Looking to the Future

JAMA

Contents

Introduction

Automobiles make a crucial contribution to society and economic development. It cannot be denied, however, that they also have negative impacts on the environment.

Since global warming came to the forefront in the 1990s, JAMA members have worked assiduously to minimise the environmental impact of their products and promote measures to curb global warming and improve air quality. At the EU level specifically, JAMA, alongside ACEA and KAMA, signed a voluntary agreement with the European Commission to cut the average CO_2 emissions of passenger cars marketed in the 15 EU Member States to 140 g/km by 2009.

JAMA members have since placed vehicles on the market that were more CO_2-efficient. Such efforts enabled JAMA to meet the intermediate target range of 165-175 g CO_2/km set in the voluntary agreement by as early as 2002, one year earlier than expected.

JAMA members are today actively pursuing the introduction of increasingly fuel-efficient vehicles.

While determined to meet the 2009 target, JAMA members must also contend with the impact of EU legislation and market changes on CO_2 emissions.

In February 2007, the European Commission presented its new strategy to reduce CO_2 emissions from new cars and vans sold in the EU. While supporting the Commission's fundamental objective, JAMA members have concerns with respect to the new binding targets and inadequate lead time.

JAMA believes it is of the utmost importance to look to the future and formulate new measures accordingly. JAMA members firmly support the adoption of an "integrated approach", which aims at reducing CO_2 emissions through greater fuel efficiency, improved traffic flow and widespread "eco-driving" by means of the combined efforts of vehicle manufacturers, governments, and vehicle users.

JAMA Members' CO_2-Related Efforts between 1995-2004

In August 2006, the European Commission published its sixth annual assessment report on the aforementioned voluntary commitments by ACEA, JAMA and KAMA to reduce CO_2 emissions. JAMA welcomed the report's conclusion that, during the period 1998 to 2004, JAMA had met all of its obligations under its voluntary commitment.

New vehicle models

From 1995 to 2004, JAMA members made strenuous efforts to place vehicles on the market that were more CO_2-efficient. Such efforts enabled JAMA to meet the intermediate target range of 165-175 g CO_2/km set in the voluntary agreement by as early as 2002, one full year earlier than expected.

In 2004, JAMA members reduced average CO_2 emissions from their new passenger cars sold within the EU-15 to 170 g/km. Compared

