

THE INTEGRATED APPROACH TO SUSTAINABLE MOBILITY



How the Transportation Sector Fits into Comprehensive, Economy-wide CO₂ Reductions

Worldwide, countries have built an **economy reliant on the power of carbon** -- carbon from burning fossil fuels. Consequently, to "decarbonise" our economy is a challenge for the whole world, one that will require holistic and global solutions.

As world leaders seek a pathway **forward to significant and sustainable carbon reductions**, one priority must be the development of a *comprehensive program engaging all sectors of the economy*, from agriculture to utilities to households to transport.

Vehicle makers are an integral part of society, and as such, we have developed multiple solutions and innovative technologies that will help reduce carbon dioxide (CO₂) emissions today and in the future. But there is no "silver bullet," and technology alone will not meet our shared objectives. *That's why we advocate collaboration and partnerships in transportation matters.*

The transportation sector must be firmly embedded in an economy-wide carbon-reduction framework, while also working to maximize CO₂ reductions through an integrated approach linking technology, energy, government and consumers.



Why Mobility Matters

“Mobility is essential to modern civilization and human needs....Mobility literally makes modern economies possible.” (Source: www.SustainableMobility.org)

Mobility provides a means to a better quality of life and serves as a powerful symbol of freedom and progress. Cars allow us to travel whenever and however we want, enabling us to live, work and play in ways unimaginable just a century ago.

Almost every car trip ends with either an economic transaction or some other quality of life benefit. Motor vehicles link products to consumers. For example, farmers are able to bring perishable goods to market, and consumers benefit from fresh foods. Trade, within a city, a country, a continent or globally, is made possible with mobility.

On every continent, from country to country, mobility is linked to economic growth. In fact, government statistics have shown a clear connection between the growth of Gross Domestic Product and the growth of distance travelled.

Why Sustainable Mobility Matters

As more countries reach for an improved standard of living, the demand for personal mobility continues to grow, increasing the pressure on resources today and into the future. This growing demand causes valid concerns covering environmental questions as well as energy-security issues, road-safety worries or the prospect of a “crowding effect.” A new, more sustainable model of transportation is needed, not only to address climate change, but also other challenges such as oil dependency and the strains of urban mobility.

What does Sustainable Mobility look like?

“Sustainable Mobility is the ability to meet society’s need to move freely, gain access, communicate, trade and establish relationships without sacrificing other essential human or ecological values, today or in the future.” (www.SustainableMobility.org)

For automakers, Sustainable Mobility means delivering on our global priorities: convenience for consumers, energy efficiency and safety. And it means doing all of this while minimizing impacts on the environment, using the earth’s limited resources responsibly, relying on renewable sources of energy and fulfilling the industry’s fundamental role in moving world economies forward. To deliver on our global priorities, we need to make sure that vehicles and technology remain affordable, and that a partnership of industries, governments and consumers is in place to advance Sustainable Mobility together.

A Comprehensive Program as the Foundational Policy

Globally, the combustion of fossil fuels in road transport contributes approximately 16 percent of carbon dioxide (CO₂) emissions. Clearly, the motor vehicle industry must contribute to stabilizing greenhouse gases (GHG) in the atmosphere; however, automakers alone cannot achieve this goal. A partnership is necessary within the transportation sector, and the transportation sector must be embedded in an economy-wide approach.

Technical, economic and policy approaches to climate change need to recognize that all CO₂ molecules (or GHG equivalents) produced by human activity make the same contribution to the atmosphere’s concentration of GHGs. The cost of mitigating those emissions, however, varies significantly depending on their source, and economically efficient decisions about how to reduce emissions depend on transparent cost signals.

Given the high cost and ubiquitous nature of GHG emissions, policymakers should seek to implement programs that are most efficient and cost-effective. All sectors of the economy must share responsibility for reducing GHG emissions and should be linked into a single comprehensive program that allows businesses to trade off costs and benefits. Our environmental and economic objectives can best be accomplished through a foundational economy-wide market-driven approach, and we in the automotive industry are ready and willing to be part of this solution.

Why an Integrated Approach Matters

Within the transportation sector, we need a collaborative, constructive dialogue between government, automakers, and other key stakeholders to meet our shared goals of enhanced energy security and reduced emissions.

The auto industry is crossing the threshold of revolutionary changes in how we power and fuel vehicles. Today dozens of technologies are on sale reducing emissions, increasing fuel efficiency, and operating on clean, alternative fuels. These innovations include advanced technologies for improved conventional engines (diesel, gasoline), alternative fuel-powered vehicles, and hybrid-electric drive systems. This range of solutions will be continuously improved and refined. In addition, fully electric vehicles are at the point of market introduction. Hydrogen-powered vehicles are being tested with dedicated fleet operators in preparation for large-scale market entry in the longer-term. However, implementing these technologies cannot be accomplished alone.

