



GLOBAL FUEL ECONOMY INITIATIVE

FOR ZERO CARBON VEHICLES BY 2050



A CHANGING WORLD

Climate change, air pollution, and energy security are all linked to increasing numbers of vehicles on the world's roads. There are now around 1.5 billion motor vehicles in use, an increase of 50% since 2009, and the number continues to rise. Transport is responsible for almost a quarter of all energy-related carbon emissions. Between 2000 and 2015, passenger transport emissions increased by 36%, while freight transport emissions rose by 75%.

The Global Fuel Economy Initiative (GFEI) was established to ensure that the world's vehicle fleet is as clean and efficient as possible in response to global concerns about clean air and climate change. New vehicle technologies are enabling some new solutions and the possibility of a widespread transition to zero emissions mobility, but there is still a long way to go, and little time to get there.

World leaders have recognised the need for action. The United Nations Sustainable Development Goals and the Paris Agreement on Climate Change have set global targets to decarbonise transport. In 2015, the Paris Agreement on global climate change codified the consensus ambition among world governments

to limit warming to well below 2 degrees celsius and established a framework for national commitments to reduce emissions.

In order to achieve the Paris Agreement, previous studies, including those conducted by GFEI partners, underscore the vital role of policies that improve vehicle fuel economy and accelerate the transition to zero emission vehicles. Only this, in combination with measures that avoid the need for motorized travel and shift activity to less carbon intensive modes, will achieve the climate action we need.

GFEI has long recognised this imperative. Our goal is the complete transformation of the world's vehicle fleet to zero emission vehicles. GFEI partners are already proactively integrating policies which stimulate the adoption of electric vehicles into their technical assistance and capacity building work including on trucks, buses and motorbikes as well as light-duty passenger vehicles.

The next decade will be crucial. GFEI is fully committed to playing our part in a global mobility transformation.



"GFEI is about accelerating the rapid transition to the most efficient, zero emission vehicles globally - saving money, energy and tackling climate change."

Sheila Watson, Executive Secretary of GFEI and Deputy Director, FIA Foundation



TIMELINE

2009

GFEI launched at Geneva motor show with '50by50' target



President Obama's MEF climate initiative backs GFEI

2010

GEF funds GFEI to pilot support in 4 countries



European Commission and US EPA support GFEI work

GFEI launches first working paper on fuel economy in South East Asia



A VEHICLE REVOLUTION

The Global Fuel Economy Initiative (GFEI) was founded in 2009 with the purpose of promoting and supporting government action to improve energy efficiency of the global light-duty vehicle fleet. The group developed and promoted a target of doubling light-duty vehicle fleetwide fuel economy (halving light-duty vehicle fuel consumption) by 2050 - "50 by 50" - relative to 2005 levels. This 2050 fleetwide target, which assumed a halving of new vehicle fuel consumption by 2030, was achievable using existing, cost effective fuel economy technologies as well as full hybridization, but did not require plug in hybrid or full electric vehicles (EVs).

At its launch and ever since, GFEI has highlighted how cost-effective investments to improve light-duty fuel economy lead to multiple benefits - saving fuel, money, reducing CO₂ emissions and, for fuel importing countries, the significant benefits for balance of payments and energy security.

In the following decade, continued policy and technology developments have resulted in increased availability of cost effective internal combustion engine (ICE) technologies and substantial reductions in the costs of battery electric and plug in hybrid vehicles.

The number of zero-emission vehicle types is increasing and battery performance developing rapidly, boosting consumer choice, vehicle range and cost efficiency. In the past, diesel vehicles were often seen as a quick win for improving fuel economy - but as 'dieselgate' showed there are real risks for air quality which must be considered too. In the same way, a focus on EVs (electric vehicles) must not detract from ensuring that the existing ICE fleet is as efficient as possible. There needs to be an integrated approach that includes the decarbonisation of electricity production through for example far greater use of renewables, and the ending of fossil fuel subsidies.

GFEI partners have revisited existing GFEI targets given ongoing developments in the vehicle fuel efficiency arena and the growing urgency around climate change. GFEI is expanding to incorporate all road transportation vehicles, to provide a more robust characterization of on-road global transportation's decarbonization potential by 2050. The Initiative's ambitions are also framed in terms of both vehicle efficiency and greenhouse gas targets. These targets are appropriately **ambitious, trackable, policy relevant, and easily communicated.**



TIMELINE

2011

GFEI publishes first international comparison of vehicle fuel economy

GFEI contributes to fuel economy policy process in Australia



2012

Fifty participants from twenty countries attend 'GFEI Africa' launch in Kenya

World leading experts ICCT and UC Davis join GFEI

GFEI part of sustainable transport commitments at Rio+20



FUEL ECONOMY POTENTIAL

For GFEI 2.0, we reaffirm our existing targets for new light- and heavy-duty vehicles in 2030 and 2035 respectively, establish more stringent 2050 targets for new light- and heavy-duty vehicles, establish first ever targets for two and three wheeled vehicles and buses in 2035 and 2050, and compile these targets into a vision for achieving major reductions in greenhouse gas emissions from the transportation sector by mid-century.