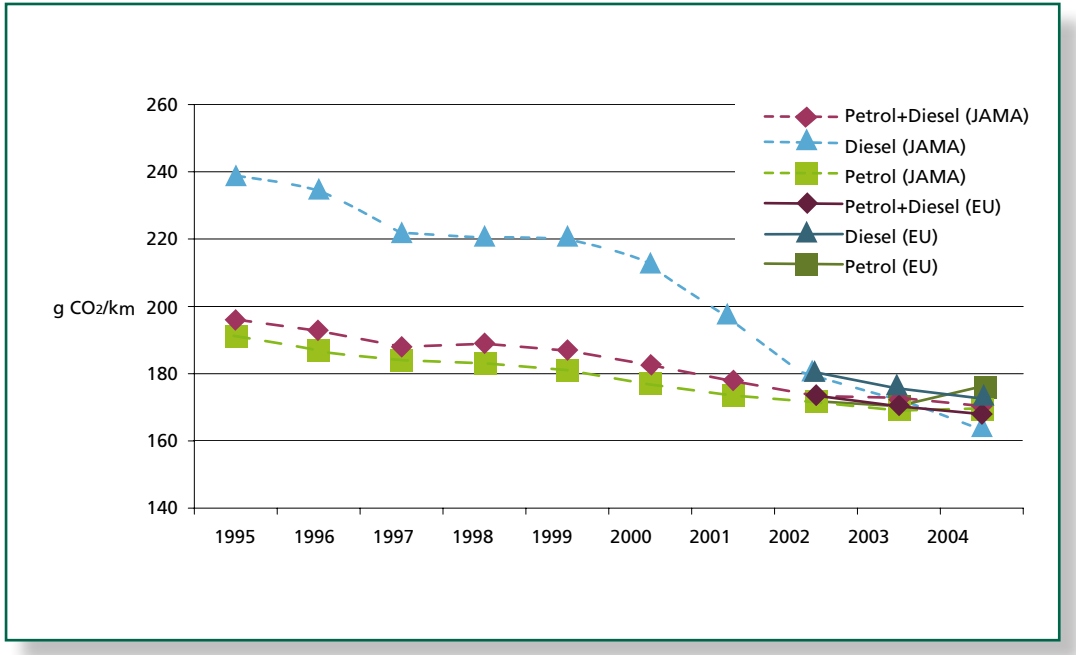


Fig. 1 Trends of JAMA fleet in average CO_2 emissions (g/km) by fuel category, 1995-2004

to 1995, this represented a reduction of 13.3% (from 196 g/km to 170 g/km).

Meanwhile, the share of diesel cars in the JAMA fleet increased over that period. While in 1995 petrol cars accounted for 89.6% of the fleet and diesel cars for 10.4%, in 2004 the shares were 69.3% and 30.7% respectively.

The share of motor vehicles emitting 160 g CO_2/km or less increased from a mere 16.2% in 1995 to 45.8% in 2004. The share of vehicles emitting more than 161 g/km decreased from 83.8% to 54.2% over the same period.

The 1995-2004 period also saw a significant increase in registrations in the 121-140 g CO_2/km vehicle category. Some 286,000 new vehicles were registered in this category in 2004, a substantial increase from the 20,000 vehicles in 1995.

JAMA believes that both these elements provide clear evidence of its firm commitment to meet the 140 g/km target by 2009.

