



# **GAS ENGINE LOCOMOTIVES OF THE RUSSIAN RAILWAY**



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# CHRONOLOGY OF THE GAS-PISTON MAIN GAS TURBINE LOCOMOTIVE ГТ1h-002

## 2015 – 2017 y.y.



**On November 11, 2015** – the beginning of under control operation of the Gt1h-002 gas turbine locomotive on a site the Equipment room – Egorshino – Serov-Sortirovochny SwRW



**On May 23, 2016** – experimental trip Gt1h-002 with train No. 9759 weighing 8445 tons , 400 осейно to a site Surgut – Voynovka Svzhddlinoy of 696 km



**On October 13, 2016** – MVK meeting by results of end of a cycle of tests Gt1h-002 in JSC VNIKTI Kolomna

**December 15, 2016** – LTZ is received the CERTIFICATE OF CONFORMITY on Gt1h-002, granting the right of serial release of these locomotives



**On February 14, 2017** – the Act No. 001 of final acceptance of the main Gt1h-002 gas turbine locomotive by operational locomotive depot of Egorshino of Sverdlovsk management of draft is issued.

# THE MAIN GAS TURBINE LOCOMOTIVES WORKING AT LNG

**ГТ1h-001**



**Technical characteristics**

|  |             |
|--|-------------|
| <b>Power, kWt</b>                          | <b>8300</b> |
| <b>Quantity of traction axes</b>           | <b>12</b>   |
| <b>Force of draft of the long mode, kN</b> | <b>630</b>  |
| <b>Reserve of fuel, tons</b>               | <b>17</b>   |
| <b>Course stock without refueling, km</b>  | <b>700</b>  |

**ГТ1h-002**



**Technical characteristics**

|  |             |
|--|-------------|
| <b>Power, kWt</b>                          | <b>8500</b> |
| <b>Quantity of traction axes</b>           | <b>16</b>   |
| <b>Force of draft of the long mode, kN</b> | <b>700</b>  |
| <b>Reserve of fuel, tons</b>               | <b>20</b>   |
| <b>Course stock without refueling, km</b>  | <b>700</b>  |



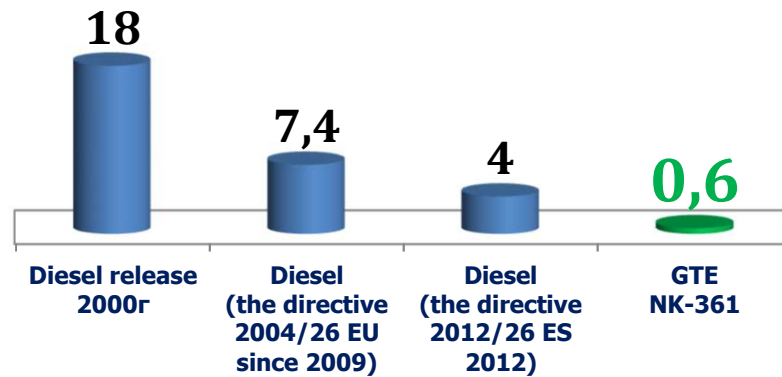
# THE MAIN GAS TURBINE LOCOMOTIVES WORKING AT LNG

## ECOLOGICAL CHARACTERISTICS

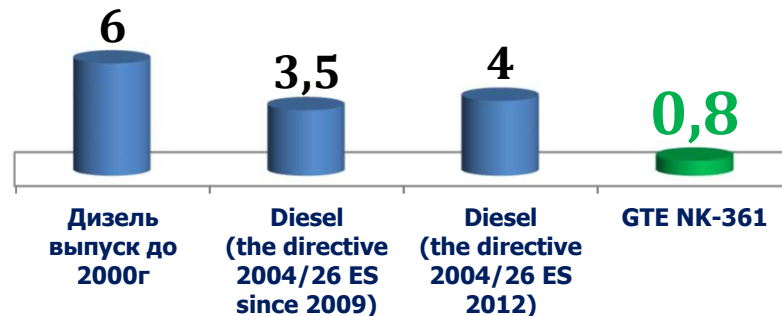


Level of harmful emissions when using Gt1h in 5 times are lower than standard requirements for diesel engines, the level of external noise conforms to standard requirements

