- India Human Rights Assessment (pdf, 41kb)
- Otosan Human Rights Assessment (pdf, 63kb)
- Vietnam Human Rights Assessment (pdf, 73kb)
- Oakville Human Rights Assessment (pdf, 37kb)
- Valencia Human Rights Assessment

(pdf, 40kb)

Craiova Human Rights Assessment
(pdf, 58kb)

Louisville Human Rights Assessment
(pdf, 68kb)

Pleukdang Human Rights Assessment
(pdf, 80kb)

Troeller Human Rights Assessment
(pdf, 78kb)

São Bernardo Human Rights Assessment
(pdf, 76kb)

Code of Basic Working Conditions
(pdf, 14kb)

TOOLBOX

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Ford and the Automotive Industry Supply Chain

Our complex global supply chain encompasses several thousand supplier facilities that employ a million people. (See Supply Chain Profile.) We aim to ensure that everything we make – or others make for us – is produced consistent with local law and our Code of Basic Working Conditions. This can be challenging, as we have less control in suppliers' facilities than in our own, particularly at the sub-tier level (i.e., our suppliers' suppliers).

The legal structures governing working conditions, and the level of enforcement, vary widely across the countries in which we operate. Ensuring sound working conditions in the supply chain is ultimately the suppliers' responsibility, and we would like governments to play the lead role in enforcing compliance with laws. However, as customers, we also have an active role to play in supplier development.

Since we began work with our suppliers to ensure alignment with our CBWC, our approach has emphasized building capability throughout the supply chain to manage working conditions effectively. Our primary focus has been on training and education about working conditions issues, in conjunction with assessments of individual suppliers in order to verify performance and progress. We are committed to collaborative action to more effectively influence all levels of the automotive supply chain.

Our long-term vision is for our industry as a whole to converge on a set of common expectations for the global automotive supply chain and then work together to ensure that these expectations are met throughout the supply chain. We are working toward that goal comprehensively, with a three-pronged approach aimed at individual supplier facilities, supplier company management and auto company management. (See the "Expanding Impact on Working Conditions" graphic.)

183,052

Number of our suppliers' workers who have been trained in human rights based on our supplier outreach programs.

RELATED LINKS

This Report:

- Supply Chain Profile
- Code of Basic Working Conditions
- Expanding Impact on Working Conditions

Supply Chain Profile

Production

(Anything that is part of the vehicle)

60+

Countries in which suppliers are located

36

Emerging markets in which suppliers are located

17

Emerging markets considered to have risks of substandard working conditions. These countries were identified as higher risk based on consultation with nongovernmental organizations, other companies with human rights experience, local Ford operations and various media and government reports.

90

Ford manufacturing sites

1,600+

Supplier companies (Tier 1)

4,600+

Supplier manufacturing sites

130,000

Parts currently being manufactured

250+

Production commodities to manage

Nonproduction

(Anything that is not in the vehicle, such as services, marketing, construction, computers, industrial materials, health care, machinery, trains)

9,000+

Supplier companies

600+

Nonproduction commodities

TOTAL GLOBAL BUY

$65+ billion

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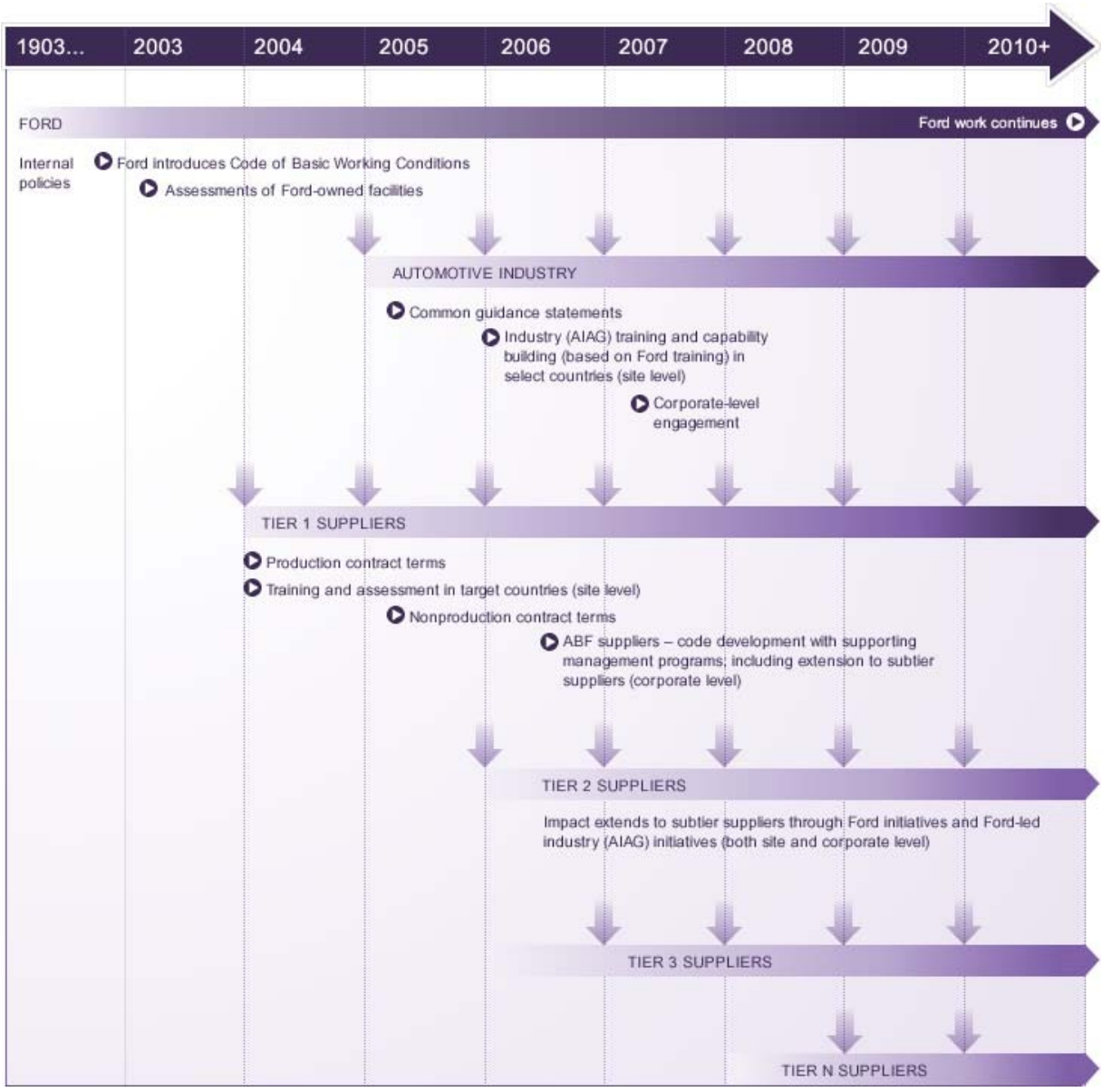
Expanding Impact on Working Conditions



Engagement with Individual Supplier Facilities

Setting Expectations for Our Suppliers

Every supplier doing business with Ford is subject to Ford's Global Terms and Conditions. This core contract reflects our prohibition of the use of forced labor, child labor and physical disciplinary abuse. These requirements were added in January 2004 for production suppliers and in September 2005 for all others. We have provided a standard for these areas – the same as we use in our own facilities (Ford's Code of Basic Working Conditions) – that supersedes local law if our standard is more stringent. The Global Terms and Conditions also prohibit any practice in violation of local laws.

In addition, the Global Terms and Conditions serve to:

- Set the expectation that suppliers will work toward alignment with our CBWC in their own operations and their respective supply chains in the areas of harassment and discrimination, health and safety, wages and benefits, freedom of association, working hours, bribery and corruption, community engagement, and environment and sustainability
- Make clear Ford's right to perform third-party site assessments to evaluate supplier performance
- Communicate that Ford can terminate the relationship for noncompliance or for failure to address noncompliance in a timely manner

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Suppliers

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Engagement with Individual Supplier Facilities

Building Supplier Capacity

The primary focus of our work on human rights in our supply chain is building capability among our suppliers to responsibly manage working conditions. This includes meeting legal requirements and Ford's expectations, as well as promoting sound working conditions in our suppliers' own facilities and supply chains. We have developed and delivered tailored training programs for Ford suppliers in select countries in cooperation with the Automotive Industry Action Group, a North American member-based, nonprofit industry group specializing in supply chain issues.

Ford's training workshops emphasize the interpretation and application of legal standards and international best practices. By interacting with managers from the human resources, health and safety, labor affairs and legal departments of participating companies, the workshops provide for a two-way learning experience touching on the areas of interest for each company.

While Ford's supplier training sessions are customized to align with the unique laws, customs, cultures and needs of each location, in general they consist of:

- A day-long interactive workshop facilitated by qualified trainers and involving multiple automotive suppliers, in which participants develop and confirm an understanding of Ford expectations, local labor law, best practices and management systems, and
- A confirmed communication cascade for providing information obtained during the classroom training to all supplier personnel at each factory and direct sub-tier suppliers.

During 2009, we held training workshops in Argentina, China, Korea, the Philippines, South Africa and Taiwan. Some 1,773 managers from 1,478 different supplier companies have completed a full day of training since the inception of the program in 2004. These suppliers have now moved on to the process of self-assessing their facilities for compliance with local law and Ford expectations, and completing the final stage of the program, which is communication to both workers and their own suppliers on the topic of working conditions expectations.

We continue to focus on the 17 countries we had previously identified as having higher risks of substandard working conditions. Among those countries, locations are prioritized based on production and sourcing trends, sales trends and relative perceived risk based on the input of human rights groups, other companies' experience and other geopolitical analysis. In 2010, we plan to conduct supplier training programs in conjunction with AIAG in Brazil, India and Turkey and by Ford alone in Romania.

WORKING CONDITIONS PROGRAM COUNTRIES

- Americas and Caribbean: Argentina, Brazil, Colombia, Mexico, Venezuela and Central America (Dominican Republic, Honduras, Nicaragua)
- Asia and Africa: China, India, Korea, Malaysia, the Philippines, South Africa, Taiwan, Thailand, Vietnam
- Europe: Romania, Russia, Turkey

1,773

managers from 1,478 different supplier companies have completed a full day of training.

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Working Conditions Assessment Status for Supply Chain

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Engagement with Individual Supplier Facilities

Assessing Suppliers

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This Report:

Working Conditions Assessment Status for Supply Chain

Since 2003, we have conducted more than 600 assessments of existing and prospective suppliers in 20 countries. The assessments provide feedback to Ford and suppliers about how well they are meeting legal requirements and Ford's expectations. They also provide insight into the effectiveness of our training programs. Assessments consist of a detailed questionnaire, a document review, factory visits, and management and employee interviews, and are conducted with the assistance of external auditors.

In 2009, we conducted assessments across the target countries. The findings from the 2009 assessments were generally consistent with those we had previously conducted. Namely, they identified a wide range of general health and safety issues, several wages and benefits issues and a limited number of other types of noncompliance.

The findings from Ford's 2009 supplier assessments included:

- No evidence of forced labor or physical disciplinary abuse
- A range of general health and safety issues, including inadequate emergency systems
- In some cases, a lack of appropriate timekeeping systems, and thus a failure to pay correct overtime wages
- In some cases, a failure to pay the correct local minimum wage or overtime or to provide the correct social insurance
- A general need to clearly define policy on harassment and discrimination
- Limited cases of restricted workers doing hazardous work
- In some cases, limited or restricted access to appropriate documentation regarding subcontracted labor and privacy policies
- In some cases, nonpayment of company contributions to government-mandated social programs
- Working hours violations related to overtime (In some cases, this overtime is a chronic issue resulting from poor capacity planning, but more often, it occurs only during peak production periods.)

Freedom of association has been difficult to verify. While all assessed suppliers have either union representatives or a grievance process, there may be issues we have not been able to identify through our assessment process.

Another common finding is that suppliers often lack fully developed management systems – including continual improvement processes – to support compliance over time. This finding has validated our training approach, which continues to emphasize management systems at both the corporate and factory levels.

We continue to engage with our suppliers to develop and implement appropriate corrective action plans. Through this process, we have the opportunity to encourage change throughout the tiers of suppliers and affect positive change more broadly.

In 2010, we will continue to conduct supplier assessments across the target countries as necessary.

Engagement with Key Suppliers' Corporate Management

Within our global supply base, we have long-term, strategic relationships with a select number of suppliers. Relationships with these suppliers are structured through our Aligned Business Framework (ABF), which is designed to create a sustainable business model to increase mutual profitability, improve quality and drive innovation. In 2010, we expanded the ABF, adding 13 new companies. There are now 90 companies identified as ABF suppliers. Minority- and women-owned suppliers make up nearly 15 percent of the ABF network.

The bilateral ABF agreements comprehensively and formally spell out 22 key business commitments to which Ford and the ABF suppliers must adhere. One element of the ABF agreement is the commitment by suppliers to manage and assure proper working conditions, including responsible environmental management, in their facilities and in their supply chain. (ABF suppliers must also adhere to our Global Terms and Conditions.) This commitment is important for several reasons. Beyond the simple fact that it is the right thing to do, there are specific business benefits to Ford and suppliers in reducing the risk of operational or reputational problems that could affect production. The commitment also provides an opportunity for joint action by Ford and its suppliers to ensure sound working conditions throughout the automotive supply chain.

Ford is facilitating this ABF commitment through a three-phase process, in which ABF suppliers are asked to:

1. Develop or verify that they have a code of conduct aligned with Ford's Code of Basic Working Conditions and internationally accepted principles,
2. Conduct internal awareness training and develop compliance processes supporting their code, and
3. Extend or cascade these expectations to their sub-tier suppliers.

We are making good progress in working through the phases with our ABF suppliers. About 24 suppliers have completed the first phase; 11 suppliers have completed the second phase and seven suppliers have completed all three. We have implemented a robust process of review at each phase, thus ensuring that suppliers have met our expectations.

Ford has committed to providing suppliers with a range of support and assistance based on our experience in this area. We have developed an in-depth resource guide to give suppliers information and background on human rights, generally, and on the development of their own codes, specifically. We are sharing the training materials we have developed, as well as information and developmental guidance on our compliance and training processes. Finally, we have committed to working with suppliers to help resolve issues and concerns.