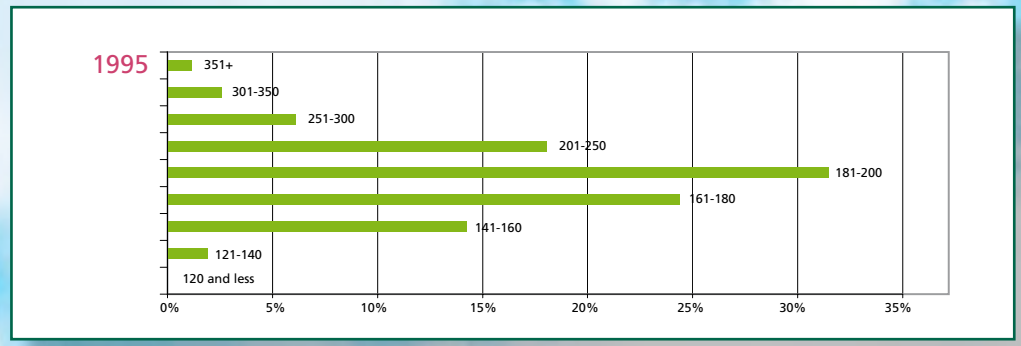


Fig. 2a Fleet composition per CO_2 category (petrol + diesel), JAMA share, 1995

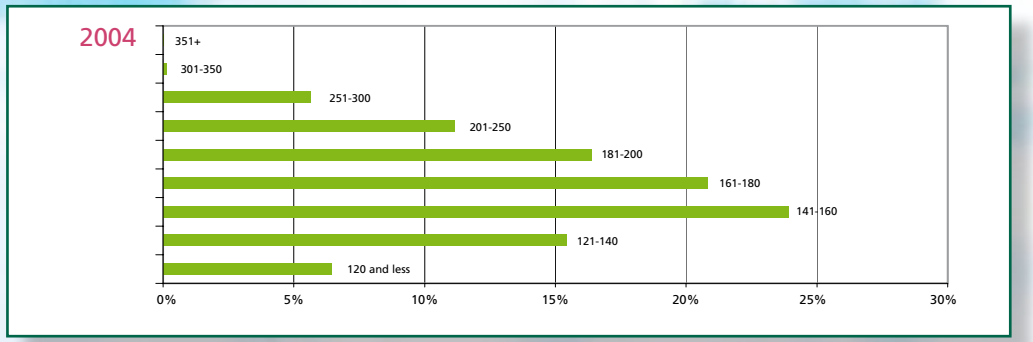


Fig. 2b Fleet composition per CO_2 category (petrol + diesel), JAMA share, 2004

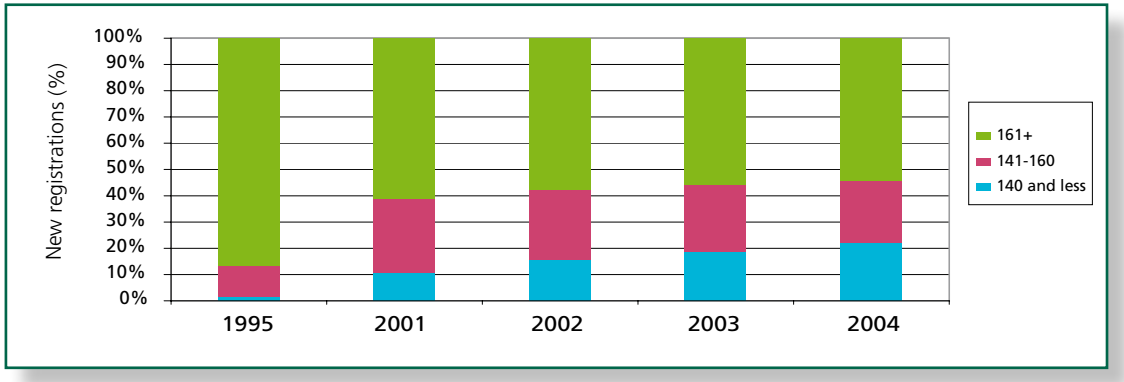


Fig. 3 Changes in JAMA's fleet composition by "aggregated CO_2 categories"

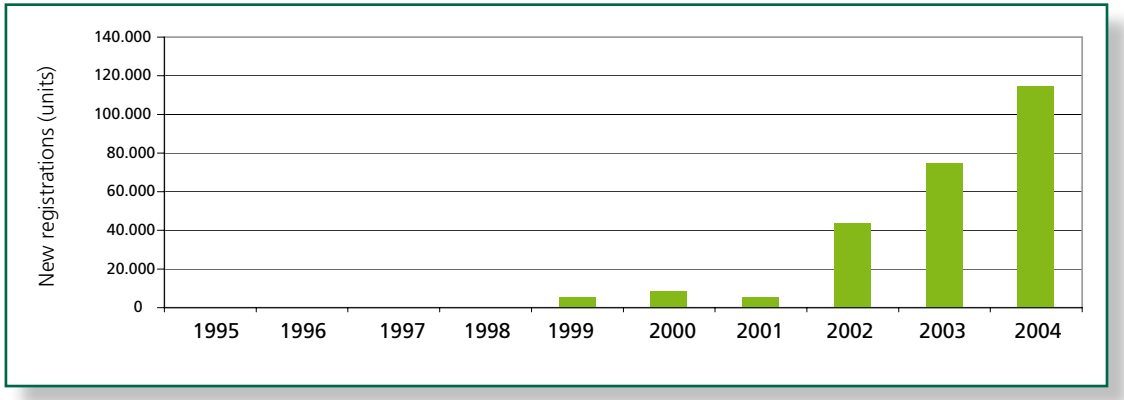


Fig. 4 JAMA members' sales of vehicles with specific emissions of 120 g CO_2/km or less

JAMA members are actively pursuing the introduction of increasingly fuel-efficient vehicles. They released their first "120 g CO_2/km or less" car on the EU market in 1999. In 2004, almost 115,000 new vehicles emitting 120 g/km or less were registered. This represented a 54% increase compared to 2003. In 2000, JAMA member companies placed an 80 g/km petrol-hybrid car and a 119 g/km petrol car on the market. A new 104 g/km petrol-hybrid model was launched in the autumn of 2003.

