Global Fuel Economy Initiative in Ukraine
Global Fuel Economy Initiative

Core partners

- UN Environment
- IEA International Energy Agency
- International Transport Forum
- ICCT The International Council on Clean Transportation
- FIA Foundation for the Automobile and Society
- ITS UCDavis Institute of Transportation Studies

Supported

- European Union
- GEF Global Environment Facility
GFEI is important for Ukraine

**Strong dependence on imported fuel products**
Reducing oil and fuel consumption will increase energy security of the country

**Climate change**
Slows down negative climate change trends by reducing carbon emissions (CO₂)

**Sustainability**
Contributes to the sustainable development of the country's economy

**Air quality**
Improving the air quality and reducing the negative impact on the health of the population
Strong dependence on imported fuel products

Source: "Scientific-Technical Center «Psychea»"
In general about vehicle fleet in Ukraine

- **9.2 millions**: Total number of registered vehicles in Ukraine.
- **6.9 millions**: Total number of registered LDV in Ukraine.
The average passenger vehicle age in 2015 was 18.8 years.

The level of motorization in Ukraine in 2016 amounted to 202 vehicles per 1,000 inhabitants.
Mission of the project
Promoting Improved Automotive Fuel Economy in Ukraine

GLOBAL FUEL ECONOMY INITIATIVE
ГЛОБАЛЬНА ІНІЦІАТИВА З ЕКОНОМІЇ ПАЛИВА

www.globalfueleconomy.org
Initial objectives

1. Research
   • Data gathering
   • Baseline development
   • Analysis

2. Capacity building
   • Identification of key stakeholders
   • Identification of potential barriers to introducing FE policies
   • Awareness rising & communications
Received data for the year 2014 and part of 2012.

Agreement between UNEP and ISA to start implementation of the Global Fuel Economy Initiative in Ukraine. Identification of key stakeholders.


Baseline analysis. Report and recommendations.
National Working Group

Members of NWG

- Ministry of Infrastructure of Ukraine
- Ministry of ecology and natural resources of Ukraine
- Ministry of energy and coal industry of Ukraine
- Ministry of interior of Ukraine (Main Service Center)
- State Agency on Energy Efficiency and Energy Saving of Ukraine
- Ministry of health of Ukraine
- State Service of Ukraine for food safety and consumer protection
- Sectoral state enterprises
- Academia
- Non-governmental organizations
- Associations of auto market operators
Project activity on a national level

1. 29 January 2016
   Initiation meeting of the GFEI National Working Group in Ukraine.

2. 26 September 2017
   Forth meeting of the NWG

3. 6 July 2016
   Second meeting of the NWG

4. 9 July 2017
   Third meeting of the NWG

5. 12-13 October 2017
   Kick-off conference «Promoting Improved Automotive Fuel Economy in Ukraine» and Workshop «FEPIT and Feebate system».

6. 22 December 2017
   Closing meeting of the NWG
National baseline development

Stage 1. Data gathering

Source of information
Ministry of Interior of Ukraine


Department of Information Technologies


Main Service Center
AIS “National database “Automobile”
National baseline development

Baseline - minimum data requirement

Number of newly registered vehicles by:

1. Vehicle make (e.g. Toyota)
2. Vehicle model (e.g. Corolla)
3. Model production year - important for used imports (e.g. 2007)
4. Engine displacement (e.g. 1,800 ccm or 1.8 l)
5. Engine power (e.g. 80 kW or 107 HP)
6. Fuel type (e.g. gasoline, diesel, LPG, CNG, electricity)

Rated fuel economy (Lge/100km) or specific carbon emissions (gCO₂ per km) and the respective test cycle basis (NEDC, CAFE (FTP), JC08)

Baseline data – “nice to have”

1. Transmission type (automatic/manual, number of gears)
2. Axle configuration (i.e. number of driven wheels, 4x2, 4x4)
3. Vehicle weight OR Vehicle footprint (wheelbase X track width)
4. Vehicle price
Acquiring input data

May 2016
• First data received for the year 2014 and part of 2012

January 2017
• Received data for the year 2016

April 2017
• Received data for the years 2005, 2008, 2010 and rest of 2012

The fuel economy baseline should only include vehicles (new cars and used imported cars) which are registered for the first time in a given year in the respective country.