Through our work with ABF suppliers to date, we have found key success factors that have enabled companies to make notable progress including: (1) the identification of executive decision makers to coordinate cross-functional efforts; (2) the support of executive management and/or the Board of Directors; and (3) facilitation by Ford of discussions and implementation support through individual or regional in-person meetings. In general, companies that have been able to make progress in aligning with these ABF expectations have been those that have not been in significant financial distress and those that may already have aligned values, but had not necessarily institutionalized those values through policies and programs. Many of these companies approach responsible working conditions and environmental management in a systemic manner with implementation and supporting management systems in mind.

During the fourth quarter of 2009, we held two sustainability sessions – one in Dearborn, Michigan, and one in Cologne, Germany – that were attended by senior management from Ford and our ABF suppliers. Topics covered in these meetings included the development of internal trainings as well as best practices from suppliers related to responsible working conditions and environmental management in their owned operations as well as with their suppliers. We also held a workshop

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Suppliers

Supply Chain

discussion on the topic of carbon measurement in the automotive value chain. This introductory dialogue helped to inform Ford's effort to test approaches to measuring greenhouse gas emissions in the supply chain.

Through the ABF, Ford is making strides in improving its working relationships with suppliers on a global basis. We are particularly excited about our sustainability work with our ABF suppliers, which leverages our efforts to manage human rights and environmental responsibility issues in our supply chain in a more collaborative, in-depth, integrated and aligned manner. In our view, it will help embed ownership for social and environmental issues throughout our value chain, and lead to the development of more robust sustainable management systems across the automotive supply chain.

TOOLBOX

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Collaboration within the Automotive Industry

Ultimately, we would like all automakers to take a coordinated approach to protecting human rights and environmental conditions in the supply chain. We promoted cross-industry collaboration beginning in North America and have extended these efforts to include global manufacturers. Our view is that all participants in the supply chain – from the original equipment manufacturers (OEMs) such as Ford, to the suppliers themselves, to the government agencies that set and enforce the regulations governing operations – must be involved to make these efforts sustainable in the long run. Such collective action will not only minimize costs and increase efficiency for OEMs and suppliers alike, but will lead to better results than if individual companies take steps in isolation.

RELATED LINKS

External Web Sites:

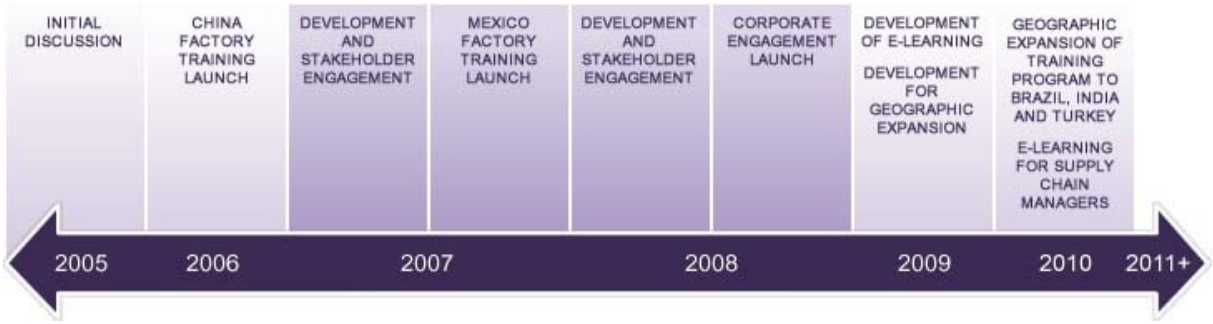
Automotive Industry Action Group

AIAG Global Working Conditions Initiative

Business for Social Responsibility

Automotive Industry Action Group Initiative

Since 2004, Ford has worked with the AIAG to implement its capability-building program with global suppliers, with the intent of leveraging that work with other automakers (see diagram below). Ford has taken an "open book" approach to its supply chain work and has contributed an "executive on loan" – the global manager of our Supply Chain Sustainability group – to the AIAG to support the industry's work and share what we have learned from working on these issues within our own operations. Materials developed within Ford to promote responsible working conditions have been offered to the group as a platform for use and development.



In 2005, Ford, General Motors, Chrysler, Honda North America and Toyota North America began collaborative work through AIAG to explore a cooperative industry approach to promoting decent working conditions in the supply chain. We continue to seek the participation of all global OEMs. We have engaged suppliers across a variety of different commodities. Their participation has been important to inform the activities pursued by the automakers at the AIAG, as has engagement with government (both U.S. and local governments in the countries in which training programs are provided) and nongovernmental agencies.

Initiative participants have created a set of guidance statements to establish a shared industry voice on key working conditions issues. The statements cover the core elements of individual companies' codes and policies, joint codes created by other industries and key international standards. The guidance statements cover child labor, forced labor, freedom of association, harassment and discrimination, health and safety, wages and benefits, and working hours. These statements serve as a baseline agreed upon by all the participating OEMs and are used as a platform for training. It should be noted that Ford's specific expectations in the Ford CBWC for child labor exceed the expectations in the industry guidance statements and also include elements not yet addressed by the industry guidance statements, such as community engagement and indigenous populations, bribery and corruption, and environment.

Training Workshops

Beginning in 2007, the sponsoring OEM manufacturers from the AIAG launched joint factory-level training workshops in China and Mexico. All training materials were based on Ford-developed training. Like Ford's own training programs, the programs carried out by the AIAG reach supplier

representatives directly, and those individuals are expected to cascade the training to their own organizations and suppliers. With the support of the AIAG and the China Association of Automobile Manufacturers, the mandatory training in China reached 461 Tier 1 suppliers to Ford, GM and Chrysler, including more than 300 suppliers to Ford's joint ventures in China.

AIAG participants engaged stakeholders and further developed training materials before the launch of a training program in Mexico. The work in Mexico was partially funded and supported by a $185,000 grant from the U.S. State Department to Business for Social Responsibility, a nonprofit group that works with companies to advance responsible business practices. This public-private partnership enabled relationship building with local industry associations, the Mexico national government and domestic suppliers in Mexico. As of year-end 2008, a total of 494 Tier 1 suppliers participated in the Mexico training, including more than 250 suppliers to Ford.

Due to the adverse conditions in the global automotive industry, training sessions planned for 2009 were rescheduled for 2010. The development of training materials and alignment of sponsoring companies continued throughout 2009 to ensure a successful 2010 deployment.

Corporate Engagement Pilot

In December 2008, the AIAG and the five participating OEMs held two pilot working conditions training sessions targeted at senior management from the procurement organizations of their top supplier companies. During 2009, these classroom training sessions were converted into an online training program on working conditions that was targeted at purchasing or supply chain management. The development of this electronic resource was in response to feedback from supplier participants in the classroom sessions run in 2008. The web-based training was launched in early 2010 by the five participating OEMs to their respective suppliers.

Next Steps – Industry Cooperation

The AIAG cooperative project continues to work on several fronts:

- Actively reaching out to others in the automotive supply chain, including global automakers and heavy truck manufacturers, industry associations, major automotive suppliers and cross-sectoral initiatives. Broader participation will be needed to achieve the vision of an industry-wide approach to promoting decent working conditions in the supply chain.
- Continuing to expand the training program.
- Increasing supplier ownership of working conditions issues through an expansion of engagement opportunities (i.e., the launch of e-learning programs in 2010 and continued direct engagement in AIAG work groups).
- Development of additional resources and networks that will ensure the successful communication of working conditions expectations throughout the automotive supply chain.

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Continued Evolution

As the work at the AIAG develops and matures, Ford will maintain a leadership position in our work with the supply chain. We will continue to conduct our own training and assessment programs in countries not covered by AIAG programs. We will also seek further opportunities to strategically leverage our assessment data and training processes to enhance our overall approach to working conditions and environmental responsibility in the automotive supply chain.

In addition, we constantly monitor approaches developed by other organizations and industries in order to incorporate what they have learned into our approach. We will continue to pursue partnerships with direct suppliers that create ownership of working conditions within those supplier organizations. Clear, consistent communication and further business integration of processes that support responsible working conditions throughout the supply chain will be a key component of our continued work.

We are also collaborating with suppliers and other stakeholders to explore additional sustainability issues in our supply chain, including carbon emissions and a range of sustainability issues related to the raw materials needed to deploy new electrification technologies.

RELATED LINKS

This Report:

Climate Change

Electrification: A Closer Look

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Data

The data relating to human rights is included in the Society section of this report.

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Vehicle Safety

2009 HIGHLIGHTS:

- Introduced the first automotive inflatable seat belts
- Supported legislation banning handheld texting while driving

Based on a variety of independent measures, Ford remains an industry leader in motor vehicle safety.

Vehicle safety is very important to us at Ford. In fact, it's one of four principles that inform and guide our every design and engineering effort.[1] We consider building safe vehicles to be part of the "price of admission" to the automotive industry, and we continually work to raise the bar on safety.

In 2009, our efforts were once again rewarded. Based on the independent measures listed below, Ford remains an industry leader in motor vehicle safety.

- Ford holds the most Top Safety Picks (awarded by the Insurance Institute for Highway Safety, or IIHS) of any vehicle manufacturer. Nineteen Ford vehicles earned this honor in 2009, including the Ford Taurus, Taurus X, Fusion, Focus, Edge, Flex, Escape and F-150; the Lincoln MKS, MKZ, MKT and MKX; the Mercury Sable, Milan and Mariner; and the Volvo S80, C30, C70 and XC90. To earn a Top Safety Pick, a vehicle must receive a rating of "good" in offset frontal impact, side impact and rear impact evaluations, and offer electronic stability control. For 2010, vehicles will also be expected to earn a "good" rating in roof strength tests.
- For the 2010 model year, 23 Ford vehicles received five-star ratings for both frontal impact and side impact from the National Highway Traffic Safety Administration (NHTSA) in its U.S. New Car Assessment Program (NCAP) ratings, compared with 24 for the 2009 model year.
- The 2010 Ford Taurus is one of the safest-rated large sedans sold in America, with five-star NCAP crash ratings for frontal and side impact and "good" IIHS ratings in offset frontal impact, side impact, roof strength and rear impact evaluations.
- The 2010 Ford F-150 is America's safest full-size pickup. It's the only full-size pickup to earn five-star crash test ratings in all categories from NHTSA.
- The 2010 model year Mustang Convertible earned five-star ratings in all categories of NHTSA NCAP.
- For the 2010 model year, the IIHS awarded 30 Ford vehicles with "good" ratings for frontal offset performance and 19 Ford vehicles with "good" ratings for side impact performance.
- In Ford's most recent EuroNCAP assessments, the Ford Kuga and Ford Fiesta achieved Ford's first three-star ratings for pedestrian protection. These cars also joined the Focus, Mondeo, S-MAX and Galaxy in having best-in-class, five-star adult protection and four-star child protection ratings.
- The Ford Mondeo was the second Ford car (after the Focus) to be awarded a five-star rating in

PERSPECTIVES ON SUSTAINABILITY

Jim Vondale

Director, Ford Automotive Safety Office

Read more

RELATED LINKS

Vehicle Web Sites:

- Ford Mustang
- Ford Taurus
- Ford Fusion
- Ford Focus
- Ford Edge
- Ford Flex
- Ford Escape
- Ford F-150
- Lincoln MKS
- Lincoln MKZ
- Lincoln MKT
- Lincoln MKX
- Mercury Milan
- Mercury Mariner
- Volvo S80
- Volvo C30
- Volvo C70
- Volvo XC90

Ford.co.uk:

the Chinese NCAP.

- The Ford Falcon was the first Australian-built car to be awarded five stars in the Australasian New Car Assessment Program (ANCAP).

In addition, Volvo's City Safety system received awards in 2009 from the following automotive publications: *Autohoje* (Portugal); *FuturAuto* (Belgium); and *Auto Motor und Sport*, Paul Pietsch Award (Germany).

This section outlines our vehicle safety performance over the past year. It includes a discussion of current vehicle safety opportunities and challenges globally, and how we manage vehicle safety within the Company. It also focuses on technologies we've developed, programs we support and research we are undertaking to promote safer driving, how we manufacture ever-safer vehicles and how we promote a safer driving environment. The section then looks at the various collaborative efforts we are undertaking with other organizations related to vehicle safety. Finally, a case study looks in-depth at the issue of driver distraction.

For a discussion of Ford's positions on U.S. public policy issues relating to vehicle safety, please see the Governance section.

1. The other principles are quality, fuel efficiency and smart technologies.

Ford Kuga
Ford Fiesta
Ford Focus
Ford Mondeo
Ford S-MAX
Ford Galaxy

Ford.com.au:

Ford Falcon

External Web Sites:

National Highway Traffic Safety Administration
Insurance Institute for Highway Safety
European New Car Assessment Programme
Australasian New Car Assessment Program

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Challenges and Opportunities

As we at Ford implement our global "ONE Ford" strategy, we are mindful that countries with different levels of economic and infrastructure development face different traffic safety challenges.

In the United States and other developed countries, traffic safety has significantly improved in recent years. Although the U.S. population has continued to increase, the number of traffic fatalities in the United States in 2009 reached its lowest level in 55 years, according to the National Highway Traffic Safety Administration (NHTSA). In fact, the fatality rate per 100 million vehicle miles traveled has declined steadily since the late 1960s, and is now at the lowest level ever recorded.

Other developed countries have also seen improvements. The nonprofit Resources for the Future looked at traffic fatality data in 32 high-income countries between 1970 and 1999, and found that traffic fatalities declined in these countries by an average of 35 percent.

These improvements can be attributed to a combination of factors, including higher safety belt usage, advancements in vehicle safety technology, greater enforcement, better traffic infrastructure and increased cultural disapproval of driving under the influence.

Of course, traffic safety remains a significant challenge in these countries, with much room for improvement. In the United States in 2009, approximately 34,000 people died in motor vehicle crashes. Traffic crashes are the leading cause of death among U.S. teens. And, as discussed in depth in our case study, distracted driving is a serious and growing problem.