The use of new technology

In order to meet the CO_2 emissions target for 2009 as set out in their voluntary agreement, JAMA members have exploited and will continue to explore a broad range of advanced technologies and design. These concern improved engine efficiency and emissions control, more efficient drive trains, reduced air and roll resistance, and the reduction of vehicle weight.

Important new technologies introduced since 1995 include such developments as the petrol and diesel direct-injection engines. A direct-injection petrol model was placed on the market in 1997. A direct-injection diesel car was launched in 1998 and has experienced great success. In 2004, this type of vehicle accounted for almost 30% of first registrations for JAMA members.

Continuously Variable Transmission (CVT) technology and robotised manual transmission have also been introduced and are widely used on cars manufactured by JAMA members. Moreover, JAMA is pursuing further development in the promising field of hybrid cars.

In the vehicle manufacturing process as well, JAMA members have significantly reduced CO_2 emissions and other air pollutants.

Daihatsu's *Cuore* ranks among the world's top petrol cars in fuel economy, thanks to its highly efficient engine. The car also features reduced CO and HC emissions when warming up from a cold start, and the engine is extremely quiet.

With the 2.2-litre i-CTDi power unit, Honda established a new benchmark in diesel performance. Honda's all-aluminium i-CTDi engine employs second-generation common-rail technology to provide further advances in fuel efficiency. It delivers both high-performance motoring and particularly low emissions, perfectly complementing the character of the new *Accord* range.

Mazda's Direct Injection Spark Ignition (DISI), developed in 2005, injects petrol directly into the combustion chamber, whereas traditional systems mix air and petrol prior to injection. Combined with the DISI TURBO system, the engine provides sharp acceleration, high torque at low and medium engine speed ranges, and also high fuel efficiency and clean exhaust emissions.

Specific Challenges for JAMA Members in Reducing CO_2 Emissions

JAMA's voluntary commitment to reduce CO_2 states explicitly that the emission reduction target will be achieved mainly through technological developments affecting different vehicle characteristics and changes in market demand linked to those developments. However, the JAMA commitment recognises that factors other than technological developments, as well as market changes linked to those developments, may impact on vehicle CO_2 emissions and on the ability of JAMA members to meet the target.

Regulation

EU legislative advances in the field of safety are very positive developments and JAMA members comply fully with all such initiatives. However, JAMA believes that it is also important to acknowledge their respective effects in relation to CO_2 emissions:

- The modifications that are required in order for vehicles to pass the Euro NCAP crash-impact tests have a clear impact on vehicle weight;
- Modifications to vehicle shape to protect pedestrians in the event of a collision have an impact on vehicle weight and aerodynamic drag;
- Safety belts and other restraint systems have an impact on vehicle weight, as does the ISOFIX system.

Weight

A 10% weight increase =
a 5% increase in CO_2 emissions

The average weight of JAMA vehicles increased by 99 kg between 1999 and 2005. Approximately 27 kg are estimated to be due

to new "regulation, quasi-regulation". The remaining 72 kg are the result of changes in market demand. This increase amounts to an average increase in CO_2 emissions of 6.6 g/km. It is to be noted that the increase of 72 kg occurred despite efforts by JAMA to use lightweight solutions such as high-strength steel, aluminium, magnesium and plastics.

Mitsubishi's AMT Allshift, which is available on the *Colt*, is a six-speed automated manual. Unlike a traditional automatic, the Allshift system provides a fuel economy and CO_2 emissions performance similar to that of standard five-speed manual transmission systems.