Total number of first registrations ~ 1.6 million cars
National baseline development

Stage 2. Cleaning data, structuring and verification of national data based on GFEI methodology

Verification and cleaning of data

Many data mistakes on the vehicle’s parameters. Most common are:

- Wrong/absent name of the vehicle’s model
- Wrong/absent data on engine displacement
- Wrong fuel type indicated
- Wrong/absent of vehicle’s weight
National baseline development

Problematic issues:

- Registration data is missing the following vehicle information:
  - engine power,
  - transmission type,
  - axle configuration,
  - production place,
  - condition of vehicle (new or used car), etc.

- Original registration data is in an inaccurate condition as to various necessary parameters (double/triple vehicle checks, an example by VIN code).
Ukraine first registrations of LDVs in Ukraine (thousands)
Ukraine GFEI baseline

Ukraine vehicle age on the date of registration, (years)

2016

2014

2012

2010

2008

2005

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Ukraine GFEI baseline

Ukraine engine size distribution in %, (cc)

2016

2014

2012

2010

2008

2005

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

0  < 999 1000-1499 1500-1999 2000-2499 2500-2999 3000-3499 > 3500

Ukraine GFEI baseline
Ukraine average engine size for the first registrations (cc)

Ukraine GFEI baseline
Ukraine GFEI baseline

Diversification of LDV fleet by fuel type (in % of market share)

<table>
<thead>
<tr>
<th>Year</th>
<th>Petrol</th>
<th>Diesel</th>
<th>LPG</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>88.01</td>
<td>2.07</td>
<td>9.83</td>
</tr>
<tr>
<td>2008</td>
<td>86.73</td>
<td>2.5</td>
<td>10.72</td>
</tr>
<tr>
<td>2010</td>
<td>71.68</td>
<td>3.9</td>
<td>24.31</td>
</tr>
<tr>
<td>2012</td>
<td>57.72</td>
<td>4.1</td>
<td>38.12</td>
</tr>
<tr>
<td>2014</td>
<td>61.81</td>
<td>5.72</td>
<td>31.34</td>
</tr>
<tr>
<td>2016</td>
<td>5.91</td>
<td>42.86</td>
<td>48.8</td>
</tr>
</tbody>
</table>
Compared with demand for fuel

Structure of fuel market in Ukraine (thousands tons)

Source: "Scientific-Technical Center «Psychea»
Most popular EV in Ukraine

Total number of registered EV in Ukraine – 7439 (01.05.2018)

Brand

- Nissan: 75%
- Tesla: 10%
- BMW: 5%
- Ford: 4%
- Renault: 4%
- Other: 3%

Age

- 1 year: 35%
- 2 years: 33%
- 3 years: 18%
- 4 years: 6%
- 5 years: 2%
- 6 years: 2%
- > 6 years: 4%

Source: MSC
Stage 3. Adding fuel economy parameters and CO2 emissions

### Sources for fuel economy information

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Green Vehicle Guide Factsheets</td>
</tr>
<tr>
<td>Brazil</td>
<td>Programa Brasileiro de Etiquetagem</td>
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<td><a href="http://planetario.pucrj.br/TableaConsumo.aspx">http://planetario.pucrj.br/TableaConsumo.aspx</a></td>
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<td>Chile</td>
<td>Comparador de Autos</td>
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<td><a href="http://www.comsumovehicular.cl/?c=comparator">http://www.comsumovehicular.cl/?c=comparator</a></td>
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<tr>
<td>China</td>
<td>氣體燃料車の燃費情報</td>
</tr>
<tr>
<td>European Union</td>
<td>Monitoring of CO2 emissions from passenger cars – Regulation 443/2009</td>
</tr>
<tr>
<td>France</td>
<td>Consommation conventionnelles de carburant et émissions de gazi carbone</td>
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<td><a href="http://green-car%E9%94%A6%E6%A0%87in.fr/server/leaflet/0cd-9bc4m-4ac-53a01-0c0-0d+B-p-12gers-179e1">http://green-car锦标in.fr/server/leaflet/0cd-9bc4m-4ac-53a01-0c0-0d+B-p-12gers-179e1</a></td>
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<td>Japan</td>
<td>自動車燃費一覧</td>
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<td>Mexico</td>
<td>Indicadores de Eficiencia Energética y Emisiones Vehiculares</td>
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<tr>
<td>Singapore</td>
<td>One Motorizing Fuel Cost Calculator</td>
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<tr>
<td>South Korea</td>
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<td>South Africa</td>
<td>COMPARATIVE PASSENGER CAR FUEL ECONOMY AND CO2 EMISSIONS DATA</td>
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<td>Switzerland</td>
<td>Automobil Revue catalogue</td>
</tr>
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<td></td>
<td><a href="http://www.faktor.automobilrevue.ch/">http://www.faktor.automobilrevue.ch/</a></td>
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<td>UK</td>
<td>Car Fuel Data Booklet</td>
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<td></td>
<td><a href="http://www.carfueldirect.co.uk/">http://www.carfueldirect.co.uk/</a></td>
</tr>
<tr>
<td></td>
<td>To download the data</td>
</tr>
<tr>
<td>US</td>
<td>DoE / EPA Fuel Economy ratings</td>
</tr>
<tr>
<td></td>
<td>To download the data</td>
</tr>
</tbody>
</table>
National baseline development