In developing countries, traffic safety is an acute public health problem. The World Bank reports that fatality rates in developing countries are 25 to 30 per 10,000 vehicles, compared to 1 to 2 per 10,000 vehicles in mature markets. Of the 1.2 million people who die each year worldwide in traffic accidents, more than 1 million live in countries with low- and middle-income economies. The World Health Organization (WHO) estimates that deaths due to road traffic accidents will increase to 2.4 million in 2030, primarily owing to increased motor vehicle ownership and use associated with economic growth in low- and middle-income countries.

Many of the traffic deaths in developing nations involve pedestrians and/or motorcycles. As mobility increases in developing markets, people initially use two-wheeled motor vehicles, and the incidence of traffic accidents rises. As people migrate to automobiles, traffic accidents and injury levels generally decrease. During this transition, holistic solutions are required, including infrastructure improvements, the modification of road user behavior and the enforcement of traffic laws. One critical task is to educate drivers about the most important primary safety feature – safety belts.

In both developed and emerging markets, continued improvements in vehicle safety are also very important, and we at Ford continue to take seriously our responsibility to build safe vehicles.

Everywhere in the world, it is increasingly important for road safety stakeholders to work together using an integrated approach to ensure the maximum benefits are delivered from any given safety initiative. To support this approach, we at Ford seek ways to partner with governments, nongovernmental organizations and other stakeholders to identify the best opportunities to promote safety based on real-world data. We have become more involved in encouraging new and innovative ways to modify road user behavior (for example, through new technologies, driver education efforts and working with government agencies such as the UK Driving Standards Agency) and encouraging infrastructure and enforcement improvements in the communities in which we operate.

RELATED LINKS

This Report:

Case Study: Driver Distraction

External Web Sites:

National Highway Traffic Safety Administration
Resources for the Future
The World Bank
World Health Organization
UK Driving Standards Agency

How We Manage Vehicle Safety

Here at Ford, our objective is to design and manufacture vehicles that achieve high levels of vehicle safety for a wide range of people over the broad spectrum of real-world conditions. Real-world safety data, driver behavior, research, regulatory requirements and voluntary agreements provide much of the input into our safety processes, including our Safety Design Guidelines (SDGs) and Public Domain Guidelines (PDGs), see graphic below. The SDGs are Ford's stringent internal engineering design targets that exceed regulatory requirements and define many additional requirements that are not regulated. The PDGs are Ford guidelines that focus specifically on helping to ensure that our vehicles earn top marks in relevant public domain assessments.

Both SDGs and PDGs are managed on a global basis and address the local needs of individual regions and markets. Awareness of road safety is rapidly increasing in many emerging markets. In 2009, Ford added Australasian-specific SDGs and PDGs to address this issue – raising the bar for vehicle performance in this market beyond regulatory requirements.

Government-run New Car Assessment Programs (NCAPs) are an increasingly important tool to improve consumer awareness in emerging markets such as China, but their relevance in developed markets is still also very strong. This is likely to remain the case, as both the National Highway Traffic Safety Administration (NHTSA) NCAP and EuroNCAP ratings systems are being significantly altered. As such, fewer vehicles (of all makes) will receive top ratings. Ford is working hard to meet this challenge. We have taken active roles working with NHTSA and EuroNCAP to help ensure that the respective rating schemes will be appropriate and will deliver additional real-world benefit.

Changes to the NCAP system were slated to apply to 2010 model year vehicles, but NHTSA delayed implementation and will now first apply the tougher requirements to 2011 model year vehicles. Ford is continuing to work with NHTSA to address several remaining concerns about the new NCAP test requirements before they are implemented. EuroNCAP's more-stringent requirements went into effect in 2009. However, EuroNCAP does not test all vehicles annually, so no Ford vehicles have yet been assessed under the new system.

Internally, Ford utilizes engineering analyses, extensive computer modeling and crash and sled testing to evaluate the performance of vehicles and individual components. These rigorous evaluations help to confirm that our vehicles meet or exceed regulatory requirements and our even more stringent internal guidelines. Our state-of-the-art crash-test facilities include the Safety Innovation Laboratory in Dearborn, Michigan, and the extensive crash-test facilities in Merkenich, Germany, and Dunton, England.

There has been increased attention recently regarding vehicle manufacturers' processes to investigate customer issues as they relate to potential vehicle safety defects, as well as the role of

RELATED LINKS

External Web Sites:

- National Highway Traffic Safety Administration
- European New Car Assessment Programme
- Global Technical Regulations

NHTSA. Ford has a proactive internal system that quickly identifies, evaluates and resolves issues as they relate to potential vehicle safety defects. In addition, when a competitor has a recall, we conduct a review to determine whether we share any of the same vendors, designs or parts. Ford has a very open and transparent process, and we work closely with the NHTSA when they contact Ford regarding customer concerns.

There has also been increased attention recently regarding vehicle electrical systems and the potential for electromagnetic interference (EMI) to affect vehicle performance. We design, engineer and rigorously test our vehicles for the wide range of environments in which they operate, including the potential effects of EMI. Our electronic safety system controls are designed to continuously monitor performance of key vehicle functions, detect issues if they arise and engage back-up functions in the unlikely event they occur.

Global Technical Regulations

The automotive industry is highly regulated, and two systems of vehicle regulation predominate globally: the United Nations Economic Commission for Europe Regulations and the U.S. Federal Motor Vehicle Safety Standards. To meet the relevant regulations of each market in which it sells, manufacturers must modify their vehicle designs and features. This is a particular challenge for Ford, given our increased focus on producing vehicles with the same platforms globally. It can increase vehicle complexity and cost, sometimes without documented, incremental real-world safety benefit.

With the aim of harmonizing world vehicle regulations, 31 countries are working together to develop Global Technical Regulations (GTRs). Ford Motor Company actively participates in the GTR development process.

Thus far, 10 GTRs have been developed. Progress has been slow due to the difficulty of reconciling varied national requirements and the historical differences of existing regulations. Despite these challenges, Ford continues to believe that harmonization has the potential to significantly reduce global complexity while maintaining high levels of vehicle safety, security and environmental performance, and we plan to support harmonization efforts.

Haddon Safety Matrix

Vehicle safety is the product of complex interactions among the driver, the vehicle and the driving environment. We use the Haddon Safety Matrix (developed by William Haddon, a former NHTSA administrator and IIHS president) to take a holistic view of the factors that affect vehicle safety.

The Haddon Matrix looks at injuries in terms of causal and contributing factors, including human behavior, vehicle safety and the driving environment. Each factor is then considered in the pre-crash, crash and post-crash phases. In the pre-crash phase, the focus is to help avoid the crash. In the crash and post-crash phases, the primary objective is to help reduce the risk of injury to occupants during and after a collision. Another goal is to minimize the amount of time that elapses between the crash and when help arrives.

	HUMAN BEHAVIOR	VEHICLE SAFETY	ENVIRONMENT
			
Pre-Crash (accident avoidance)	• Research • Education • Advocacy	• Crash avoidance technologies • Security	• Road design for accident avoidance • Traffic control
Crash (occupant protection)	• Technology and proper use	• Crashworthiness	• Road design for injury mitigation • Research
Post-Crash (injury mitigation)	• Telematics	• Post-crash notification	• Emergency medical services
Examples of Ford Actions	• SYNC® technology • MyFord™ driver connect technology • MyKey™ • Ford Driving Skills for	• Accident avoidance features • SYNC® with 911 Assist • Inflatable safety belts • Roll Stability Control®	• Global Road Safety Initiative • Accident research

TOOLBOX

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Encouraging Safer Driving

The U.S. Department of Transportation reports that human factors cause or contribute to more than 90 percent of serious crashes.

In the pre-crash stage, drivers can try to avoid crashes by practicing safe driving. In the crash and post-crash phases, drivers can help reduce the risk of injury by always properly using safety equipment such as safety belts. Ford Motor Company provides information, educational programs and advanced technologies to assist in promoting safe driving practices.

In the past year, distracted driving has received increased national attention as a contributing factor in motor vehicle crashes. We at Ford have been working for years to provide teen driver education and appropriate technologies to help prevent crashes due to distracted driving. Our sustainability report last year included a case study on distracted driving; the case has been updated for this year's report.

Numerous studies show that hands-free multimedia devices offer safety benefits compared to hand-held devices. The benefits are seen in driving performance as well as object and event detection. Ford's popular and award-winning SYNC® technology, powered by Microsoft®, provides a way for drivers to use cell phones and MP3 players more safely, because they can do so through voice commands alone while keeping their eyes on the road and their hands on the wheel. Ford SYNC was launched in late 2007 and is now available on nearly every vehicle from Ford, Lincoln and Mercury.

In 2010, Ford will introduce new MyFord™ driver connect technology – an all-new user interface that will deliver a smarter, safer and simpler way to connect drivers with in-car technologies and their digital lives. MyFord, along with MyLincoln™ and MyMercury™, was developed after a thorough review of current interior design – and its limitations – considering the abundance of new and emerging technologies. After studying vehicle communications trends and the ways drivers were using technology inside their vehicles, it was evident that the current way of interacting with car and truck technology was rapidly becoming obsolete.

MyFord™ map-based navigation offers an Eco-Route option, which instantly calculates the most fuel-efficient route for the driver.

The MyFord user interface replaces many of the traditional vehicle buttons, knobs and gauges, and is designed to allow maximum focus on driving, while providing unparalleled access to information, entertainment and connectivity features. The system includes two easily reached and intuitive five-way controllers on the steering wheel, a next-generation, state-of-the-art voice recognition system with nearly 10,000 available commands, and clear, large, color LCD displays. These features ensure that drivers maximize the time their eyes are on the road and their hands are on the steering wheel. And although the user interface is all new, it should not feel unfamiliar, as it is based on the fundamentals of Ford's award-winning navigation system, as well as the SYNC user interface.

MyFord launches on the 2011 Ford Edge and goes global with availability on the 2012 Focus. MyLincoln will be standard equipment on new Lincolns beginning with the 2011 MKX.

Beginning last year on select 2010 models, SYNC became available with Traffic, Directions and Information, a subscription service that allows drivers to access traffic reports, turn-by-turn directions and business news and information, all via voice command. SYNC will be launched on Ford's European product range beginning in 2011. (See the case study in this section for more on how SYNC helps to reduce driver distraction.)

RELATED LINKS

This Report:

Case Study: Driver Distraction

Vehicle Web Sites:

Ford Taurus
Ford Focus
Ford Edge
Ford Flex
Ford Escape
Ford Expedition
Ford F-150
Mercury Mariner
Lincoln MKS
Lincoln MKT
Lincoln MKX
Lincoln Navigator

Ford Web Sites:

SYNC®
MyFord™
MyKey™
Ford Driving Skills for Life

External Web Sites:

U.S. Department of Transportation
Operation Teen Safe Driving

Ford's MyKey™ system is an innovative new technology designed to help parents encourage their teenagers to drive more safely. MyKey allows owners to program a key that can limit the vehicle's top speed to 80 mph and the audio volume to 44 percent of total volume. MyKey encourages safety-belt usage by enabling Ford's Beltminder™ to chime every minute indefinitely until the safety belt is buckled, rather than ceasing after five minutes, and also by muting the audio system until the belt is buckled. In addition, MyKey provides an earlier low-fuel warning (at 75 miles to empty rather than 50); sounds speed-alert chimes at 45, 55 or 65 mph; and will not allow manual override of other safety systems. For the 2010 model year, MyKey is available on the Ford F-150, Taurus, Flex, Focus, Escape and Expedition; the Mercury Mariner; and the Lincoln Navigator, MKS and MKT.

MyKey™ programmable keys enable restricted driving speeds and audio volume.

Ford Driving Skills for Life (FDSFL), Ford's driver education program, demonstrates our continued commitment to educating teens about safer driving. In 2008, Ford launched FDSFL in the Asia Pacific and Africa (APA) region, and in 2009 continued with the successful rollout of the program to additional APA markets. FDSFL is now in Indonesia, the Philippines, Thailand, Vietnam, China, Taiwan and India. During 2009 in these markets, Ford provided training for roughly 11,000 licensed drivers and several thousand Ford India employees.

The U.S. FDSFL program (www.drivingskillsforlife.com) was carried out in nine different states in 2009. The program provides outstanding learning tools, including an award-winning curriculum with hands-on training and web-based learning, a teacher and parent educational kit, a teaching DVD designed for interactive learning, and printed materials to help young drivers improve their ability behind the wheel. Both the FDSFL Web site and "Ride and Drives" for teen drivers include modules on the importance of avoiding distracted driving. In addition, the program includes information about eco-driving, car care tips and information for mature drivers.

COMMENTS AT A FORD DRIVING SKILLS FOR LIFE "RIDE AND DRIVE" EVENT

"They hit it out of the park with the kids today in the top-notch way this was put together. Kids come in scared and walk away feeling much more confident in their driving skills." – Dr. Jennifer Reeves, Area Superintendent, Orange County (Florida) Public Schools

"We would love to see more programs like this, sponsored by a manufacturer of automobiles... Kids and adults can learn a lot from this program." – Jim Ports, former deputy administrator, NHTSA

"A lot of people can pass the permit test without being a good driver. This really teaches you how to be a good driver." – teenaged participant

Beginning in 2007, Ford partnered with the Illinois Department of Transportation, secretary of state, and state police to launch a statewide effort – modeled on Ford Driving Skills for Life – designed to reduce teen crashes and fatalities. Called Operation Teen Safe Driving, this campaign was the first of its kind and got high school students directly involved by challenging them to develop and implement a teen safe driving community awareness campaign using FDSFL resources. This seven-month statewide effort involved 778 schools in 102 Illinois counties, and had the support of the governor, the secretary of state and the Chicago board of education.

The results have been remarkable: The state has seen a 49 percent reduction in teen fatalities over the last three years.

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Building Ever-Safer Vehicles

IN THIS SECTION

Accident Avoidance Technologies

Read about Ford's accident avoidance technologies, including Forward Collision Warning with Auto Brake and other features that use forward-looking radar and vision sensors.

Read more

Occupant Protection Technologies

Learn about our occupant protection technologies, including our Safety Canopy® and the world's first automotive inflatable seat belts.

Read more

Post-Crash/Injury Mitigation Technologies

Discover Ford's latest post-crash technologies, including SYNC® with 911 Assist and our SOS-Post Crash Alert System.

Read more

Research

Read about our research efforts, including two projects in Europe that are testing the performance of active safety systems.