Aerodynamics

A 10% aero drag increase =
a 2% increase in CO_2 emissions

Over the period 1999-2005, rising CO_2 emissions owing to increases in aerodynamic drag were attributable to various factors, including:

- Expanded frontal areas* of vehicles to meet customer demands
- Higher vehicles (for roominess and design features)
- Larger vehicles (for roominess, passive and active safety purposes)

* Extent of frontal area expansion varies according

Nissan launched its first Continuously Variable Transmission (CVT) on a production model in 1992. CVT improves fuel economy, provides smooth acceleration, delivers engine power continuously and facilitates powerful driving performance.

The Subaru 'boxer' turbo diesel is a highly rigid unit with low levels of noise and vibration. "Boxer" engines of this type are more compact and provide a much lower centre-of-gravity. This reduces body roll for safer cornering and enhances handling precision, such as during a sudden lane-change manoeuvre on a motorway.

JAMA's Voluntary Commitment

- Reduce average CO_2 emissions of passenger cars marketed in 15 EU Member States to 140 g/km or less by 2009
- Evaluate in 2003 the potential for further reductions towards 120 g CO_2/km by 2012
- Place on the market some models emitting 120 g CO_2/km or less by 2000
- Achieve collectively an intermediate CO_2 emissions target in the range of 165 to 175 g CO_2/km
- Joint JAMA-European Commission monitoring of all relevant factors related to the commitment

Looking to the Future

A revised community strategy to reduce CO_2 emissions

In February 2007, the European Commission presented its new strategy to reduce CO_2 emissions from new cars and vans sold in the EU. The Commission proposed to replace the voluntary commitments agreed to with JAMA, KAMA and ACEA in favour of new binding targets that will be set out in a legislative proposal due by mid-2008 at the latest. For average CO_2 emissions from new cars sold in the EU-27, a target of 120 g/km by 2012 is to be set. Improvements in vehicle technology will be expected to reduce average emissions to no more than 130 g/km, while supplementary measures will be required to contribute a further emissions cut of up to 10 g/km.

JAMA members fully support the adoption of measures to curb global warming through the reduction of CO_2 emissions, but believe that meeting the stipulated target by 2012 is not feasible. A principal concern is with the lack of adequate lead time.

Development and product cycles in the automotive industry require a lead time of at least seven years, including a five-year period that covers an initial concept phase for design and the introduction of environmental (emissions, engine, etc.) and safety technologies, as well as a subsequent execution phase. Following that, at least two years are required for application to individual models.

In recognition of the lengthiness of this process, Japan has introduced new fuel efficiency standards which are to be enforced beginning in 2015, thus providing manufacturers with a lead time of eight years.

Another concern is with the impact of other EU automotive regulations on CO_2 reduction efforts. JAMA strongly urges the Commission to assess the impact of such regulations—including Euro 6—on the 130 g CO_2/km target.

In view of the foregoing, JAMA requests that the enforcement date for the new CO_2 regulation be postponed from 2012 to 2015.

Toyota's *Prius Hybrid*, launched in 1997, offers a balance between the costs and benefits of motorisation for the individual, society and the environment. The revolutionary Toyota Hybrid System (THS) that powers the *Prius* achieves outstanding fuel efficiency and cleaner emissions.

Suzuki's *Swift* 1.3-litre diesel engine has a common-rail fuel-injection system for superior performance, emissions control and fuel efficiency.

The importance of an integrated approach

JAMA is concerned there may be a prevailing misperception that compliance with CO_2 reduction targets can be achieved through vehicle technologies alone. JAMA therefore supports the adoption of an integrated approach that aims for further significant reductions in CO_2 emissions by involving not just auto manufacturers, but all relevant stakeholders including governments, for improvements in road infrastructure and traffic management, as well as vehicle users, for eco-friendly driving.