PASSENGER LIGHT-DUTY VEHICLES (PLDV)

The GFEI partners reaffirm our target of **doubling fuel economy of new passenger light-duty vehicles (PLDV) globally by 2030** (relative to 2005) through continued progress on combustion engine efficiency improvements plus the introduction of electric passenger vehicles.

The GFEI partners also establish a new PLDV per kilometre CO₂ reduction target of **90% by 2050** (also relative to 2005).

HEAVY-DUTY (FREIGHT) TRUCKS

The GFEI partners reaffirm our target of cutting fuel consumption from new heavy-duty trucks by **35% by 2035** (relative to 2005) through continued progress on combustion engine efficiency improvements plus the introduction of electric heavy-duty trucks.



The GFEI partners also establish a heavy-duty truck per kilometre CO₂ reduction target of **70% by 2050** (also relative to 2005).

TWO AND THREE WHEELERS

The GFEI partners establish new targets for two and three wheelers to reduce per kilometre CO₂ emissions by **80% by 2035** and **95% by 2050** (both relative to 2005).

TRANSIT BUSES

The GFEI partners establish new targets for urban buses to reduce per kilometre CO₂ emissions by **65% by 2035** and **95% by 2050**.

Source: GFEI Working Paper 20

DECARBONISING THE TRANSPORT SECTOR

The GFEI partners recognize the importance of supporting government actions and policies that bring the transportation sector into compliance with the Paris Climate Agreement. GFEI's analysis shows that continued improvements in vehicle efficiency plus the aggressive introduction of electric vehicles (EVs), combined with decarbonisation of the electric grid, can achieve a 55-70% reduction in fleetwide CO₂ emissions by 2050 for road vehicles.

This reduction, while quite significant, is relative to emissions as they are forecasted to exist in 2050 under a business as usual scenario. The GFEI estimates that **reductions of 65% relative to a 2005 baseline** will be required to comply with the Paris Climate Agreement. The GFEI targets will deliver a more modest 30% reduction by 2050 (from a 2005 baseline). This is because expected growth in kilometers of travel, estimated to increase by a factor of 3.2 between 2005 and 2050, offsets a considerable share of the net fleet-wide CO₂ emission reductions, and because a large part of the emissions reductions will come after 2050. Thus, to achieve a full decarbonization, additional measures are needed - especially measures to avoid motorised transport. Such measures, for example, include policies that target improved city design and improved access to non-motorised transport, and measures to increase shared, public transport.

Decarbonizing the electricity grid is crucial to meet emissions targets for the global vehicle fleet. Indeed we would expect CO₂ reductions to nearly double when EVs make up 100% of the market for all sectors (other than heavy-duty trucks). The CO₂ intensity of the electricity grid becomes the

dominant influence on the CO₂ impacts of EVs, especially after 2050 when EV sales are projected to approach or exceed 90% in all but the heavy-duty truck sector. It is also important to recognize that introducing zero emissions vehicles, such as EVs, will deliver major air quality benefits regardless of the level of grid decarbonization.

Therefore, although there is a path to achieving compliance with the Paris Agreement commitment to limit the global average temperature increase to "well below" 2°C, that path is dependent on a faster transition to electric vehicles and a faster decarbonization of the electricity grid than envisioned even in the stringent GFEI targets established today, while at the same time pursuing "avoid" and "shift" measures such as those described above. Such measures are now and will continue to be an important and necessary compliment to the GFEI targets.



It is clear that both automakers and regulators will have to build on their commitments to improved fuel efficiency of conventional technologies and increased availability of electric vehicles to meet the trajectory envisioned in this analysis. The analysis trajectory is aggressive, but achievable, and essential to delivering an EV dominated fleet by 2050.



TIMELINE

2013

Fuel economy label introduced in Chile



GFEI report shows how fuel economy savings can help fund transition to plug-in electric vehicles

2014

G20 Summit in Brisbane prioritises action on vehicle fuel economy and mentions GFEI

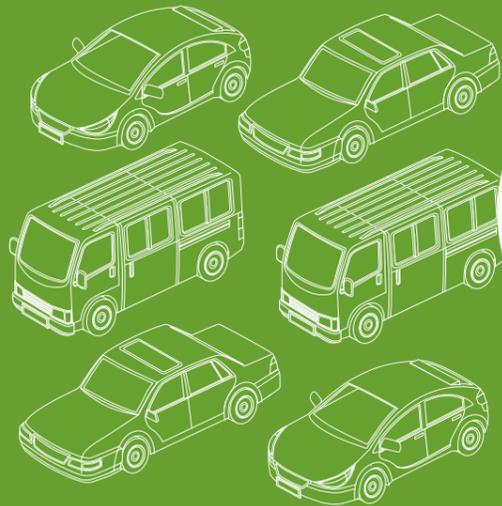
GFEI briefs UN Secretary General at Abu Dhabi climate summit