Read more

TOOLBOX

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Accident Avoidance Technologies

A variety of technologies, in addition to a vehicle's handling and braking capabilities, can help drivers avoid accidents. These technologies are generally not necessary for attentive drivers in most road conditions, but may provide added benefits for drivers who become distracted or experience challenging road conditions.

For example, Ford's Rearview Camera with Guidelines can enhance rear visibility, as well as assist with actions that require reverse maneuverability such as parallel parking and hitching trailers. The system uses an exterior camera embedded in the rear of the vehicle that sends images to a video display in the rearview mirror or the navigation system screen. These images can help improve visibility directly behind the vehicle when the vehicle is in reverse. The camera image is overlaid with lines that mark the width of the vehicle, which makes it easier to gauge distance and navigate in reverse. The system increases visibility in low light by using a low-light-capable camera and high-intensity reverse taillights. Rearview Camera with Guidelines is offered on most of Ford's vehicles – including the new 2010 Ford Taurus.

In the 2010 Ford Taurus, the rearview camera projects through the centerstack-mounted screen.

Ford is continuing its development of accident avoidance features that use forward-looking radar and vision sensors. These features help to warn drivers of potentially dangerous situations, such as unintended lane departures, pedestrians in the roadway or following a vehicle too closely. These technologies are being developed by a joint team in Dearborn, Michigan; Merkenich, Germany; and Gothenburg, Sweden. Some are now available on selected Ford and Volvo vehicles.

Adaptive Cruise Control (ACC), for example, helps drivers maintain a safe distance from the vehicle in front of them. It is one of the innovations now available on the 2010 Ford Taurus, Lincoln MKS and MKT, as well as the Volvo XC60, S80, XC70 and V70 and the Ford Mondeo, S-MAX and Galaxy. While primarily a comfort and convenience feature, Adaptive Cruise Control also contributes to more controlled driving when traffic flow is uneven. The ACC module is mounted at the front of the vehicle and uses radar to measure the gap and closing speed to the vehicle ahead. The system automatically adjusts the speed of the car to help maintain a pre-set distance from the vehicle in front. Ford Motor Company was the first manufacturer to launch radar-based ACC several years ago.

On Volvo vehicles, Forward Collision Warning with Auto Brake is part of a "Driver Support" package and uses radar, camera and "heads-up" display[1] technology to help avoid or reduce the effects of rear-end collisions. The area in front of the vehicle is monitored by a radar and camera sensor. If the equipped vehicle detects another vehicle ahead of it, and the driver does not react, a visual and audible warning signal is activated. The system is designed to provide additional time for the driver to react and avoid or reduce the hazard. If the risk of collision increases despite the warning, Auto Brake is activated. This system supports driver-initiated braking by pre-charging the brakes and preparing for panic brake application, and then brakes automatically if a collision remains imminent. A similar system with Brake Support is available on

RELATED LINKS

Vehicle Web Sites:

- Ford Taurus
- Ford Edge
- Ford Flex
- Ford Escape
- Ford Escape Hybrid
- Ford Explorer
- Ford Sport Trac
- Ford Expedition
- Ford F-150
- Ford Super Duty
- Ford E-Series
- Lincoln MKS
- Lincoln MKT
- Lincoln MKX
- Lincoln Navigator
- Mercury Mariner
- Mercury Mountaineer
- Volvo S60
- Volvo S80
- Volvo V70
- Volvo XC60
- Volvo XC70

Ford.co.uk:

- Ford Mondeo
- Ford S-MAX
- Ford Galaxy

the 2010 Ford Taurus and Lincoln MKS, and will be available on the 2011 Ford Edge and Lincoln MKX. A Forward Collision Warning system is also available in Europe on the Ford Mondeo, S-MAX and Galaxy.

The next generation of these preventative safety technologies was unveiled in 2009 at the Detroit Auto Show on the Volvo S60 Concept vehicle. The S60 Concept featured Collision Warning with Full Auto Brake and pedestrian detection. This advanced radar- and camera-based technology is designed to react when a pedestrian is detected in front of a car, and will activate the car's full braking power if the driver does not respond to the danger. The radar has a widened field of vision, which allows it to detect the moving pattern of a pedestrian. The automatic full braking power – a first in the industry – is an emergency measure that is designed to activate when a collision with a pedestrian or vehicle is imminent. The S60 Concept also featured an upgraded Driver Support package, which includes Blind Spot Information System, Driver Alert Control, Lane Departure Warning, Distance Alert, Adaptive Cruise Control (at all speeds) and Forward Collision Warning with Full Auto Brake. These next-generation technologies are now available on the all-new 2010 Volvo S60.

Driver Alert Control and Lane Departure Warning are now also available on the Volvo XC60, S80, V70 and XC70. These systems are designed to reduce the risk of a driver drifting out of the lane. (Driver inattentiveness is a traffic safety concern worldwide.) The Driver Alert Control and Lane Departure Warning features use a forward-looking camera to continuously monitor the road and keep track of where the car is in relation to the lane markings. The system is designed to sense if the driver loses concentration or the vehicle's wheels move outside the lane markings without an obvious reason, such as use of a turn signal. In that case the system provides a warning chime to alert the driver and a visual alert in the shape of a coffee cup. This patented system has been tested both on roads and in simulators and is unique among vehicle manufacturers.

Volvo has also introduced a unique and award-winning system called City Safety, which will help drivers avoid the sort of low-speed collisions that are common in slow-moving urban traffic. If a driver is about to collide with the vehicle in front and does not react in time, the City Safety system is designed to activate the brakes to slow the vehicle.

City Safety is active at up to 30 km/h and works via an optical laser system integrated behind the top of the front windscreen. It can monitor vehicles up to 10 meters from the front of the car. If the vehicle in front suddenly brakes and City Safety senses that a collision is imminent, it pre-charges the brakes to help the driver avoid an accident by braking or letting the driver steer away from a potential collision. The City Safety feature allows driver-initiated interactions (steering or braking) to override the City Safety system. Volvo introduced City Safety as standard equipment on the Volvo XC60 in late 2008, and for 2010 it is also standard on the all-new S60.

Another important Ford safety innovation is the next generation of adaptive headlamps. Our Adaptive Front Lighting System (AFLS) allows drivers to see better at night around curves in the road. The system allows drivers to take corners and curves more safely, and to consume less energy while doing so. The AFLS is available on all Lincolns (except the Navigator) and a number of vehicles across the Ford fleet, in both North America and Europe.

Finally, Ford's industry-leading innovation known as AdvanceTrac® with Roll Stability Control® (RSC) continues to give drivers more driving confidence. RSC actively measures and helps control both yaw and roll movements. It uses two gyroscopic sensors to detect when a driver corners too fast or swerves sharply to avoid an obstacle. It then applies pressure to select brake(s) to help the driver maintain control and thus reduce the risk of a rollover event.

Roll Stability Control was first introduced on the 2003 Volvo XC90 and is now standard equipment on the Ford Flex, Explorer, SportTrac, Expedition, Edge, Escape and F-150, as well as E-Series Wagons equipped with the 5.4L engine and the 2011 SuperDuty with single rear-wheel configurations. It is also standard equipment on the Mercury Mountaineer and Mariner; the Lincoln Navigator, MKX and MKT; and the Volvo XC60. Ford has developed a next-generation regenerative braking system for the 2009 and 2010 Escape Hybrid and Mariner Hybrid that is compatible with RSC. For the 2011 model year, 84 percent of all Ford vehicles will offer either RSC or our standard electronic stability control system.

Percent of North American Nameplates with Standard Offering of Electronic Stability Control or Roll Stability Control

	Percent
2011 Model Year	84%
2010 Model Year	77%
2009 Model Year	62%
2008 Model Year	40%

2007 Model Year	27%

1. "Heads-up display" is the projection of an image onto the windshield, so that the information may be viewed without looking down to an instrument cluster.

TOOLBOX

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Occupant Protection Technologies

Many factors influence a vehicle's crashworthiness, including the design of the vehicle's structure to absorb impact energy and the use of passive safety equipment such as air bags. To help protect drivers and passengers in the event of a crash, a variety of Ford technologies have been designed to enhance the performance of safety belts and air bags and provide additional occupant protection in side crashes and rollovers.

Safety belts remain the most important vehicle safety technology available. In 2010, Ford is bringing to market the world's first automotive inflatable seat belts, combining the attributes of traditional seat belt and airbag technologies to help reduce head, neck and chest injuries for rear-seat passengers. Ford will introduce inflatable rear seat belts on the next-generation Ford Explorer, to be introduced in 2010 in North America. Over time, Ford plans to offer the technology in vehicles globally.

Ford introduces the auto industry's first-ever production inflatable seat belts, which are designed to provide additional protection for rear-seat occupants.

The inflatable belts are designed to deploy over a vehicle occupant's torso and shoulder in 40 milliseconds in the event of a crash. Each belt's tubular airbag inflates with cold compressed gas. The inflatable belt's increased diameter can more effectively restrain the occupant in the appropriate seating position in the event of a frontal or side crash, and the belt distributes crash force energy across five times more of the occupant's torso than a traditional belt, helping to further reduce the risk of injury.

In everyday use, the inflatable belts operate like conventional seat belts and are safe and compatible with infant and child safety car and booster seats. In Ford's research, more than 90 percent of those who tested the inflatable seat belts found them to be similar to or more comfortable than a conventional belt because they feel padded and softer. That comfort factor could help improve the 61 percent rear-belt usage rate in the U.S., which compares to 82 percent usage by front-seat passengers, according to NHTSA. Ford will monitor real-world effectiveness and customer acceptance of this new technology as it begins the phase-in into the Ford fleet.

Ford was the first in the industry to offer rollover-activated side-curtain air bags, known as the Safety Canopy®, beginning with the Ford Explorer and Mercury Mountaineer in 2002. Today, the Safety Canopy with rollover sensors – which helps reduce the risk of injury to vehicle occupants during side-impact collisions and rollover accidents – is available on most Ford vehicles, including the Ford Taurus, Flex, Edge, Escape, Explorer, SportTrac, Expedition and F-Series; the Mercury Mariner and Mountaineer; and the Lincoln MKS, MKX, MKT and Navigator. By the 2010 model year, all Ford, Lincoln and Mercury retail SUVs and crossovers, as well as vans and trucks under 8,500 lbs., are planned to have the Safety Canopy as standard equipment.

The 2010 Ford Taurus, Ford Flex, Lincoln MKS and Lincoln MKT have been engineered with crush zones designed to direct excess energy around the passenger compartment into a high-strength frame. This advanced engineering design – known as SPACE™ Architecture – utilizes crash form management techniques to help channel impact forces around and away from the passenger cabin.

In Europe, the Ford Mondeo, S-MAX and Galaxy are equipped with an Inflatable Knee Bolster, designed to help reduce the driver's forward motion in the event of a severe frontal crash and reduce the risk of injury to lower limbs. This technology is also available on the 2010 Fusion Hybrid and Milan Hybrid and on the 2011 Ford Fiesta in the United States.

RELATED LINKS

Vehicle Web Sites:

- Ford Fiesta
- Ford Fusion Hybrid
- Ford Taurus
- Ford Edge
- Ford Flex
- Ford Escape
- Ford Explorer
- Ford Sport Trac
- Ford Expedition
- Ford F-150
- Lincoln MKS
- Lincoln MKT
- Lincoln MKX
- Lincoln Navigator
- Mercury Milan
- Mercury Mariner
- Mercury Mountaineer

Ford.co.uk:

- Ford Mondeo
- Ford S-MAX
- Ford Galaxy

External Web Sites:

- National Highway Traffic Safety Administration

Finally, as smaller and more fuel-efficient vehicles become more popular, the safety of smaller cars is sometimes raised as a concern. Ford's study of accident trends found that fatality rates for small cars of the 1990s were lower than for large cars of the 1970s, due to improvements in vehicle safety, changing driver behavior such as increased seat-belt usage and generally safer road infrastructure.

Ford's focus is to continue making small cars even safer while building larger vehicles that are more crash compatible with smaller vehicles. We've already lowered the front bumper structures on most of our crossovers, SUVs and pickups to help them better match up with small vehicle crash structures. Ford now uses more high-strength steel as part of our continuing effort to enhance the safety and fuel efficiency of our vehicles. In fact, we have recently introduced ultra-high-strength steel as well. Increased usage of high-strength steels helps us design vehicle structures with enhanced crash energy management, while balancing overall vehicle weight – even as we add more standard safety equipment.

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Post-Crash/Injury Mitigation Technologies

One method of assisting emergency responders to reach the scene of a vehicle crash quickly is through in-vehicle emergency call systems, also called post-crash notification. These systems enable a driver to summon assistance in an urgent situation either automatically (if, for example, an airbag deploys) or at the touch of a button.

In the United States, Ford SYNC® is an award-winning, in-car connectivity system that was introduced on certain 2007 model year vehicles. Beginning with the 2009 model year, SYNC-equipped vehicles come with an all-new occupant communications capability called 911 Assist. In the event of a severe crash, the ability to directly contact the local 911 emergency operator could be critical, for both the vehicle occupants and first responders. While any cell phone alone could be used in an emergency situation, SYNC can assist in placing a call to a local 911 emergency operator – when a phone is properly paired, turned on and connected to SYNC and where the system and cell phone remain powered and undamaged – should a crash with an airbag deployment or fuel shutoff switch activation occur. The key advantage of SYNC 911 Assist is speed, as calls are placed directly to local 911 operators and do not have to be routed through a call center (as in competitors' versions), which can delay the time it takes to get help on the way. SYNC 911 gives the occupants a choice as to whether or not to make the emergency call, and places the call if the occupant does not respond after a short time.

This voice-activated feature is available to customers with 2008 and beyond model year SYNC-equipped vehicles through a dealer-installed software update. We are investigating a system similar to SYNC's 911 Assist for introduction in Ford's European product range beginning in 2011.

In late 2004, Ford, via its membership in the European Automobile Manufacturers' Association, signed a memorandum of understanding (MOU) regarding the development of a pan-European, in-vehicle emergency call system dubbed "eCall." The purpose of the MOU is to promote the development and implementation of eCall systems throughout Europe, in order to improve the number of vehicles reached by emergency responders within a short period of time.