Energy providers will need to provide lower-carbon fuels and electricity along with the supporting refuelling and recharging infrastructure. And governments will need to promote all of this by implementing consistent long-term policies, incentives and regulations. At the same time, the existing transportation and energy infrastructure needs to be improved.

Finally, as consumers, all of us have the power to determine the success of green technologies through our decisions about the kind of cars we buy, the kind of fuels we use to power them, and the distances that we drive. Consumers can make better decisions with appropriate price signals, as well as better information about vehicle technology choices and their implications for fuel savings and GHG emissions reductions.



Sustainable Mobility is the intersection of vehicles, energy, infrastructure and consumers. For mobility to become sustainable, there is no simple remedy. Many factors are involved that all need to be addressed, and many actors already developing solutions need to work together. Sustainable Mobility's elements are integrated, or connected to each other, in such a way that success requires all parts to be addressed as a whole.

The Contribution of Automakers: Improving Vehicle Technologies

Automakers support moving to a low-carbon future. As corporate citizens, automakers are committed to environmental care. We are also profoundly connected to our consumers, who value quality vehicles, motor vehicle safety, reducing dependence on foreign oil, and protecting the local and global environment. We aim to deliver products with the attributes valued by our customers and in order to realise this commitment, we as automakers must continually invest in innovative technologies.



The automobile industry is a leading sector in research and development (R&D). Major automobile manufacturers typically invest 4 to 5 percent of their *gross* revenue in R&D each year. Total R&D investment by automakers in 2007 was over €84 billion.

Automakers are pursuing a diverse range of vehicle technologies for the future. There is no “silver bullet” or one right answer to what the automobiles of the future might look like. In coming decades, the vehicle fleet will likely become much more diverse technologically, with growing proportions of alternative fuel, clean diesel, fuel cell, hybrid and all-electric vehicles. Our commitment is to work to accelerate the introduction of these advanced technologies.

Affordability is a key factor to the success of the technologies implemented by automakers. Consumers make buying decisions on new technologies based on several factors, including the upfront investment and fuel prices. Emission-free journeys are part of a powerful long-term vision, and advanced technology vehicles will help move us closer to that vision. At the same time, we all must recognize that a broad range of technologies, including continued improvements to internal combustion engines, will play a significant role in improved vehicle efficiency for many years to come.

The Contribution of Energy Suppliers: Providing Alternative Fuels



Development of new low-carbon fuels and electricity is important for Sustainable Mobility. Alternative fuels are one pathway forward to sustainability, and automakers support a widely available, diverse range of low carbon and renewable energy sources that include biofuels, CNG, LPG, clean diesel, electricity and hydrogen. For a sustainable supply of biofuels, for example, investments are needed in developing and marketing, as well as more R&D for low-carbon biofuels such as cellulosic ethanol.

Access to alternative fuels will affect the successful introduction of new vehicles. Vehicles and fuels form a system. The auto industry’s best efforts to develop and deploy new, alternative fuel vehicles will succeed only if high quality fuels to support these vehicles are widely available. Consumer acceptance of alternative fuel vehicles and their fuels will depend on adequate fuel infrastructure and competitive fuel pricing, in addition to affordable vehicles. Thus, alternative fuel autos and the fuels that power them need to be developed and introduced in harmony.

The electricity infrastructure for vehicles needs to be ready. While electricity is not new, the infrastructure needed to power large numbers of electric vehicles is in its infancy. Consumers will soon need charging stations to be widely available, and over time, the electrical grid will need to be adapted and extended to accommodate a large volume of electric vehicles and new recharging systems. Transportation will become increasingly dependent on other sectors (e.g., electric utilities) and other technologies (e.g., wind and solar power) to enable lower carbon fuels.

The Contribution of Government: Creating the Right Conditions



Consistent, long-term policies set the stage for effective CO₂ reductions. For manufacturing industries, lead-time and advance planning are critical. Delivering any new motor vehicle technology to the market requires years of product planning, and policies that provide automakers with regulatory certainty and adequate lead-time are essential.

Technology neutrality is a sound policy. Technology development is inherently unpredictable, so government should strive for technology neutrality in their policies to the greatest extent possible. When automakers are racing to bring new vehicles to market, a broad-based approach promoting a wide range of vehicle technologies has the best overall chance of market success. This principle of technology neutrality should guide government vehicle technology programs from basic and applied research, to manufacturing R&D, to deployment and commercialization activities.