For the sake of comparison, achievement of the CO_2 reduction target for Japan's road transport sector as established under Japan's Kyoto Protocol commitment calls for a reduction of 54.9 million tonnes of CO_2. Of that, 48% is to be achieved through vehicle technologies (greater fuel efficiency, vehicles powered by alternative fuels, etc.), while 52% is to be achieved through improved road infrastructure and better traffic management.

Tasks for Industry	Tasks for Government	Tasks for Vehicle Users
Auto and auto parts industries: • Advance CO_2 reduction technologies • Promote the application of new alternative-fuel technologies • Provide consumer information • Promote eco-driving **Fuel industry:** • Expand market penetration of alternative fuels • Promote eco-driving	• Improve road and traffic management infrastructures • Support research and development of automotive technologies and alternative fuels • Provide consumer information • Promote eco-driving	• Purchase eco-friendly vehicles • Adopt eco-driving practises

Japan's adoption of the integrated approach

Japan has adopted a "three-in-one" approach which is based on the three core elements of greater fuel efficiency, improved traffic flow and eco-driving.

Greater fuel efficiency (vehicle technology improvements)

The Japanese government estimates that 21 million tonnes of CO_2 will be cut by 2010 through greater fuel efficiency. JAMA is pursuing its efforts in this area by introducing vehicles that meet strict fuel-economy standards. JAMA members are also developing a range of hybrid vehicles, as well as vehicles that operate on natural gas and LPG. In order to promote the more widespread use of such vehicles, the Japanese government has implemented tax incentives to encourage consumers to buy "greener" models.

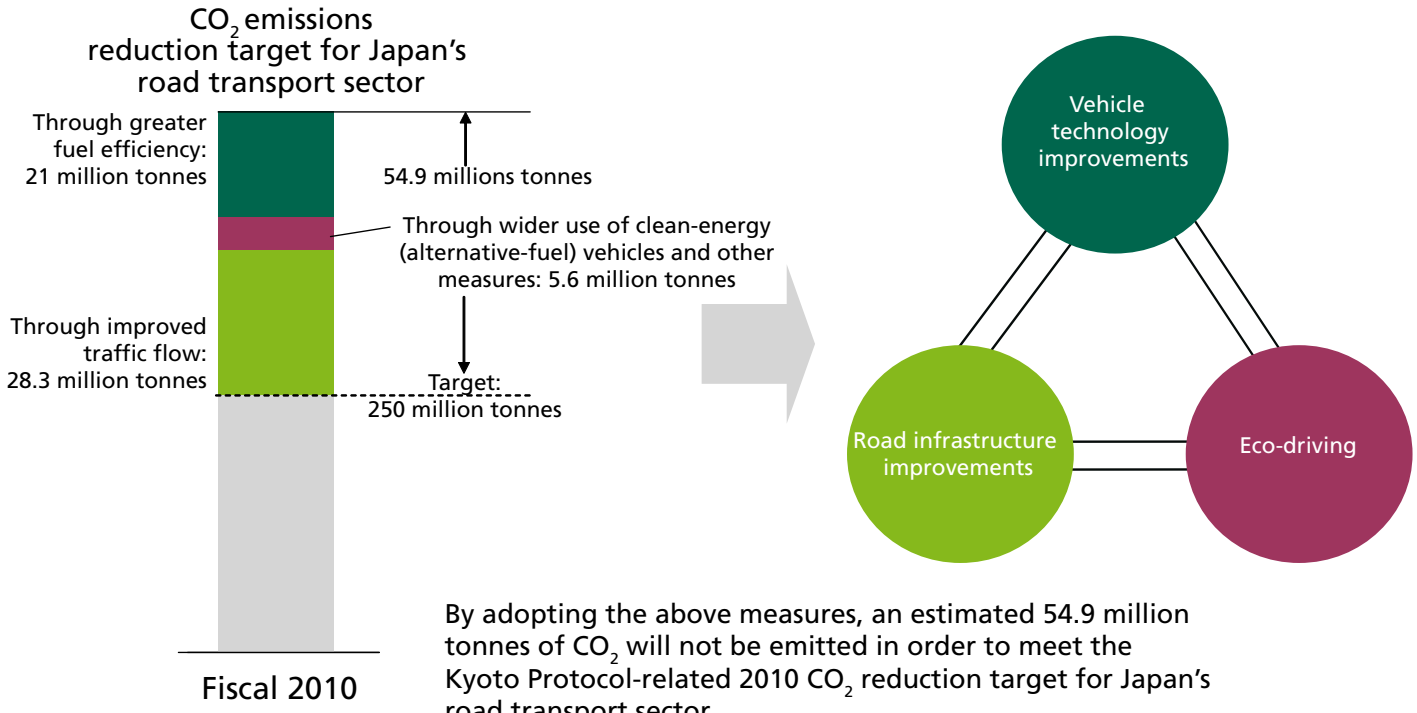
Improved traffic flow (road infrastructure improvements)