The On Call system – a GSM- and GPS-based emergency and assistance system [1] – is currently available on Volvo vehicles. It is sold and operational in a number of European countries, including Russia. With the On Call system and any future deployment of a 911 Assist-type feature in Europe, Ford has made and will continue to make significant progress toward increasing the availability of eCall technology on vehicles in Europe.

The SOS-Post Crash Alert System, which is standard equipment on most Ford, Lincoln and Mercury vehicles, is another important advance in post-crash safety technology. The SOS-Post Crash Alert System automatically activates the horn and emergency flashers in the event of an airbag deployment or safety belt pre-tensioner activation. The second-generation system – which is being launched on the 2011 Ford F-150 SuperDuty, Ford Edge and Lincoln MKX – also automatically unlocks vehicle doors in the event of an airbag deployment or safety belt pre-tensioner activation. The system is designed to alert passers-by and emergency services to the vehicle's location.

1. GSM = Global System for Mobile communications; GPS = Global Positioning System

RELATED LINKS

Ford Web Sites:

SYNC®

Vehicle Web Sites:

Ford Edge

Ford Super Duty

Lincoln MKX

External Web Sites:

European Automobile Manufacturers' Association

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Research

Ford is undertaking a number of research efforts to assess and verify the effectiveness of new active safety technologies, such as those using forward-looking radar and vision sensors.

In January 2010, a consortium of 29 partners – led by the Ford European Research Center in Aachen, Germany – joined forces in the Accident Avoidance by Active Intervention of Intelligent Vehicles (interactIVe) European research project. The consortium seeks to support the development and implementation of active safety systems, and consists of seven automotive manufacturers, six suppliers, 14 research institutes and three other stakeholders. The European Commission will cover more than half of the €30 million budget.

During the planned 42-month duration of interactIVe, the partners will test the performance of implemented safety systems through active intervention, including autonomous braking and steering in critical situations, with the aim of avoiding collisions or at least mitigating impact severity in accidents.

In 2008, Ford launched a major European research project (called EuroFOT) to deliver a large-scale field operational test of the real-world impact of active safety systems. Under the EU's Seventh Framework Program (FP7) for research and technological development, this project joins together 28 partners – including vehicle manufacturers, suppliers, universities and research centers – and will run until August 2011. More than 1,500 cars and trucks will be equipped with eight new active safety technologies, along with advanced data-collection capabilities. This will allow a thorough evaluation of the new technologies for safety, efficiency and driver comfort, in real-world scenarios and with ordinary drivers. The project has a total budget of €22 million and is led by the Ford research center in Aachen, Germany. It includes 100 Ford and 100 Volvo vehicles.

One particularly creative research technique Ford has been using involves driving cars with Forward Collision Warning with Brake Support into large "balloons" nearly the size and shape of real cars. The purpose of these tests is to assess the accuracy of the radar and the timing of the warning signals and braking pre-charge. The balloons play the role of a "target" vehicle, allowing Ford engineers to assess the radar and braking features without endangering test drivers or damaging real cars. The balloons offer enough "give" to allow impact without injury. Ford uses about a dozen balloon cars in different sizes, each made from tarp-like material and weighing more than 40 pounds.

Ford is testing an array of active safety technologies by driving prototypes into large, car-shaped balloons.

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Promoting Safer Roadways

The driving environment includes physical infrastructure (roads, signs, traffic lights, etc.) and the condition and maintenance of that infrastructure. Increasingly, information technologies play a role in the driving environment – for example, by controlling the timing of traffic lights. All of these factors have a significant influence on traffic safety.

Safety challenges related to the driving environment vary between countries and between developed and developing economies. Around the world, we work with government agencies and private-sector partners to promote road safety.

In 2009, Volvo and the Swedish Road Administration began a strategic partnership to understand how their respective visions (Volvo's Vision 2020 and Sweden's Vision Zero) could work together. Through information exchange and data sharing, the two entities will seek to develop a common view of safer infrastructure and vehicles in the future.

In late 2004, working in partnership with General Motors, Honda, Michelin, Renault, Shell and Toyota, Ford helped to found the Global Road Safety Initiative (GRSI). The purpose of the GRSI has been to transfer best practices, with the objective of reducing accidents and building capacity in developing countries to manage road safety. Projects have included educational outreach to increase safety-belt and helmet usage rates, and training aimed at improving roadway design.

Ford and other participating companies pledged a total of $10 million to the GRSI over five years to fund important road safety projects in China, Brazil and countries in the Association of Southeast Asian Nations. The projects were implemented through the Global Road Safety Partnership, an existing organization founded by the World Bank and national governmental aid organizations. Ford served on the Partnership's Executive Committee and has been actively involved in project execution. The projects relied on delivery through local organizations, so those organizations could build capacity and continue their work long after the projects were completed.

Also in China, Ford is cooperating with the China Automotive Technology & Research Center (CATARC) and the Chinese Ministry of Public Security to launch a new project that aims to provide accurate and scientific data for research into road safety in China.

RELATED LINKS

External Web Sites:

- Volvo's Vision 2020
- Global Road Safety Initiative
- Global Road Safety Partnership
- China Automotive and Technology Research Center

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Collaborative Efforts

Ford Motor Company is involved with a number of partners to enhance the safety of the driving experience and develop future technologies.

ON THIS PAGE

RELATED LINKS

External Web Sites:

- National Highway Traffic Safety Administration
- John Force Racing
- National Hot Rod Association
- Society of Automotive Engineers
- U.S. Council for Automotive Research
- Global Human Body Models Consortium

CAMP

In 1995, Ford and General Motors launched the Crash Avoidance Metrics Partnership (CAMP) to conduct pre-competitive active safety research with other OEMs, suppliers and the U.S. government. Within CAMP, the Vehicle Safety Communications Two (VSC-2) Consortium, which included Ford, GM, Toyota, Daimler and Honda, worked with the U.S. Department of Transportation on projects to develop safety applications that utilize vehicle communications. Their efforts focused on developing a communication system whereby vehicles can "talk" to each other and to the roadway. This would be analogous to a wireless internet system or a cellular telephone for cars. CAMP VSC-2 successfully completed projects that demonstrated the basic feasibility of this technology and evaluated several applications.

CAMP has now formed a VSC-3 Consortium with Ford, GM, Honda, Hyundai-Kia, Mercedes, Nissan, Toyota and VW-Audi to continue work on vehicle safety communications such as cooperative intersection collision avoidance systems and vehicle-to-vehicle communications for safety applications. This consortium is being funded by NHTSA to complete all of the pre-competitive work necessary for a deployment decision for vehicle safety communications in 2013.

CAMP is also conducting two additional projects with NHTSA. The Crash Imminent Braking Project (involving Ford, GM, Mercedes, Continental and Delphi) is developing minimum performance requirements and objective test procedures for systems that automatically apply the brakes to avoid crashes or mitigate the severity of a crash. The Advanced Restraint Systems Project (involving Ford, GM and Mercedes) is developing restraint systems that utilize pre-crash and occupant sensing information.

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First Responder Training

Ford has been involved in several cooperative efforts with first responder groups in order to improve performance in the critical area of emergency response. The increasing use of stronger steels (e.g., boron steel, tubular hydroform steel, and high-strength steel) in motor vehicles, as well as issues surrounding hybrid vehicles (i.e., the challenge of disengaging the high-voltage battery), have raised some concerns by first responders regarding gaining access to vehicle occupants who have been involved in an accident. Engineers from Ford's Customer Service Division, Design Analysis and Crash Safety Departments have held several informative events with emergency first responder groups, ranging from equipment manufacturers like DeWalt and Hilti to local law enforcement and firefighters. First responder groups from several cities were represented in these sessions, where the industry's latest techniques for occupant extraction were reviewed and

explained for various crash scenarios. The events were well received by the first responder community, and should help their important efforts in the future.

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Ford Racing and the NHRA

Ford (through Ford Racing) has been working cooperatively with John Force Racing and the National Hot Rod Association to make significant safety improvements in the cars they use during testing and racing. Substantial safety improvements have already been implemented, including additional head padding (that is also thicker and more shock absorbent), stiffer chassis, and the Ford Blue Box data acquisition system (developed by Ford Racing and Delphi) to help with analysis of vehicle safety systems. This work will continue, with additional improvements expected in the years to come.

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University Partnerships

Ford is increasingly collaborating with university partners on crucial advanced safety technology projects. Ford has major research alliances with the Massachusetts Institute of Technology (MIT), the University of Michigan and Northwestern University and has utilized Ford's global University Research Program (URP) to collaborate with leading researchers at more than 100 universities worldwide. Safety is a central thrust in our collaborative university programs. The following are some examples:

- Projects within the Ford–MIT alliance are yielding progress in areas of vehicle autonomy and active safety, including computer vision, lane keeping, vehicle controls, obstacle detection and avoidance, and accurately assessing the driver's interaction with the vehicle. One project aims to assess the role of active safety technologies, features and functions in reducing driving-related stresses and enhancing driver wellness.
- At Auburn University, Ford has an ongoing project to conduct "sensor fusion" – that is, to coordinate between Global Positioning System sensors and the motion sensors in a vehicle's stability control systems, to predict when a driver is about to lose control. The ultimate goal is to use satellites to feed data to a vehicle's electronic stability control system, allowing it to adjust and prevent a loss-of-control accident.
- At the University of Michigan, safety work includes a portfolio of projects on 360° sensing and developing more robust and capable active vehicle control and enhanced collision avoidance systems, utilizing both onboard sensors and offboard information sources.
- At Virginia Tech, Ford has an ongoing URP project assessing the properties of maternal tissues from pregnant women. This project will enable the improvement of computer models to help gain a better understanding of the injury risk to pregnant women and their unborn babies.
- A project at the State University of New York's Downstate Medical Center should yield an improved understanding of human tolerance to pelvis injury.
- Collaborative work is ongoing with Purdue University investigating enhanced vehicle dynamics and stability control.
- As part of its accident research projects in Germany, the UK and Australia, Ford works closely with internationally acknowledged safety experts from the Universities of Hannover, Loughborough, Dresden, Birmingham and Monash.

Collaborative university work catalyzes innovation at Ford by providing access to the leading researchers at the cutting edge of vehicle dynamics and stability control, accident avoidance and driver assist safety technology, to name just a few. Ford will continue to integrate these collaborative innovations, driving continuous improvement in real-world safety and sustainability for all Ford Motor Company products.

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Alcolock Blue Ribbon Panel

Reducing the incidence of impaired driving would go a long way toward improving road traffic safety. In the EU, 25–30 percent of all car accidents involve alcohol. In the United States, approximately 40 percent of all traffic fatalities are alcohol-related (as reported by NHTSA).

The Automotive Coalition for Traffic Safety formed a Blue Ribbon Panel (BRP) in 2007 for the development of advanced alcohol detection technology, often called "alcolocks." The panel consists of vehicle manufacturers, including Ford, alcohol detection technology suppliers, Mothers Against

Drunk Driving, the Insurance Institute for Highway Safety, government representatives and other experts.

The BRP and its research are being funded jointly by NHTSA and the Alliance of Automobile Manufacturers. The purpose of the research is to "...engage major automakers in cooperative research that advances the state of alcohol detection technology... to promote the standardization of the technology, its widespread deployment, and acceptance by the general public."

Ford continued to participate in the work of the Blue Ribbon Panel through the Alliance during 2009.

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New Crash-Test Dummies

Crash-test dummies are essential research tools that aid in the development of passive safety technologies, and Ford Motor Company continues to develop, often in partnership with other parties, more advanced test dummies.

From 2005 through 2008, Ford partnered with the Children's Hospital of Philadelphia (CHOP), the University of Virginia, Virginia Tech and the Takata Corporation in a multi-year project to develop a new abdominal insert and sensor for a crash-test dummy representing a six-year-old child.

CHOP studies have shown that, in vehicle crashes, significant abdominal injury in four- to eight-year-old children is second in frequency of occurrence only to head and facial injuries. Abdominal injuries often occur when children too young (i.e., the four- to eight-year-old range) utilize adult restraint systems without a booster seat. The abdominal insert and sensor will allow restraint engineers industry-wide to test the potential for abdominal injuries in children and ultimately improve the development of in-vehicle restraint systems for young children.

In February 2008, the Society of Automotive Engineers established a task force to perform "round robin" testing of the new dummy component, and the group held its first meeting in June. More than 20 organizations from around the globe have signed up to participate. Tests will be performed by dummy manufacturers, other OEMs and NHTSA's Vehicle Research and Test Center. Testing was scheduled to begin in March 2010.

In another effort, Ford, GM and Chrysler have been working together under the auspices of the Occupant Safety Research Partnership (OSRP), a group within the U.S. Council for Automotive Research, to research, develop, test and evaluate advanced crash-test dummies and other pre-competitive safety systems. A number of years ago, the OSRP initiated development of WorldSID, a male side-impact dummy that is recognized as the most advanced crash-test dummy ever created. From 2006 through 2008, the OSRP worked with NHTSA to help them evaluate WorldSID for potential use in the federal government's new side-impact crash-test standard. NHTSA concluded that the "biofidelity" of WorldSID is better than that of the dummy in the current side-impact regulation. WorldSID is the first side-impact dummy with the potential to be commonly used in side-impact regulations around the world. To that end, in November 2009, the U.S. government proposed the creation of an informal working group, under the UN's Global Road Safety Partnership, to fully develop WorldSID dummies for use in government regulations globally.

Ford is also involved in the Global Human Body Models Consortium (GHBMC), which holds promise for the future of safety research. Established in 2006 by nine automotive manufacturers (including Ford) and two automotive suppliers, the GHBMC is working to develop next-generation, computer-generated virtual reality models of the human body. These advanced models will help researchers to better predict the effect of trauma resulting from automobile crashes on the human body and enable a variety of virtual crash tests, with the ultimate goal of improving automotive safety globally. The research and development is currently being led by multidisciplinary teams at universities in five countries – the United States, Canada, France, India and Korea – with the first set of human digital models expected to be completed in 2011. Ford brings much expertise to this effort, having developed its own human body model representing an average-sized male occupant and publishing this work in peer-reviewed journals over the last 15 years. Ford continues to refine its human body model for use in internal research.

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Data

The data relating to vehicle safety is included in the Society section of this report.