Government can incentivize consumer adoption of low-carbon products. Tax policy is a powerful tool to encourage the deployment of advanced technology vehicles, and should also be technology neutral overall. Many new technologies have up-front cost premiums that may deter consumers, despite the expectation of lower fuel costs over the lifetime of the vehicle. Consumer fiscal incentives can compensate early adopters for these cost premiums, accelerating the acceptance of new technologies by the market.

The energy and fuel infrastructure also needs investments. Government can contribute most by creating the conditions that promote private sector investment and innovation. Government has traditionally played a role in financing infrastructure projects, and as more alternative fuel and electric vehicles reach our roads, alternative fueling and charging infrastructures will require significant public investment.

Road infrastructure and traffic management with intelligent systems are also priorities for CO₂ reductions. Alleviating congestion requires a balanced approach of policies, including road improvements, elimination of bottlenecks, and public transit in the most affected areas.

The Contribution of Consumers: Engaging on the Road and in the Marketplace

Success ultimately hinges on consumers and their purchasing decisions. Consumer engagement is the link that takes us beyond simply manufacturing energy-efficient vehicles to actually achieving broad deployment of these vehicles into our national fleet. To reduce CO₂, consumers will need to buy energy-efficient technologies in large volumes.



Ecodriving plays a role in CO₂ reductions. Automakers support ecodriving globally to educate drivers on techniques to reduce fuel consumption and CO₂ emissions, which can also improve road safety and provide vehicle integrated solutions that report on efficient driving. Ecodriving refers to both driving and vehicle maintenance practices. One of the greatest benefits of ecodriving is that it reduces CO₂ from all vehicles on the road today, not just new vehicles. Ecodriving projects within the European Union have, for example, shown a long-lasting fuel-efficiency effect of up to 10 percent.

The marketplace will advance Sustainable Mobility. While the vehicle fleet of the future may include many of the advanced technology vehicles being developed and introduced today, we should expect - and accept - that some of them will fail. The market should be allowed to weigh variables such as cost, quality, reliability, and risk. Government should allow for market competition between the technology options that emerge. The best policies are based on performance metrics rather than technology mandates, allowing markets - and markets are simply consumers - to find optimal, least-cost solutions while maximizing the well-being of the public.

The Road to Comprehensive, Economy-wide CO₂ Reductions

Exploring the intersection of vehicle technology, alternative energy, government policies and consumer engagement reveals why any effective climate protection program must be comprehensive and economy-wide.

We in the auto industry support the Copenhagen conference paving the way for a comprehensive, global framework for sustainability in the world market. Sound long-term targets provide long-term clarity and direction for businesses. Looking forward, government and industry need to continue to work towards sustainable solutions through open and constructive discussions of our common goals and the multiple possible pathways for achieving them.

About Automobiles, the Economy and Investments

The automotive industry is key to the strength and competitiveness of the global economy. While auto manufacturing has been one of the industries hit hardest by tight credit availability, automakers continue to invest in the future in many ways.

- **Economic Output:** The global auto industry is a key sector of the economy for every major country in the world. In fact, if auto manufacturing were a country, it would be the sixth largest economy. Auto manufacturing has contributed a level of output that is equivalent to a global turnover (gross revenue) of more than €1.5 trillion....even during the recession.
- **Jobs, Jobs, Jobs:** Globally, auto manufacturing requires the direct employment of about 9 million people, who represent 5 percent of the world's manufacturing jobs. Autos are built using the goods of many industries, including steel, iron, aluminum, glass, plastics, carpeting, textiles, computer chips and more, so economists estimate that each direct auto job supports another 5 indirect jobs in the community.
- **Government Revenue:** Vehicle manufacturing and use are also major contributors to government revenues around the world, contributing over €400 billion in 26 countries alone, according to the International Organization of Motor Vehicle Manufacturers (www.oica.net).

About the authors

Members of the European Automobile Manufacturers Association (www.acea.be) are BMW Group, DAF Trucks, Daimler, FIAT Group, Ford of Europe, General Motors Europe, Jaguar Land Rover, MAN Nutzfahrzeuge, Porsche, PSA Peugeot Citroën, Renault, Scania, Toyota Motor Europe, Volkswagen Group and Volvo Group.

Members of the United States Alliance of Automobile Manufacturers (www.autoalliance.org) are BMW Group, Chrysler Group LLC, Ford Motor Company, General Motors Company, Jaguar Land Rover, Mazda, Mercedes-Benz USA, Mitsubishi Motors, Porsche, Toyota and Volkswagen Group of America.

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