Stage 4. Calculation of the national average fuel economy

To correctly use rated fuel economy, the different energy densities of gasoline and diesel need to be taken into account. Therefore, volumetric fuel economy values (litres per 100km) of diesel cars need to be normalized to the energy content of gasoline – i.e. they need to be converted to litres of gasoline equivalent per 100km (Lge/100km).

Conversion factors to normalize volumetric fuel economy values to Litres of Gasoline equivalents per 100km for Diesel, CNG and LPG fuel economy adjustment:

<table>
<thead>
<tr>
<th>L/100km to Lge/100km</th>
<th>Diesel</th>
<th>*1.08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrofit adjustment</td>
<td>CNG</td>
<td>*1.12</td>
</tr>
<tr>
<td></td>
<td>LPG</td>
<td>*1.15</td>
</tr>
</tbody>
</table>

Factors to convert fuel economy (Lge/100km) to carbon emissions (gCO2/km):

- Petrol: *23.2
- Diesel: *24.8
- CNG: *18.8
- LPG: *21.1
National baseline development

Stage 4. Calculation of the national average fuel economy

\[ FE = \frac{\sum_{i}^{n} Reg_i \times FE_i}{\sum_{i}^{n} Reg_i} \]

With:

\[ FE = \text{weighted average fuel economy} \]

\[ Reg_i = \text{number of newly registered vehicles of type } i \]

\[ FE_i = \text{fuel economy of vehicle of type } i \]
Main findings of baseline analysis

Average emissions of gCO2/km in Ukraine
Main findings of Ukraine GFEI baseline

Distribution by CO2 emissions (gCO2/km)

<table>
<thead>
<tr>
<th>Year</th>
<th>0 - 0</th>
<th>&lt;100</th>
<th>100-150</th>
<th>150-200</th>
<th>&gt;300</th>
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</thead>
<tbody>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
Ukraine GFEI baseline

Distribution by fuel consumption (Lge/100 km)

- 2016
- 2014
- 2012
- 2010
- 2008
- 2005

Distribution by fuel consumption (Lge/100 km):
- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

Fuel consumption categories:
- <4
- 4-5
- 5-6
- 6-7
- 7-8
- 8-10
- 10-15
- >15

Years:
- 2005
- 2008
- 2010
- 2012
- 2014
- 2016
Ukraine GFEI baseline

Average fuel consumption in Ukraine

<table>
<thead>
<tr>
<th>Year</th>
<th>Ukraine</th>
<th>Global</th>
<th>OECD and EU</th>
<th>Non-OECD</th>
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</thead>
<tbody>
<tr>
<td>2005</td>
<td>9.8</td>
<td>8.8</td>
<td>8.8</td>
<td>8.5</td>
</tr>
<tr>
<td>2008</td>
<td>8.3</td>
<td>8.3</td>
<td>8.2</td>
<td>8.5</td>
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<tr>
<td>2010</td>
<td>8.4</td>
<td>8.1</td>
<td>7.8</td>
<td>8.4</td>
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<td>2012</td>
<td>8</td>
<td>7.8</td>
<td>7.6</td>
<td>8.2</td>
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<tr>
<td>2014</td>
<td>6.9</td>
<td>7.6</td>
<td>7.4</td>
<td>8</td>
</tr>
<tr>
<td>2016</td>
<td>6.2</td>
<td>7.4</td>
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</tbody>
</table>
## Ukraine vs. Global fuel economy developments