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Case Study: Driver Distraction

Over the past two decades, cellular phones have gone from clunky novelties to ubiquitous must-haves. Wireless subscriptions in the United States have grown from about 28 million in 1995 to about 270 million by 2009 – a whopping 960 percent increase. The public has become accustomed to using cell phones everywhere – at home, on the street, in restaurants, at the office, while shopping and – of most interest to Ford's safety researchers – while driving.

The ubiquity of cell phones – coupled with the proliferation of portable music players in vehicles – has heightened concerns about driver distraction. We at Ford agree that this is an important safety issue and we have taken steps to address it. We also believe that continued research is needed to better understand the complex interactions involved in this issue and we are participating in that research.

Ford Focus with SYNC®, Ford's fully integrated, voice-activated in-car communications and entertainment system

In 2009 and again in 2010, the National Safety Council (NSC) called for a total ban on the use of cell phones, both handheld and hands-free, while driving. The NSC stated that cell phone use while driving is "...a very high-risk behavior with significant impact on crashes...." And indeed, some studies have concluded that there's no difference in driver behavior whether using handheld or hands-free phones. In many of those laboratory studies, participants in simulated driving situations were observed while being asked to engage in in-depth conversations on challenging or emotional subjects, such as the latest political scandal or a near-death experience. Such intense and lengthy discussions can indeed be distracting.

Naturalistic driving studies – in which study participants' driving performance, "eye glance behavior," driving environment and in-vehicle activities are observed and recorded over weeks or months in real-world situations – have revealed different results. For example, naturalistic studies completed by the University of Michigan Transportation Research Institute reveal that, when immersed in real traffic conditions, drivers using cell phones by and large exhibit prudent driving behavior.

In addition, the landmark 100-Car Naturalistic Driving Study conducted by the Virginia Tech Transportation Institute (VTTI) found that almost 80 percent of all crashes and 65 percent of all near-crashes involved the driver looking away from the forward roadway just prior to the onset of the incident. In 2008, the study's authors summarized their findings in this way: "...it is a rare case that a crash occurs while the driver's eyes are on the forward roadway, regardless of any other 'cognitive demand' that they might be engaged in."

In 2009, the VTTI published a new naturalistic driving study based on commercial vehicle operator experience. This study suggested that there is a 23-fold increase in risk when commercial operators send text messages while driving and that some behaviors like checking gauges and talking on the cell phone can have protective benefits. After this study was published, legislative

RELATED LINKS

Ford Web Sites:

- SYNC®
- Ford Driving Skills for Life

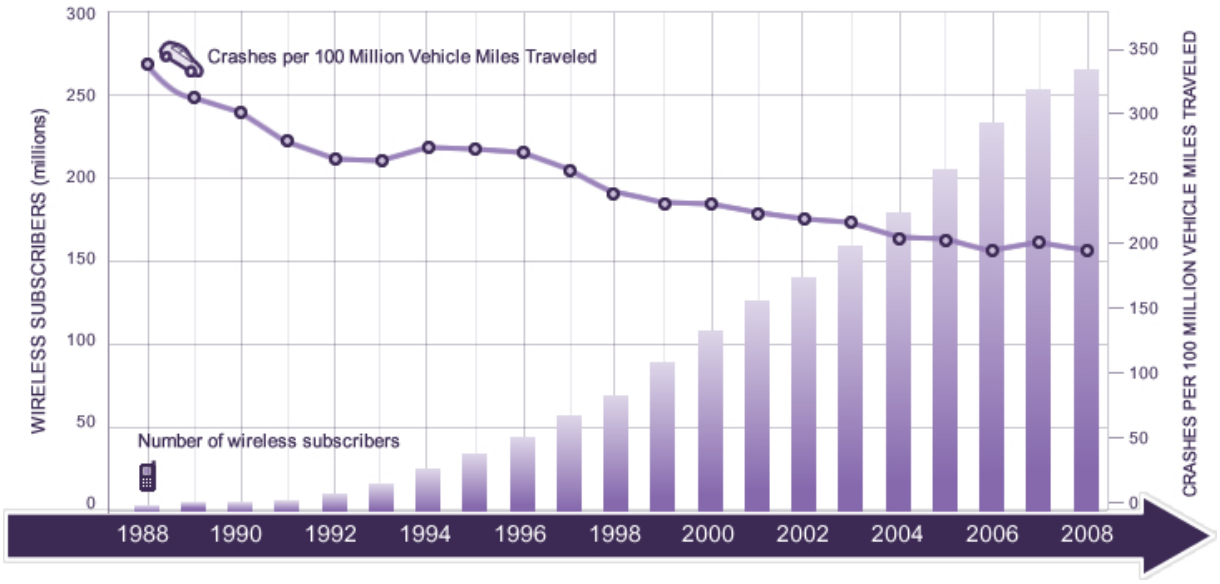
External Web Sites:

- National Safety Council
- University of Michigan Transportation Research Institute
- Virginia Tech Transportation Institute
- U.S. Department of Transportation
- Alliance of Automobile Manufacturers
- Insurance Institute for Highway Safety

and executive action to ban texting while driving increased dramatically, and the Secretary of Transportation convened a two-day Distracted Driving Summit to open a dialogue between the various stakeholders. Ford took part by sending representatives to attend the Summit as well as leading the development of the Alliance of Automobile Manufacturers' presentation for the Advanced Technologies Panel.

Beyond the VTTI and University of Michigan studies, there exists a considerable body of published research that indicates the superiority of hands-free voice interfaces as compared to handheld or visual–manual interfaces for the same tasks of command or data entry. These studies show advantages in driver performance, eye glance behavior toward the roadway, and object and event detection when the driver can keep eyes on the road and hands on the wheel. It is also interesting to note that, despite the significant increase in cell phone use in recent years, crash rates have fallen over the same time period (specifically, in both the categories of "fatal crashes" and "police-reported crashes"). (See graph below.) Also, the Insurance Institute for Highway Safety (IIHS) has published studies indicating that handheld phone bans in New York, Washington, DC and Finland led to an initial decline in the banned behavior followed by a return to pre-ban levels of handheld phone use within roughly one year.

Police Reported Crash Rates and Wireless Subscription Growth 1988-2008



More recently, the IIHS evaluated insurance data to see if there were demonstrable benefits to handheld bans. The IIHS had previously claimed that driving while using a cell phone causes a four-fold increase in risk, thus it was expected that insurance data would show a drop in claims after the enactment of handheld bans. However, the data showed no observable drop in claims as expected, and the IIHS is now re-evaluating its position on distracted driving and cell phone use risks.

For several years now, Ford has been focused on the issue of driver distraction and has taken steps to enhance driving safety for those who use cell phones and other telematics devices while driving. Through its work with the Alliance of Automobile Manufacturers, for example, Ford helped lead the development of an industry-wide Driver Distraction Voluntary Agreement, and Ford designs its telematics systems to meet that agreement. In addition, Ford was the first automotive manufacturer to support the Schumer Bill, the first bill in Congress to propose a ban on handheld texting while driving. Ford also clarified its employee policies to explicitly ban the practice. And, Ford Driving Skills for Life, Ford's driver education program, includes modules on the importance of avoiding distracted driving.

In addition, Ford designed and introduced SYNC®, our voice-activated in-car connectivity system, which has been shown to enhance the ability of drivers to keep their eyes on the road and hands on the wheel while using cell phones and music players. Recently completed simulator research at Ford has shown that SYNC substantially reduces drivers' eyes-off-road time and improves lane-keeping, speed maintenance, and object and event detection response times, when compared to handheld devices for the same tasks. (See the above video for an example. It shows how long it takes a driver to find a song on an MP3 player manually vs. using SYNC's voice-activated system.) This study evaluated driver performance, not driver behavior in the real world. However, these performance effects are consistent with the 100-Car VTTI Study, and strongly suggest that SYNC will reduce driver distraction and thus improve driving safety in situations where a hand-held device would otherwise be used. In addition, these findings were recently confirmed by independent, on-road testing performed by the VTTI and published at the most recent SAE Congress.

Ford recognizes the fact that drivers will use cell phones and music players while driving, and that evolving technologies like text messaging are growing increasingly popular. Text messaging is a particular concern, as it requires significant time looking away from the roadway to operate. Ford's SYNC system addresses this concern as well: when a text message arrives, it does not display that message but instead reads it aloud through text-to-speech technology, and then provides a list of canned replies for the driver to select rather than key-in or compose manually. SYNC also locks out certain features (such as adding or editing a phone book contact) while driving.

The next generation of SYNC will allow for more conversational commands, and will allow customers to use voice commands to control smart-phone applications such as OpenBeak (an app for posting messages to Twitter), Pandora (for music streaming) and Stitcher (for podcast streaming). Pandora and Stitcher report that more than 40 percent of their users use this feature in their vehicle.

We believe that further education is needed to help drivers understand the importance of focusing on the driving task and keeping their hands on the wheel and eyes on the road. Ford plans to continue to work with the government and other safety-related groups to discuss measures that can effectively reduce driver distraction and improve driving safety. We also plan to participate in continued research that can further our understanding of safe driving and help spread the message of safe driving.

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Sustaining Ford

2009 HIGHLIGHTS:

- Doubled our hybrid vehicle production, and on the way to delivering our first pure battery electric and plug-in hybrids

We are forging a path toward profitable growth through teamwork and leveraging global scale.

After enduring several of the most difficult years in our Company's history, Ford turned a corner in 2009. In the face of a global economic and financial crisis, as well as unprecedented events in the U.S. automotive industry, Ford achieved $2.7 billion of net income, its first full year of positive net income since 2005, and a $17.5 billion improvement over 2008.

Despite the continued economic slump of 2009, which included the bankruptcies of two of our domestic competitors and a nearly 40 percent cumulative drop in new vehicle sales in the United States since 2005, we gained market share in most of our business units across the globe, including our first full-year market share gain in the United States since 1995.

Based on our improving performance, the gradually strengthening economy and our present assumptions, we now expect to deliver solid profits in 2010 with positive Automotive operating-related cash flow.

Our progress in 2009 offers the strongest proof yet that our business strategy is successful and that we are forging a path toward profitable growth through teamwork and leveraging global scale. Three years ago, we created the "ONE Ford" plan to guide our business toward better times. We cascaded the plan across our global organization. And we are executing the plan.

Ford is steadfastly focused on creating a strong business that builds great products that contribute to a better world. As part of our plan, we continue to press forward to globalize vehicle platforms that can be adapted to meet specific regional needs. Flexible manufacturing capabilities allow us to bring products to market with greater speed and efficiency than ever before.

Our commitment to innovation is supported by four principles that inform and guide every design and engineering effort: to be best in class in quality, safety, fuel efficiency and the "smart technologies" that make the driving and riding experience easier and more enjoyable. We are working to continually raise the bar on quality and safety. Fuel efficiency and smart technologies are strategically important because green technology and smart innovations are helping us serve our customers and differentiate Ford.

Our sustainability strategy has helped us to understand the global challenges driving the need for innovation in these areas and positions us to succeed in delivering them. We believe that we have been able to weather these last difficult years because our business strategy and our sustainability strategy are aligned and intertwined.

But we're far from complacent and we're continuing to address adverse conditions. Notwithstanding many positive signs of an economic recovery, the global business environment remains

PERSPECTIVES ON SUSTAINABILITY

Abby Joseph Cohen

Senior Investment Strategist and President of the Global Markets Institute at Goldman Sachs

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- Delivering More Fuel-Efficient Vehicles
- Working as One Team

extraordinarily challenging, with increasingly intense competition from other automakers. We know the road ahead won't be easy.

We are focused on our future and our ultimate objective: profitable growth for all. Our ONE Ford transformation plan was developed in 2007 to create a leaner, more-efficient global enterprise. It is anchored by four key priorities:

- Aggressive restructuring to operate profitably at current demand and changing model mix
- Accelerated development of new products our customers want and value
- Financing the plan and improving our balance sheet
- Working together effectively as one team to leverage our global assets

While we are well on our way, it's clear that our ONE Ford transformation is not yet complete. By continuing to work together and staying focused, we believe we can deliver a future that includes benefits for our stakeholders, including our employees, our investors, our business partners, our suppliers and our dealers. When Ford succeeds, so do the broader communities in which we operate.

Our path toward long-term viability began well before the recent economic downturn. We have been fundamentally restructuring our operations in ways that impact every part of our business – from product innovation and fuel efficiency to labor relations and our interactions with suppliers and dealers. These last years have demonstrated how critical it is for Ford to stay focused on issues of sustainability, even in difficult economic times.

We recognized that our business model needed to change, and we have been changing it. One key element of our plan has been our increased focus on a more balanced portfolio that includes more small and midsize vehicles, to respond to consumer demands.

We've also been very clear about our product strategy to deliver improved fuel economy and reduced greenhouse gas emissions through affordable advanced technologies. We continue to make improvements in gasoline-powered vehicles through the use of EcoBoost™ engines, six-speed transmissions, electric power-assisted steering and other technologies. We doubled our hybrid vehicle production, and we're on the way to delivering the first of our pure battery electric and plug-in hybrid vehicles. It is a practical, comprehensive approach designed to provide affordable fuel economy to millions of drivers around the world.

Over the next few years, Ford is investing nearly $14 billion in advanced technology vehicles in the United States alone.

Our blueprint for sustainability, which highlights how we will meet our product carbon-dioxide-reduction goal, has positioned us to lead in the industry. And on the supply side, we are continuing to strengthen our U.S.-located supply base, instituting practices designed to increase collaboration, provide for data transparency and expand the volume of business with select suppliers – all with an eye toward building a more sustainable business model. We're also focused on improving transportation options for people in urban areas to promote sustainable mobility and build electric vehicles for these markets.

In 2010, we will deliver substantially more new or freshened products by volume than in 2009 globally, bringing to market an unprecedented volume of new products – with class-leading fuel efficiency, safety, smart design and value.

Offering vehicles with smaller environmental footprints, tackling the mobility challenges of rapidly growing urban centers, and tailoring our products and services to increasingly diverse global markets are not peripheral to Ford's future success – they are central to it.