Emissions NO<sub>x</sub>, g/kWt\*h

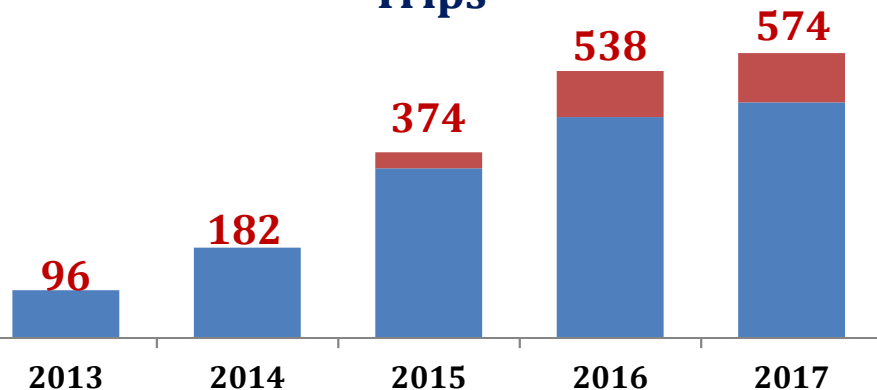


Emissions CO, g/kWt\*h

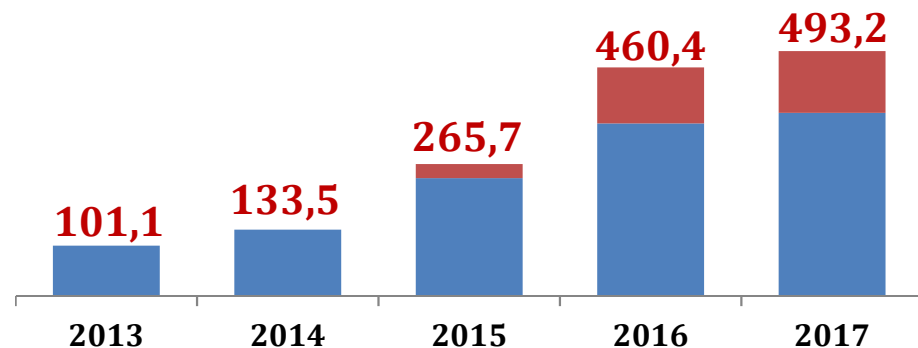


# THE MAIN RESULTS OF OPERATION OF GAS TURBINE LOCOMOTIVES ON SVZHD FOR 2013 - 2017 y.y.

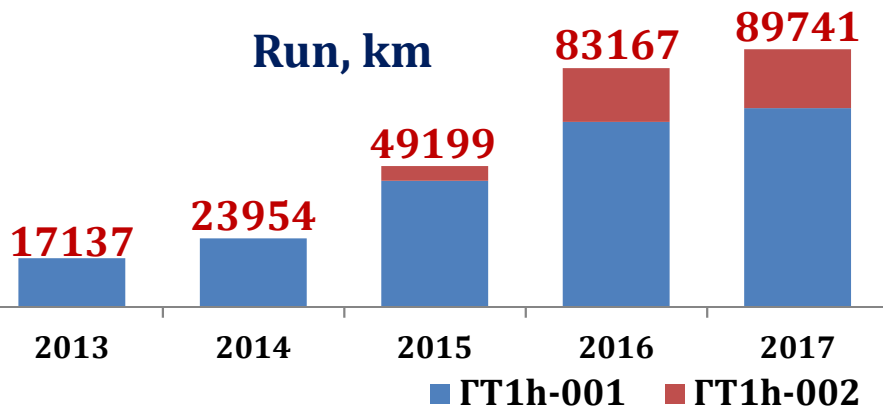
## Trips



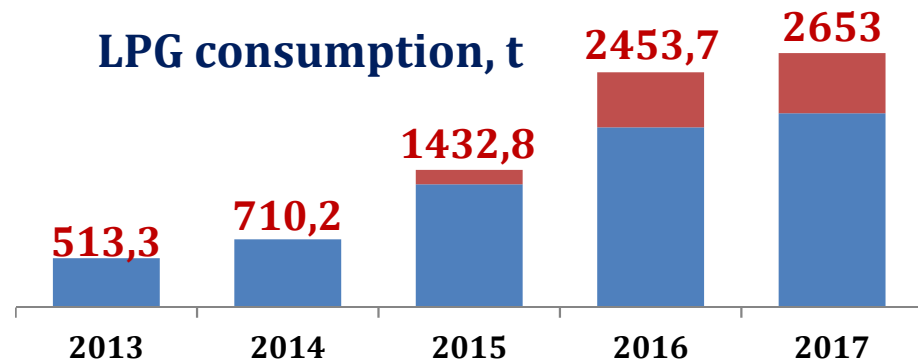
## Work of one mln. tkm gross



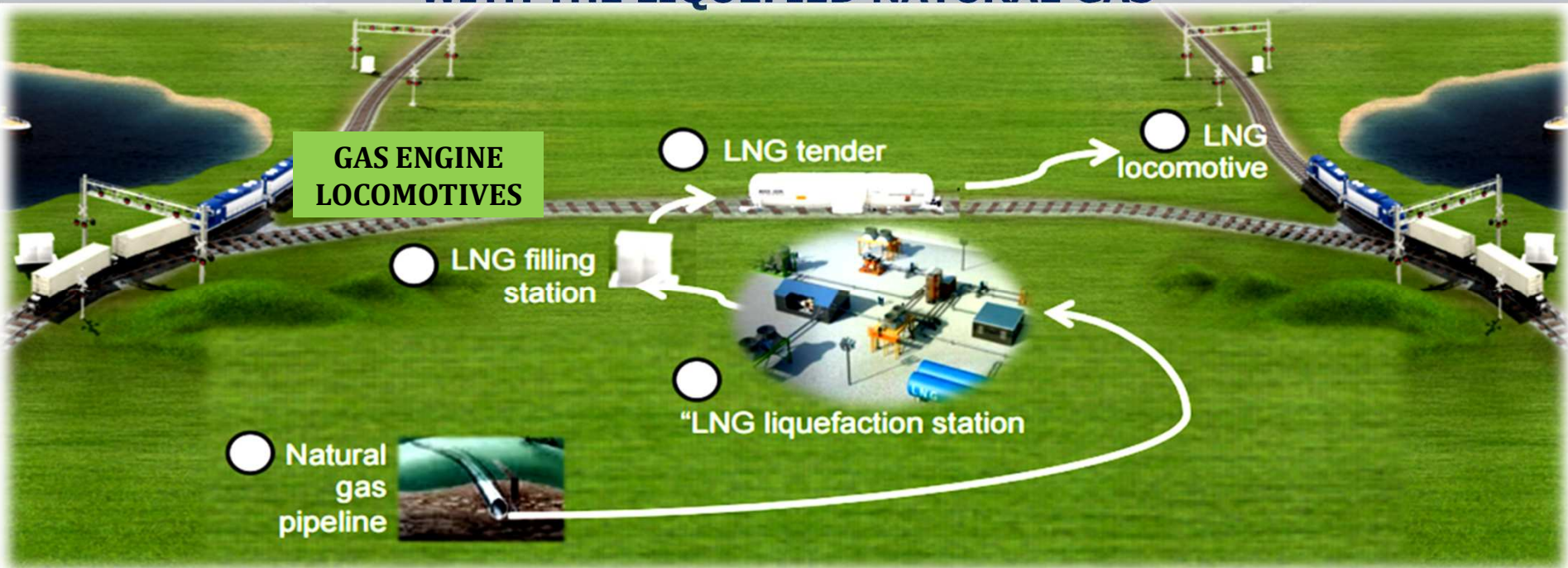
## Run, km



## LPG consumption, t



# NECESSARY INFRASTRUCTURE OF PROVIDING GAS ENGINE LOCOMOTIVES WITH THE LIQUEFIED NATURAL GAS



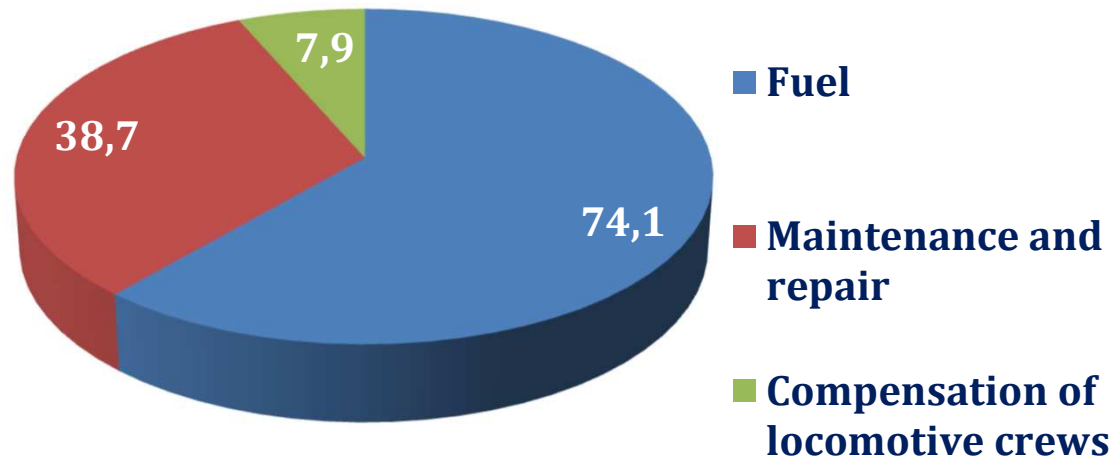
- COMPLEXES ON LNG PRODUCTION (LNG KP)
- POINTS of EQUIPMENT of LNG (PE LNG) of gas engine locomotives (GML)
- LNG DELIVERY SYSTEMS from the producer to the consume