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>OECD &amp; EU average</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>average FE (Lge/100 km)</td>
<td>8.8</td>
<td>8.2</td>
<td>7.8</td>
<td>7.6</td>
<td>7.4</td>
<td>7.3</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>annual improvement rate (% per year)</td>
<td>-2.3%</td>
<td>-2.8%</td>
<td>-1.6%</td>
<td>-1.3%</td>
<td>-0.5%</td>
<td>-1.8%</td>
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<tr>
<td><strong>Non-OECD average</strong></td>
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<tr>
<td>average FE (Lge/100 km)</td>
<td>8.5</td>
<td>8.5</td>
<td>8.4</td>
<td>8.2</td>
<td>8.1</td>
<td>8</td>
<td>7.9</td>
<td></td>
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<tr>
<td>annual improvement rate (% per year)</td>
<td>-0.1%</td>
<td>-0.3%</td>
<td>-1.4%</td>
<td>-1.2%</td>
<td>-1.6%</td>
<td>-0.8%</td>
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<tr>
<td><strong>Global average</strong></td>
<td></td>
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<tr>
<td>average FE (Lge/100 km)</td>
<td>8.8</td>
<td>8.3</td>
<td>8.1</td>
<td>7.8</td>
<td>7.6</td>
<td>7.6</td>
<td>4.4</td>
<td></td>
</tr>
<tr>
<td>annual improvement rate (% per year)</td>
<td>-1.8%</td>
<td>-1.6%</td>
<td>-1.3%</td>
<td>-1.3%</td>
<td>-1.1%</td>
<td>-0.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ukraine</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>average FE (Lge/100 km)</td>
<td>9.8</td>
<td>8.3</td>
<td>8.4</td>
<td>8</td>
<td>6.9</td>
<td>6.2</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>annual improvement rate (% per year)</td>
<td>-15.0%</td>
<td>1.2%</td>
<td>-4.5%</td>
<td>-14.5%</td>
<td>-8.8%</td>
<td>-3.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GFEI target</strong></td>
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<td></td>
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<tr>
<td>required annual improvement rate (% per year)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-2.80%</td>
</tr>
<tr>
<td>annual improvement rate (% per year)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>-3.7</td>
</tr>
</tbody>
</table>
Ukraine on GFEI`s global map

Source: GLOBAL FUEL ECONOMY - AN UPDATE FOR COP23
FEPlt – fuel economy projection modeling

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Average fuel economy</th>
<th>Var% base year</th>
<th>Average CO2 emissions per km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base year (2016)</td>
<td>6.38</td>
<td>-23.6%</td>
<td>153.2</td>
</tr>
<tr>
<td>Projection year - Fuel economy Target (2025)</td>
<td>4.88</td>
<td>-34.7%</td>
<td>117.1</td>
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<tr>
<td>Projection year - Other Fuel economy policies (2025)</td>
<td>5.51</td>
<td>-13.7%</td>
<td>132.2</td>
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<tr>
<td>Projection year - combined policy scenario (2025)</td>
<td>4.17</td>
<td>-0.5%</td>
<td>100.1</td>
</tr>
<tr>
<td>Projection year - Baseline trend (2025)</td>
<td>6.35</td>
<td>-0.5%</td>
<td>152.4</td>
</tr>
</tbody>
</table>

Graphs showing fuel economy and CO2 emissions trends for different scenarios.
Informational support for GFEI in Ukraine

https://www.facebook.com/GFEIUKRAINE

http://www.standardacademy.org

http://www.fueleconomy.in.ua
Information support for GFEI in Ukraine

**Identified problem:** Many FE sources create perplexity.

**Solution:** Standardization - creation of a uniform database.

**Potential benefits for GFEI:**
- Speed up of national baseline developments for the new members of GFEI
- Uniform database will provide more data accuracy for users
- Flexibility for upgrading the database based on a new FE information

http://www.fueleconomy.in.ua
Recommendations for FE Policy development

1) Informational measures:
   a) Establishing a unified central vehicle registration database which should contain overall fleet information regarding vehicles’ engine power, transmission type, axle configuration, fuel efficiency and CO₂ emission data, including any other informational provision required for vehicle labelling and taxation systems;
   b) Vehicle fuel economy labeling system;
   c) The national informational campaign in support for the fuel and energy efficiency in the transport sector;
   d) Voluntary eco-driving programmes for different categories of existing drivers and obligatory for driving school programs and new drivers.

2) Fiscal measures to encourage the purchase of more fuel-efficient vehicles:
   a) Progressive CO₂-based LDV registration tax;
   b) CO₂-based LDV ownership tax (on annual basis);
   c) Fiscal incentives for owners of “zero” emission vehicles.

3) Technical regulation measures:
   a) Implementation of the EU Fuel Economy Directive and accompanying measures;
   b) Launching of the fuel quality monitoring system;
   c) Launching of mandatory technical inspection system for LDVs.
Thank you

Looking forward to fruitful cooperation for a cleaner future

Oleg Tsilvikh

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