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Segment Shifts

As consumer preferences in North America have shifted from larger vehicles to smaller, more fuel-efficient models, we are responding. We have made a commitment and are taking steps to make our assembly plants "flexible" – that is, more nimble to enable us to adapt our vehicle production more swiftly to changing market preferences and needs. Thanks in part to significant investments in our manufacturing facilities, we're retooling three of our North American assembly plants that previously had built large trucks and SUVs to instead build smaller, more fuel-efficient vehicles on Ford's global platforms. For example, we're investing $550 million to transform our Michigan Assembly Plant – formerly the production site for the Ford Expedition and Lincoln Navigator SUVs – to one that will build Ford's next-generation global Focus for the North American market. This transformation is emblematic of the larger transformation under way at Ford. In the modern marketplace, we see flexibility and adaptability as critical to our success.

We have made a commitment and are taking steps to make our assembly plants "flexible" – that is, more nimble to enable us to adapt our vehicle production more swiftly to changing market preferences and needs.

We have been working hard these last few years to reverse the decades-long trend of losing money on the production of small cars in the United States. We have boosted production of smaller-sized vehicles in North America and globally, and we are improving costs to competitive levels. The strength of the new Ford Fiesta in markets from Europe to Africa to Asia is proof of the progress we are making in this area. (The Fiesta debuts in the United States in the summer of 2010.) We are also improving sales thanks to the increased production of vehicles with class-leading fuel economy, safety performance, quality and technology.

As part of our ONE Ford plan, we have shifted our entire business structure. We historically operated as four somewhat independent automotive companies around the globe – North America, South America, Europe and Asia Pacific – each with its own product development systems, manufacturing processes, suppliers and other duplicative structures. While this made sense in the past, such a structure led to unnecessary and inefficient processes and a failure to realize the substantial benefits of scale available to a global enterprise like ours.

As we expanded our brand portfolio around the world, our global enterprise became more difficult to manage, and we neglected to ensure that the Ford brand retained its strength in all markets and in all segments. The situation was especially acute in the United States where, in the 1990s, both Ford and our foreign and domestic competitors became increasingly dependent on sales of trucks and large SUVs.

While we did begin to refocus our North American portfolio in the early 2000s with a new line of midsize cars, we did not adequately predict the sizeable shifts in consumer preferences that were to come later in the decade. When fuel prices shot up rapidly in early 2008, consumers migrated toward small cars at a much faster pace than we and others in the industry anticipated.

In 2010, sales trends show that consumers are continuing to move toward smaller vehicles, which bodes well for our Company as we prepare for the U.S. launch of the Fiesta this summer.

Today, gas remains relatively inexpensive in the United States, but we think consumers will remember how higher gas prices impacted their wallets, and we believe the shift in buying patterns is more than a temporary fluke.

When we watch how our customers' aspirations and lifestyles change, monitor long-term trends and connect the dots, we succeed in bringing our customers the vehicles they really want and value. For example, while we anticipated a shift in U.S. consumer attitudes regarding the desire for cars with affordable fuel economy, we also appreciated that not everyone is ready for a hybrid. That's why we pursued two compatible plans. The result was our high-horsepower, high-mileage EcoBoost technology – developed on a parallel path to our popular hybrids.

Our innovative technologies have been well received within the industry, in the media and, most importantly, with our customers. Our challenge is to maintain – or even further improve – the pace of innovation that we set in 2009 to deliver even better vehicles each and every year, with even better technology. We're not delivering technology just for technology's sake. Every piece of

technology that goes into a Ford product is there for one reason: it adds real value.

As customers look for more fuel-efficient choices, we intend to be there with more of the products they really want.

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Sales Trends

While overall industry sales and production levels remained low in the United States in 2009 compared to pre-recession levels, Ford saw growth in market share in most of our major markets. Government incentives, such as the popular "cash for clunkers" program in the United States and even larger scrappage programs in Europe (particularly Germany) helped boost what was otherwise a dismal year overall. In the United States, the Ford Focus was the top-selling Ford car under the cash for clunkers program. Reflecting the shifts in consumer preferences, three Ford Explorer models from the 1990s were among the vehicles most traded-in under the program.

Strong products drove Ford's full-year market share gains in North America, South America and Europe, while we maintained our share in the rapidly growing Asia Pacific Africa region.

In the United States, Ford, Lincoln and Mercury fourth-quarter 2009 sales were up 13 percent versus a year ago – leading to the first full-year market share gain since 1995. Fusion sales rose 22 percent, setting a new annual record, and the F-Series was the No. 1 selling truck for the 33rd straight year.

In Europe, fourth-quarter sales increased 19 percent. Led by the Fiesta, Focus and Ka, Ford strengthened its position as Europe's No. 2 brand. Ford Europe's market share of 9.1 percent increased a half point for the year, setting an 11-year high. In South America, meanwhile, Ford Brazil achieved its best-ever full-year sales in 2009 by selling 325,000 units – a 15 percent sales increase over levels from the previous year. And, in our Asia Pacific Africa region, fourth-quarter sales rose 53 percent, with full-year sales up 15 percent in the region. Ford sales in China led the full-year increase, up 45 percent from 2008.

We're extremely pleased that we were able to report a full-year 2009 pre-tax operating profit. And we're on track toward profitability for full-year 2010.

More and more, consumers are recognizing that Ford is different, and the real difference is our great products, stronger business and the better world we are creating – particularly our leadership in quality, fuel efficiency, safety, smart technologies and value.

(For more information, please see the Economy section of this report.)

Workforce

We've had to make some difficult decisions over the last few years in order to match production capacity with demand for new vehicles. That meant significant reductions in employment levels in our North American business unit. The personnel reductions were painful for every person affected. But the results of these efforts are helping Ford to strengthen our competitive position and long-term financial viability. Since 2005, we have closed 12 manufacturing facilities in North America.

In 2009, we offered 42,000 hourly employees two opportunities to accept buyout and early retirement offers, which included payments of up to $70,000 for newer workers and up to $60,000 for those already eligible for retirement. Approximately 1,300 hourly employees accepted a buyout offer in 2009. We have attempted to handle workforce separations and plant closings with respect for the people and communities affected.

In March 2009, Ford-UAW membership ratified modifications to the existing collective bargaining agreement that significantly improved our competitiveness, saving us up to $500 million annually and bringing us near to competitive parity with the U.S. operations of foreign-owned automakers. The operational changes affected wage and benefit provisions, productivity, job security programs and capacity actions, allowing us to increase manufacturing efficiency and flexibility. In addition, modifications to an independent trust called the Voluntary Employee Beneficiary Association, or VEBA, allowed for smoothing of payment obligations and provided us the option, at our discretion, to satisfy up to approximately 50 percent of our future payment obligations to the VEBA trust in Ford Common Stock.

On November 1, 2009, the CAW announced that a majority of its members employed by Ford Canada had voted to ratify modifications to the terms of the existing collective bargaining agreement between Ford Canada and the CAW. One day later, the UAW announced that a majority of its members employed by Ford had voted against ratification of a tentative agreement that would have further modified the terms of the existing collective bargaining agreement between Ford and the UAW. The latest modifications were designed to closely match the modified collective bargaining agreements between the UAW and our domestic competitors, General Motors and Chrysler. (For more on this topic, see the Economy section of this report.)

Our improved financial performance has resulted in some tangible improvements for our workforce in 2010. We were able to pay profit sharing to 43,000 eligible United Auto Workers in 2009. We have reinstated a 401(k) matching program and we are awarding 2010 merit increases for eligible U.S. salaried employees.

In February 2009, our two top executives, Bill Ford and Alan Mulally, voluntarily agreed to accept a 30 percent reduction in salary for 2009 and 2010 and neither received a cash bonus in either of the last two years. Mr. Ford has requested that his compensation be set aside, to be paid only at a point when the Company's global automotive operations achieved full-year profitability.

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2009 Sales and Highlights

Business Unit	2009 Wholesales (in thousands)	Percent Change from 2008	Highlights
Ford North America[1]	1,958	-16%	• Ford, Lincoln and Mercury brands collectively increased U.S. overall and retail market share 14 of the last 15 months as of December 2009, and posted the first full-year market share gain since 1995. • The new 2010 Fusion Hybrid was named *Motor Trend* magazine's Car of the Year and awarded the title of North American Car of the Year at the North American International Auto Show in January 2010. • Our combined car and truck market share (including all of our brands sold in these markets) in 2009 was 15.2% for Canada – up 2.6 percentage points from the previous year – which represents our highest full-year share since 2001 and made Ford the No. 1- selling brand in Canada. • The Ford Fusion, the most fuel-efficient midsize sedan sold in America, posted a full-year sales record in 2009 with 180,671 units sold. • The new Ford Transit Connect was introduced in North America in the second quarter of 2009 and was awarded the 2010 North American Truck of the Year at the North American International Auto Show. • The 2011 Ford Fiesta was revealed in North America in the fourth quarter of 2009 and will go on sale in the second quarter of 2010. • The F-Series pickup truck has been the best-selling truck in the United States for 33 straight years. • Ford has the most U.S. government five-star-rated vehicles and the most "Top Safety Picks" from the Insurance Institute of Highway Safety of any automaker.
Ford Europe	1,568	14%	• We improved our 2009 full-year market share to 9.1% in the 19 European markets we track – a 0.5 percentage point increase versus 2008 and our best market share since 1998. • The Ford Fiesta was the second best-selling model in Europe in 2009, reaching its best full-year sales since 1996. More than 15 months after its sales debut in autumn 2008, more than 675,000 customers have purchased the Fiesta globally. • In 2010, we will continue to build on our product momentum, with at least 11 vehicle reveals or launches, including the new Ford C-MAX and Grand C-MAX, the freshened Ford Galaxy, S-MAX, Mondeo and a new Focus ECOnetic.
Ford South America	443	2%	• In Brazil, 2009 industry sales were strong in comparison to other markets in South America due to government stimulus actions taken in response to the global economic slowdown. • In 2010, we are bringing a flex-fuel version of the European-based Ford Focus to Brazil; nine additional product introductions are planned for the region in 2010. • In 2009, the European-based Ford Focus came to Brazil, Argentina and Venezuela. • Ford is investing $2.57 billion in our Brazil operations between 2011 and 2015 to accelerate the delivery of more fuel-efficient, high-quality vehicles, and another $250 million in our Argentina operations from 2009 to 2012.
Ford Asia Pacific Africa[2]	523	14%	• In 2010, we will introduce the all-new Ford Fiesta five-door and four-door sedan, built in Rayong, Thailand. • The four-door Fiesta will join the five-door counterpart in Australia, New Zealand, South Africa and Taiwan. • The new Ford Figo commenced sales in the second quarter in India and later

in the year in South Africa.

- Ford is investing $500 million to expand our manufacturing facility in Chennai, India, to begin production of a new small car and to build a fully integrated and flexible engine manufacturing plant.

1. Includes sales of Mazda6 by our subsidiary, AAI.
2. Included in wholesale unit volumes of Ford Asia Pacific Africa are Ford-badged vehicles sold in China by unconsolidated affiliates totaling about 264,000 and 184,000 units in 2009 and 2008, respectively.

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Perspectives on Sustainability

IN THIS SECTION

David Chock

Former Ford Scientist (1989–2009)
Current Member of the Science Advisory Board (SAB)
U.S. Environmental Protection Agency

"I believe it's very important for major corporations to consider science when making decisions about their products and their operations."

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Abby Joseph Cohen

Senior Investment Strategist and
President of the Global Markets Institute at Goldman Sachs

"Sustainability can't be an add-on; it must be well integrated into a corporation's regular business activities."

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Timothy Fort

Executive Director and Professor of Business Ethics
Institute for Corporate Responsibility, George Washington University

"I think people see Ford – and rightly so – as a company that is focusing on substantial larger social issues, like human rights and environmental sustainability, that are critical for our planet."

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Steve Marshall

Senior Fellow
Cascadia Center for Regional Development

"The question is not *should* we move toward plug-in vehicles. The real question is how can we get there quickly."

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Peter Sherry, Jr.

Corporate Secretary and Associate General Counsel
Ford Motor Company

"These days, sustainability governance and more traditional corporate governance overlap, maybe even to the point of merging. We have a very complicated business that impacts a host of different areas, and you can't divorce any one from the others."

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Jim Vondale

Director
Ford Automotive Safety Office

"To identify the safety priorities that can save the most lives, we must rely on real-world crash and injury data and apply sound science to motor vehicle safety problems."

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David Chock

Former Ford Scientist (1989–2009)
Current Member of the Science Advisory Board (SAB)
U.S. Environmental Protection Agency

Before my retirement last year, I spent 20 years as a scientist at Ford, doing research and working to understand issues like the impact of emissions on air quality. In the late 1990s, our team began looking into the science of climate change and its implications for auto emissions. We were also looking at sustainability issues, developing Ford CO_2 emission reduction targets from the perspective of energy resource availability and potential economic and environmental impacts.

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This Report:

Climate Change

When I joined Ford, the Company's sustainability strategy tended to be short term, as was typical of many large companies at that time. Five to 10 years down the road was generally considered a far-reaching outlook. But when we started addressing the issue of climate change, the Company's mindset began to change, and Ford took a much longer-term view of sustainability, with a much more global perspective.

I think Ford had some key enablers that allowed us to push ahead in our climate change work. The first enabler was Bill Ford, a very forward-looking environmentalist. He deserves a lot of credit for nurturing the sustainability mindset at the Company and for opening up direct channels of communication with corporate decision-makers. The second enabler was a company culture that encouraged discussions among employees – of any rank. Ford has a very open and collaborative atmosphere, which made it an exciting place to work.

By keeping abreast of the scientific literature and evaluating the scientific merit of different arguments, we came to the conclusion that the science of climate change is credible. This allows Ford to use science as a guide for future planning. One scary thing about climate change is that short-term climate noise may lull us into complacency even as the longer-term trend has become increasingly evident. There are also many practical issues on global CO_2 emission reduction that have not been adequately addressed and coordinated. But eventually, we, and especially our children and future generations, will have to face the consequences of our action or inaction.

In the process of developing the Company's CO_2 model and strategy, we found it very helpful to work with other interested partners, leveraging each other's expertise as necessary. For example, BP's knowledge and realistic projections of biofuel availability in different regions of the world provided critical input in our construction of meaningful fossil-CO_2 emission reduction requirements from vehicles.

Our approach assumed a climate stabilization target and took into consideration the economic growth of developing countries, proceeding logically from global CO_2 emission-reduction requirements down to regional responsibilities. We constructed many scenarios. Obviously, while we don't know which scenarios might be closer to reality in the future, at least we know what to anticipate in order to fulfill our corporate citizenship responsibility.