The Japanese government also estimates that 28.3 million tonnes of CO_2 will be cut by 2010 through road infrastructure improvements (including improved traffic management) to reduce traffic congestion.

Eco-driving (driver behaviour)

The Japanese government expects that eco-friendly driving will contribute to a further reduction of CO_2. The fuel-economy performance of a vehicle depends to some extent on the driving habits of individual users. Driver responsibility in this regard can contribute significantly to fuel conservation and the reduction of CO_2 emissions. JAMA believes that eco-driving habits must be further encouraged by relevant authorities. For its part, JAMA will continue to develop driver education programmes and implement public awareness campaigns that promote the adoption of eco-driving by vehicle users.

An integrated, “three-in-one” approach is required.



By adopting the above measures, an estimated 54.9 million tonnes of CO_2 will not be emitted in order to meet the Kyoto Protocol-related 2010 CO_2 reduction target for Japan’s road transport sector.

10 Tips for Fuel-Conserving Eco-Driving

1
Accelerate gently.
Start off gently (20km/h in 5 seconds, for an 11% increase in fuel economy) and avoid abrupt, heavy accelerations while driving.

2
Keep your speed constant.
Maintain a steady speed for safe and fuel-efficient driving. Tailgating leads to unnecessary acceleration/deceleration, resulting in 2% and 6% less fuel efficiency respectively in urban and suburban areas.

3
Slow down by decelerating.
Releasing the accelerator when recognising the need to slow down stops the fuel supply, leading to a 2% increase in fuel efficiency. Make maximum use of the engine's braking function.

4
Use your air conditioner only when necessary.
Control cabin temperature without excessive use of the AC, and don't set your AC too low when you do use it. AC use when the outdoor temperature is 25° decreases fuel efficiency by 12%.

5
Don't idle your engine.
Ten minutes of engine idling (in neutral, with the AC off) wastes 130cc of fuel. Make a habit of turning your engine off instead of letting it idle.

6
Don't warm up your engine before starting off.
Today's passenger cars don't require warming up, except in cold climates and after long periods of non-use. Slow running is enough to warm up the engine.

7
Plan your itinerary; make good use of traffic information.
Plan the route to your destination using a map or your GPS before starting off and avoid congested areas. Ten minutes of unnecessary driving in a 1-hour trip results in a 14% decrease in fuel efficiency.

8
Check your tyre pressure regularly.
Driving on tyres whose air pressure is 50kPa (0.5kg/cm2) lower than it should be decreases fuel efficiency by 2% and 4% respectively in urban and suburban areas.

9
Reduce your load; travel light.
Driving with 100kg of unnecessary onboard weight leads to a 3% decrease in fuel efficiency.

10
Respect parking regulations.
Illegal on-street parking causes traffic congestion and increased emissions. A drop in average vehicle speed from 40km/h to 20km/h causes fuel efficiency to decrease by 31%.

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