GFEI centre stage at UN Climate Summit in New York



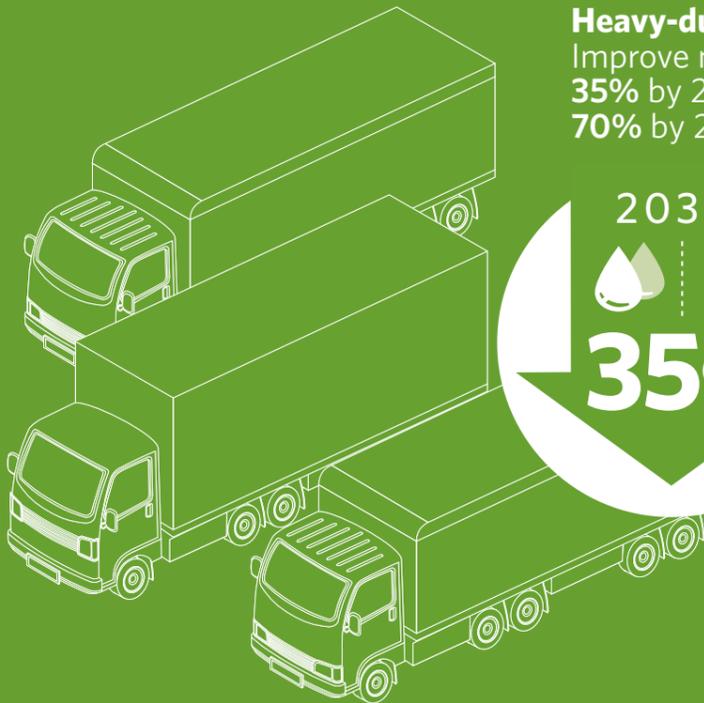
Passenger light-duty vehicle targets

Double global fuel economy of new vehicles by 2030, reduce CO₂ emissions by **90%** by 2050



Heavy-duty vehicle targets

Improve new vehicle fuel consumption **35%** by 2035 - CO₂ reduction target of **70%** by 2050



Transit bus targets

Improve fuel economy to reduce CO₂ emissions by **65%** by 2035 and **95%** by 2050



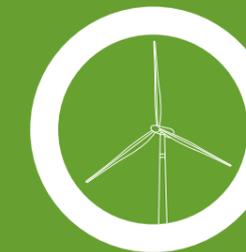
Two & three wheel vehicle targets

Improve fuel economy to reduce CO₂ emissions by **80%** by 2035 and **95%** by 2050



Decarbonising road transport to tackle climate change

A new fleetwide CO₂ reduction target of **65%** by 2050 compared with 2005. To comply with the Paris Agreement's less than 2 degree scenario, better fuel efficiency of conventional vehicle technologies; a faster transition to electric vehicles; a faster decarbonisation of the electricity grid; and additional 'avoid' and 'shift' measures eg more non-motorised mobility, are all needed



Source: GFEI Working Paper 20 - Data based upon 2005 baseline



THE GLOBAL FUEL ECONOMY INITIATIVE APPROACH



GFEI is a partnership of the world's leading vehicle efficiency experts. The founding GFEI partners were the International Energy Agency (IEA), International Transport Forum (ITF), UN Environment, and FIA Foundation. In 2012, the International Council on Clean Transportation (ICCT) joined the initiative, followed a year later by the Institute of Transportation Studies at the University of California, Davis (UC Davis).

GFEI's approach is based on knowledge sharing and collaboration in the following areas:

- Evidence-based decision-making**
 GFEI is based on detailed data and technical analysis published through a working paper series of technical papers. GFEI has also established the only regular global monitoring of fuel economy trends.
- Capacity-building**
 GFEI's in-country support started with four pilot countries, and has expanded to over 70 countries. GFEI provides policy support through our 'toolkit' approach, which enables countries to custom-build solutions based on a full understanding of their own unique circumstances and fleet characteristics.
- Advocacy and awareness raising**
 GFEI engages at high-level events, and in key global processes, bringing the issue of vehicle efficiency to the fore, and pressing for effective policy globally, regionally, and nationally.