I believe it's very important for major corporations to consider science when making decisions about their products and their operations. Natural science guides us about how our actions will impact the environment. Equally important are the social sciences, especially economics and behavioral science, which can help direct us to define workable solutions that are beneficial to society at large, to the environment and to corporations themselves.

Companies must sell their products; if they can't get customers to purchase them, they'll go out of

business. We need to build environmentally friendly products that people will buy. I'm proud that my work at Ford could help impact the Company's product development and sustainability strategy.

MATERIAL ISSUES

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- Climate Change
- Mobility
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Abby Joseph Cohen

Senior Investment Strategist and
President of the Global Markets Institute at Goldman Sachs

It's important for companies to monitor, measure and manage their sustainability performance for their own purposes, but also because shareholders are increasingly asking them to do so. Social responsibility may not yet be the dominant investment model, but an increasing number of fund managers and institutional investors are paying attention to these issues.

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Sustaining Ford

For many years, the socially responsible investing (SRI) movement was stymied by studies that showed lower rates of portfolio returns for those that used sustainability or another SRI metric as their primary investing criterion. Until relatively recently, it was difficult to show a positive correlation between good corporate stewardship and strong financial market performance. Perhaps this was linked in part to the focus of early adopters of SRI to simply avoid certain companies and industries. Another contributing factor was the relatively small amount of portfolio assets that was targeted toward companies with strong records in SRI performance.

More recently, SRI has been broadened to include environmental, sustainability and governance (ESG) issues. Importantly, ESG investors are seeking to identify the companies that are strong performers in these categories rather than merely avoiding those in challenged industries. Data from the Investor Network on Climate Risk (INCR) – a network of investors that say they care about the environment – show a fascinating trend. As recently as 2003, the INCR represented investors with about $600 billion in assets under management. Today, the INCR has grown to an estimated $8 trillion network. Even when compared to the size of global capital markets, this is substantial and has reached critical mass.

One problem for investors interested in sustainability issues is that much of the publicly available information is not as useful as it could be. Moreover, there is often little consistency or comparability in the data offered by different companies. A sustainability issue that may be extremely relevant for one industry may not matter at all for another. Although the US Securities and Exchange Commission recently mandated corporate disclosures related to climate change, full details on the specific nature and form of disclosures must still be decided.

Investors are accustomed to evaluating companies using quantified financial data. We know how earnings, balance sheet and other items are defined because of clear guidelines such as Generally Accepted Accounting Standards (GAAP). But that level of specificity does not yet exist for the measurements related to sustainability. Many portfolio managers simply aren't sure what benchmarks and metrics to use.

From my viewpoint, however, one especially important benchmark is governance. Not surprisingly, there's a very high correlation between companies that score well on governance issues, and those that score well on sustainability, climate stewardship and community engagement.

Early on in the sustainability movement, investors – particularly large public pension funds – were driving the reporting process for companies. Their emphasis was largely on liability management, with the primary goal of avoiding bad long-term outcomes associated with corporate activities, such as the costs of environmental damage and remediation. There are two changes of consequence. First, investors are increasingly rewarding not only the avoidance of bad outcomes but also the pursuit of new business opportunities that enhance sustainability. These include developing new sources of revenues based on products and processes that have a friendlier environmental footprint. Second, more mainstream investors recognize that they can improve their financial returns by focusing on companies that prioritize sustainability. The results may prove to be mutually

reinforcing, with companies responding to shareholders and shareholders responding to the successes of companies.

Bill Ford introduced sustainability reports for the vehicle manufacturer more than a decade ago, so Ford has a culture of paying attention to these issues. The credibility of Ford's effort is enhanced because the company's environmental policies are part of the overall business strategy. Sustainability can't be an add-on; it must be well integrated into a corporation's regular business activities.

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Timothy Fort

Executive Director and Professor of Business Ethics
Institute for Corporate Responsibility, George Washington University

Ford's human rights policy builds on a notion of establishing trusted partners among suppliers, employees and regulators. That's a good strategy, because trust is essential for businesses that want to succeed in today's environment. (It's also much more efficient than trying to police those within your supply chain.)

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Human Rights

I believe there are three types of trust for businesses that are aiming to be socially responsible: hard trust, real trust and good trust. "Hard trust" is essentially obeying the law; people will trust that a company is in compliance with human rights codes because there are third parties that will punish them – through fines or prosecutions – if they do not. Unfortunately, that's about as far as many companies ever go.

"Real trust" companies actively engage with the stakeholders that are affected by their business operations. They're not forced to do this; they do it because they believe in doing good and they want to ensure they and their employees are living to the highest standards of ethical behavior. "Good trust" goes one step further. Companies that practice good trust have an almost spiritual or aspirational aspect to their work. They want to move far beyond basic codes of conduct to look at how they can help solve problems and create a better world.

I think you need to have all three elements of trust in order to have a rich company culture on issues of human rights. Only a very small percentage of companies are actually incorporating elements of good trust into their business, but the numbers are growing.

Over the last 20 years or so, more and more companies have moved beyond mere compliance with the law, recognizing that employees are more motivated and suppliers more loyal if you treat them well. And plenty of academic studies show a correlation between corporate social behavior and corporate financial behavior.

Ford is one of those companies that is trying to achieve much more than just "staying out of trouble." I think people see Ford – and rightly so – as a company that is focusing on substantial larger social issues, like human rights and environmental sustainability, that are critical for our planet. One good example of this is Ford's efforts on HIV prevention and education among its employees in South Africa. Ford's receptiveness to programs that have an impact on their employees' well being is an indication of its corporate culture.

More consumers are aware today of where their products are coming from, and if they were ethically sourced. But whether they are willing to pay more for ethical products is decidedly mixed.

Companies will always find new ethical demands and challenges. Looking ahead, for example, companies may find themselves working to create more peaceful societies. There might even be a role for businesses to help mediate religious conflict among people who live in the areas in which they operate. Companies may be better suited to do this than governments because of their experience taking a pragmatic approach to religious differences in the workplace.

MATERIAL ISSUES

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Steve Marshall

Senior Fellow
Cascadia Center for Regional Development

Our think tank is primarily concerned with transportation and energy issues. We have worked with Ford over the years to figure out ways to link electrified vehicles with transportation and communications networks.

In order to move beyond oil and make communities more sustainable, we need to align the interests of vehicle manufacturers, software firms, regulators and utility companies. That in itself is challenging, since these groups have never before had to work together.

For example, if electrified vehicles are going to succeed, we need utility companies to be on board without reservation, since they will provide the infrastructure for the re-charging stations that will become the gas stations of the future. Now they're concerned about uncertainties. Will they need to add generation capacity to make energy for electric vehicles and, if so, can they pass on the costs to consumers? Utilities are creatures of regulation and the rules and incentives have to be right.

Many stakeholders recognize the potential benefits of plug-in technologies, but there's a lot of work to do before they can become mainstream. There are issues with infrastructure, power grid limitations – even concerns about declining revenues from the gas tax, if consumers switch to electric vehicles.

At our Beyond Oil conferences, we strive to point out that moving away from foreign oil and toward electricity will actually create an economic stimulus effect for the United States. Last year, for example, my home state of Washington spent more money to import fuel from overseas than it spent on K-12 education. For those worried about loss of gas tax benefits, there are other alternatives, such as a gas tax stabilization plan that ensures a set level of revenue or ultimately moving to a vehicle mile travel fee and congestion pricing, where vehicles are charged more per mile based on the time of day they travel.

Henry Ford famously said that if he had asked his customers what they wanted, they would have answered: "a faster horse." People didn't know what was out there, so they didn't know what to request. The same holds true for electrification and the mobility hubs of the future.

What Henry Ford did was introduce a systems approach to making affordable cars. The more affordable the cars became, the more roads and support services were created. I would urge people to think of a systems approach when it comes to new forms of vehicle technology. The question is not *should* we move toward plug-in vehicles. The real question is how can we get there quickly. Information technology will play a critical role in linking the elements of the system together and making it seamless for consumers.

We need to re-think our transportation systems. Imagine being able to drive an electric vehicle from your home to a transportation hub where you can plug in your car for charging while you then take light rail or a rapid bus into a core metropolitan area.

Years from now, people will look back and wonder what it was like to drive a gasoline-powered car, much in the same way that people now look back and wonder what it was like to rely on horses for transportation.

Ford has been taking a leadership position not just on electric vehicle development, but on a whole host of sustainability issues, such as mobility hubs and overall transportation systems approaches. There are very few companies that are thinking broadly like that and trying to link the different

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components that will make them work – and work to their optimum capability.

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Peter Sherry, Jr.

Corporate Secretary and Associate General Counsel
Ford Motor Company

When I first started here at Ford Motor Company in the early 1980s, I don't think "sustainability" was part of our corporate lexicon. That started to change over time and really accelerated when Bill Ford became CEO in 2001. We began to recognize that it was in our Company's bottom line business interests to focus on issues of sustainability.

Sustainability has been a steadily accelerating progression at Ford. Take for example, our Board of Directors, which in 2009 renamed its Environment and Public Policy Committee as the Sustainability Committee. This change helped narrow the focus of the Committee. It sent a clear and consistent message both inside and outside the Company that Ford's leadership is focused on the important sustainability issues that are pivotal to our business, such as climate change, energy independence, vehicle safety, mobility and human rights. Changing the name ensured a continuity of purpose and a continuity of approach.

In particular, the committee has been spending increasing amounts of time looking at technology issues to make sure that Ford will be able to meet and exceed government-mandated fuel economy standards, both in the U.S. and in Europe, and that we will continue to be a leader in this area around the world.

These days, sustainability governance and more traditional corporate governance overlap, maybe even to the point of merging. We have a very complicated business that impacts a host of different areas, and you can't divorce any one from the others. In other words, you can't manage each issue separately. Fuel economy, alternative fuel vehicles, electrification – these are absolutely critical to the success of this Company. They are also critical from a broader social, environmental and economic standpoint. So, it's essential that your strategy and your plans in these areas be part of your overall business plan.

Sustainability permeates Ford's management. Each week, senior executives participate in the Business Plan Review chaired by our CEO, Alan Mulally. There, and in the Special Attention Review that follows, sustainability issues are discussed, just as any other critical issue within our business would be discussed. Sustainability governance is just a part of the whole. Indeed, if Ford itself is not sustainable as a company, nothing else we do will matter.

Of course, it is impossible to predict the future. Instead, the Board, the Committee and Company management must try to anticipate long-term trends to make sure we are able to position ourselves favorably. For example, it's no secret that we're anticipating a larger segment of the world population will want to drive smaller, more fuel-efficient cars that also have the features that discerning consumers want and value. That wasn't historically the case, particularly here in the U.S., yet we're now making the investments to develop more fuel-efficient vehicles to meet developing consumer demand.

It's important that Ford work collaboratively with all of our stakeholders around the world, whether they are shareholders, employees, dealers, government agencies or nongovernmental organizations. Historically, the mentality at companies like ours was that others outside our industry shouldn't presume to tell us what to do. Today, we know that's not an effective approach. The best way to solve difficult global issues, such as vehicle safety and fuel economy, is to work together with others – even with those whose interests may not always be completely aligned with ours.

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Jim Vondale

Director
Ford Automotive Safety Office

In recent decades, the global vehicle safety community has together made significant strides in reducing motor vehicle crashes, fatalities and injuries. We can accelerate this progress in the future by staying focused on the most-effective real-world safety priorities and by harmonizing global safety regulations and requirements.

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Safety progress over the past decades can be attributed to a variety of factors, including a better understanding of crash and injury mechanisms, an array of new safety features and technologies, a greater commitment to enforcing laws that address risky driving behaviors, and increased customer awareness of vehicle safety in purchase decisions.

The rate of future improvement, however, will largely depend on how effectively policy makers, nongovernmental safety groups and vehicle manufacturers utilize safety engineering resources. The more focused, aligned and effective we all are, the greater our achievements will be.

To identify the safety priorities that can save the most lives, we must rely on real-world crash and injury data and apply sound science to motor vehicle safety problems. We are most productive when we devote resources to technologies, regulations and requirements that have the greatest potential real-world benefit. For example, there is consensus that crash-avoidance technologies and vehicle-to-vehicle/infrastructure communications have great potential to reduce crash risks for a broad range of driving situations. All stakeholders in the global safety community should be prioritizing efforts in those areas.

Another important way to enhance the effective and efficient use of vehicle manufacturers' safety engineering resources is to harmonize global vehicle regulations. While some progress has been made, vehicle manufacturers continue to face increasingly complex and conflicting requirements and metrics, including two different regulatory schemes that are used globally – one based on U.S. regulations, the other based on European regulations. Local requirements can also be added to these base regulatory schemes, further increasing vehicle design complexity.

At the same time, consumers must grapple with interpreting the proliferating and sometimes conflicting studies and rankings on auto safety (such as government-run New Car Assessment Programs, or NCAPs, and others conducted by private groups), which are based on various laboratory tests with different crash-test dummies, test requirements and metrics. These studies and rankings are a useful tool for consumers, and they are having their intended effect of driving vehicle manufacturer behavior. However, they don't always correlate well with real-world crash data, in large part because driver behavior plays such an important role in real-world safety and can overwhelm any differences found in laboratory tests. In addition, these public domain assessments at times appear to compete with one another for greater complexity and stringency. And currently, there is no organized effort to harmonize them.

While some regional differences in regulations and public domain testing are to be expected, the global safety community should intensify efforts to determine whether all of the differences are justified. Resources spent to modify vehicle designs in order to meet variable regulations and public domain requirements – especially those without proven and significant real-world safety benefits – are resources that are lost to pursuing real-world safety improvements that can save many lives.

We also must not forget that vehicle technology alone cannot solve all vehicle safety challenges.

Many of the advanced technologies currently being studied or considered for implementation require decisions about such things as policy, governance and security. In addition, driver behavior and driver responsibility will continue to be critical to future safety progress and will require additional driver education and enforcement. Also, governments need to step up efforts to provide a safer vehicle infrastructure.

These efforts will take some time, and changes will need to be phased in to maximize the effective use of safety engineering resources. But, if all the stakeholders in the global safety community work together to address these important challenges, we will see even greater safety benefits in the future.