# COMPARATIVE ECONOMIC INDICATORS OF THE GAS TURBINE LOCOMOTIVE Gt1h-002 IN COMPARISON WITH THE LOCOMOTIVE 3TE116U ON THE SITE SURGUT-VOYNOVKA

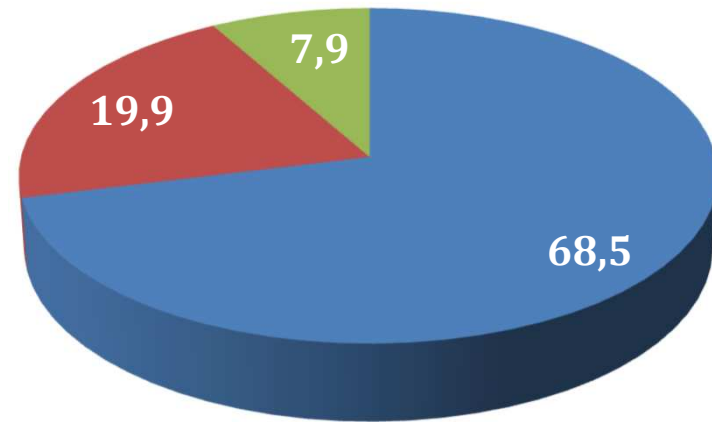
## 3TE116U

**ANNUAL CHARGES – 120,6 million rubles  
(1,773 million euros).**



## GT1h-002

**ANNUAL CHARGES – 96,3 million rubles  
(1,416 million euros)**



**ECONOMY of ANNUAL CHARGES ON TRANSPORTATIONS – 24,4 million rubles (0,359 million euros)**





# THE MAIN RESULTS OF TRIAL OPERATION OF TEM19-001 ON SVZHD IN 2014 – 7 MONTHS 2017. ON 31.07.2017



| ТЭМ19-001                      | Indicator      | 2014   | 2015    | 2016    | 7 mon.<br>2017 г. | TOTAL<br>2015-2017 |
|--------------------------------|----------------|--------|---------|---------|-------------------|--------------------|
| It is fulfilled changes        | Change         | 38     | 164     | 350     | 195               | <b>747</b>         |
| It is fulfilled hours          | hour           | 450,8  | 1967    | 4178    | 2 132             | <b>8 727,8</b>     |
| Run                            | iok.-km        | 2415   | 11678   | 14502   | 7 528             | <b>36 123</b>      |
| It is processed cars           | cars           | 6444   | 28138   | 70117   | 36 561            | <b>141 260</b>     |
| The mass of the processed cars | T gross        | 279667 | 1235561 | 3148416 | 1 698 441         | <b>6 362 851</b>   |
| LNG consumption                | т              | 23,180 | 51,034  | 89,345  | 48,4              | <b>211,9</b>       |
| Specific fuel consumption      | kg/100 iok.-km | 959,8  | 438,0   | 616,1   | 580,8             | <b>648,7</b>       |

**THANK YOU FOR ATTENTION**