TIMELINE

2016

Largest ever global networking event in Paris



First estimate of fuel economy potential of HDVs

2017

GFEI contributes to SDG7 events ahead of HLPF

China publishes updated FE standards with EV mandate



GFEI update report for COP23 show fuel economy support reaches around 70 countries



GFEI'S IMPACT



GFEI has a track record of impact, working with over 70 countries. Already fifty of these countries have mapped and tracked trends in the fuel consumption of their vehicle fleet, and started developing policy options with the support of GFEI partners. GFEI provides comprehensive support and guidance, working closely with regional and in-country partners to share lessons from different countries, and draw on advanced analytical modelling tools to understand the impact of potential policies.

- New **import regulations** in Uganda and Kenya among others
- New **EV mandate** in China

In addition, GFEI works globally and regionally to share lessons and make the case for fuel economy. GFEI has organised a series of global workshops over the past decade, bringing together policy makers from around the world to build momentum for improved fuel economy. This has led to major policy commitments at the global and regional scale, including:

Analysis by IEA in 2015 showed that in the decade from 2005-2015, around 1.5 EJ of energy was saved by fuel economy policies - the equivalent of the transport related energy use of Italy each year.

With support from GFEI, often over a number of years, many governments that have introduced policies for improved fuel economy. These include:

- **Regional fuel economy roadmaps** in South-East Asia (ASEAN), and West Africa (ECOWAS)
- **Global commitments to improved energy efficiency** through UN Sustainable Development Goal 7, as a Sustainable Energy for All (SE4ALL) accelerator, a sustainable mobility 'Quick win' on climate action, and as technical partner to the Transport Task Group of the G20. GFEI showcased Jamaica at the High Level Political Forum (HLPF) in July 2018, and supported G20 members in Argentina consider the impact of fuel economy policy for Heavy-Duty Vehicles. GFEI has also had a major influence in the UNFCCC process, including at COP21 in Paris.



- Fuel economy **labelling** schemes in Chile, Saudi Arabia, Vietnam, Thailand and Montenegro, with new proposals for Philippines and Indonesia currently being finalised
- New **tax and fiscal incentives for improved fuel economy** in Chile, Sri Lanka, Mauritius, Ukraine and proposed for Zambia
- New and updated or extended **fuel economy standards** in the EU, US, Canada, India, China, Saudi Arabia



TIMELINE

2018

Ukraine exempts EVs from VAT after GFEI support

Montenegro launches new fuel economy label



GFEI included in SDG7 report for UN High Level Political Forum on SDGs

GFEI host event with Jamaica at HLPF



G20 Transport Task Group discuss HDV fuel economy



GFEI PARTNERS



"To meet the Paris Climate Agreement and global air quality targets the transport sector needs to shift to low and no emissions vehicles fleets. The Global Fuel Economy Initiative (GFEI) is supporting countries around the world to put in place policies to decarbonise their vehicle fleets – through improving vehicle fuel economy and introducing low and no emissions vehicles. As the only global initiative to support this, the GFEI is a crucial programme in meeting our global targets."

Rob de Jong, Head of Air Quality and Mobility, UN Environment



"The GFEI partnership has played a significant role in keeping fuel economy at the top of transport agendas over the past decade, both for light-duty vehicles, and increasingly trucks. As a founding member of GFEI, the ITF is proud of this achievement. We look forward to continuing to inform governments on vehicle efficiency options over the next decade."

Young Tae Kim, Secretary General, the International Transport Forum (ITF)



"The rapid increase in electric mobility offers exciting options for improved vehicle efficiency and cutting global CO₂ emissions. It is clear that national, regional and sub-national policy all have a key part to play in promoting EVs, along with improving conventional vehicle fuel economy via cost-effective technological improvements."

Professor Dan Sperling, UC Davis



"It is clear that transport is a massive consumer of energy, and that improving vehicle efficiency is vital if the world is going to have any chance of meeting the Paris Climate targets. Cars and trucks, and increasingly zero emission vehicles are key areas for policy focus in the coming years."

Fatih Birol, Executive Director, IEA



"Most of the world's vehicles passenger cars and commercial trucks are produced sold into a small number of countries. Ensuring that these producers markets have the highest vehicle efficiency standards is vital. GFEI plays a key role in our work with G20 countries and supporting major markets."

Drew Kojak, Executive Director, ICCT



"We are immensely proud that the FIA Foundation has provided the Secretariat for the Global Fuel Economy Initiative for the past decade, and has consistently invested to allow the partnership to grow to where it is supporting 70 countries to save fuel, resources and CO₂. GFEI is unique in its reach, and in the deep long-term collaboration between world-leading experts which lies at its heart. The climate and clean air challenge we face requires renewed policy focus to decarbonise mobility. GFEI is set to provide continued leadership at this vital time."

Saul Billingsley, Executive Director, FIA Foundation



ASEAN countries adopt fuel economy roadmap



EU announces progress on fuel economy standards for 2030

GFEI contributes to COP24 climate talks in Poland

2019

GFEI launches updated global report tracking fuel economy progress

South Africa includes FE standards in Green Transport Strategy

GFEI 2.0 launched



