Russian NGV market development

Vasiliy Zinin
## INFLUENCE ON FUEL TECHNOLOGIES DEVELOPMENT

<table>
<thead>
<tr>
<th>Fuel Technology</th>
<th>Drivers</th>
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</thead>
<tbody>
<tr>
<td>Increased efficiency of the engine and transition to Euro-6</td>
<td>High oil prices</td>
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<tr>
<td>CNG and LNG</td>
<td>Limited oil resources</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>Ecology</td>
</tr>
<tr>
<td>E-vehicles</td>
<td>Accessibility</td>
</tr>
<tr>
<td>Biofuel</td>
<td>Technology replication</td>
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</table>

- **High oil prices**
- **Limited oil resources**
- **Ecology**
- **Accessibility**
- **Technology replication**
Compressed Natural Gas (CNG)

Greenhouse gas emissions by the production of gasoline 4 times more, than for the life-cycle of CNG

Gasoline

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AIR POLLUTANT EMISSIONS FROM VARIOUS FORMS OF TRANSPORT

CO2 emissions
(Volkswagen Golf with variable speed drives as an example)

- Gasoline engine: 167 g/km
- Hybrid engine: 146 g/km
- Gas engine (propane-butane): 136 g/km
- Gas engine (methane): 127 g/km
- Electric motor: 88 g/km
- Fuel cells (Hydrogen from water by Electrolyze): 276 g/km
- Fuel cells (Hydrogen from natural gas): 110 g/km

* The problem of accumulators utilization

Source: Volkswagen Group

Source: the Flemish Institute of Technological Research
Natural gas increases efficiency of hydrogen technology
There are pricing incentives for consumers and producers to enter Russian NGV market.
REQUIREMENTS FOR GAS FILLING INFRASTRUCTURE IN THE RUSSIAN FEDERATION

Expected additional investments in creating minimum infrastructure: 3,4 BLN USD

Network – to solve the problem of covering areas (city, region) when access to refueling for any customer

Trunk – to solve the problem of covering the main highways

Point – to create infrastructure for client’s needs within a specific asset (depot, port, quarry, etc.)
REGIONAL PRIORITIES FOR NGV MARKET DEVELOPMENT

2 PILOT REGIONS
1. Krasnodar Region
2. Volgograd Region
3. Saint Petersburg
4. Saint Petersburg Region
5. Moscow
6. Moscow Region
7. Samara Region
8. Nizhny Novgorod Region
9. Bashkortostan
10. Omsk Region
11. Tomsk Region
12. Novosibirsk Region
13. Altay Region
14. Perm Region
15. Sverdlovsk Region

15 MOST ACTIVE REGIONS

6 HIGHWAY PROJECTS
1. M-10 «Russia»
2. M-11 «Moscow – Saint Petersburg»
3. M-4 «Don»
4. M-1 «Belarus»
5. M-7 «Volga»
6. MTM «Europe – Western China»

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CURRENT PRODUCTION AND DISTRIBUTION INFRASTRUCTURE OF GAZPROM GAS-ENGINE FUEL

Gas-filling stations in Russia

405 → 294 (73%)

Assets owned by Gazprom PJSC

CNG NETWORK

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ENGINE FUEL MARKET IN RUSSIA

Consumption of motor fuels by vehicles in Russia*, %

- **CNG**
  - Light motor vehicles; 49.9%
  - Commercial transport;
  - Light-duty trucks;
  - Municipal vehicles.

- **LNG**
  - Light motor vehicles;
  - Long-distance haul motor transport;
  - Railway transport;
  - Water transport;
  - Quarry vehicles;
  - Agricultural vehicles.

2018

- **Gas**
  - 47.3%
- **Diesel**
  - 2.1%
- **LPG**
  - 0.7%
- **CNG**
  - 22.7%

* According to Avtostat analytical agency

**Light motor vehicles** – 29.9 million tons (46.7%)
- Trucks and specialized vehicles – 21.6 million tons (33.7%)
- Light commercial vehicles – 9.3 million tons of fuel (14.5%)
- Buses – 3.1 million tons (4.8%)
- Motorcycles – 0.1 million tons (0.3%)
GROWTH OF NATURAL GAS VEHICLES FLEET

**FLEET EXPANSION OF GAS-ENGINE FUEL VEHICLES IN RUSSIA**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number (Units)</th>
</tr>
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<tbody>
<tr>
<td>2014</td>
<td>131,000</td>
</tr>
<tr>
<td>2019*</td>
<td>163,000</td>
</tr>
</tbody>
</table>

The number of gas-engine fuel powered vehicles sold within the framework of the federal grants allocation in 2014–2017

Number of gas-engine fuel vehicles sold by Russian motor manufacturers in 2014–2017: 14,079

The number of gas-engine fuel powered vehicles sold within the framework of the Ministry of Industry and Trade of Russia’s program in 2014–2017: 8,811

Number of equipment purchased by Gazprom within the framework of its own program in 2014–2017: 5,586

In order to achieve the self-sustainability effect at the gas-engine fuel market, the annual gas-engine fuel vehicles fleet growth should be **50,000** units.

*expected
GOVERNMENTAL PROGRAM FOR NGV MARKET DEVELOPMENT

INCREASE IN SUBSIDIES

<table>
<thead>
<tr>
<th>Year</th>
<th>3,5 BILLION RUB.</th>
<th>10 BILLION RUB.</th>
<th>10 BILLION RUB.</th>
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<tbody>
<tr>
<td>2019</td>
<td>50 Mn USD</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2020</td>
<td>150 Mn USD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>150 Mn USD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>150 Mn USD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td>150 Mn USD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td>150 Mn USD</td>
<td></td>
<td></td>
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</tbody>
</table>

- 20-25 Regions are to be chosen
- 30% of CAPEX for filling stations
- 30% of Retrofit cost

Rule-making
Standardization
Popularization
Expertise
Communication
Monitoring

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Thank you for your attention!

Natural Gas Vehicles Association

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